



INDUSTRIAL · CS-700

TURNAROUND TO ZERO

A docking and replenishment station that lets a working fleet return, recharge and redeploy without a hand touching it.

APPROACH · CAPTURE · SWAP/CHARGE · REFILL · LAUNCH

PATENT PENDING

CIVIL GROUND INFRASTRUCTURE — RADIO & GNSS PERMITTED ON THIS LINE

CARRIER SUPPORT ONLY — NO MUNITIONS HANDLING, EVER (D19)

U→1

UTILISATION APPROACHES ONE AS
TURNAROUND APPROACHES ZERO

1

GENERIC DOCK INTERFACE,
REUSED ACROSS THE WHOLE
INDUSTRIAL LINE

3

STATED ENERGY-REPLENISHMENT
OPTIONS UNDER TRADE — NO
WINNER DECLARED

0

MUNITIONS, WARHEADS OR
TERMINAL-EFFECT CONTENT
HANDLED, EVER (D19)

OVERVIEW

THE HINGE THAT MAKES AN AUTONOMOUS FLEET ACTUALLY AUTONOMOUS.

Part of the **6-system Industrial line** — shares its envelope and doctrine with Relay Chain, Fibre Spool Line, Seeder.

U→1 UTILISATION APPROACHES ONE AS TURNAROUND APPROACHES ZERO	1 GENERIC DOCK INTERFACE, REUSED ACROSS THE WHOLE INDUSTRIAL LINE	3 STATED ENERGY-REPLENISHMENT OPTIONS UNDER TRADE — NO WINNER DECLARED	0 MUNITIONS, WARHEADS OR TERMINAL-EFFECT CONTENT HANDLED, EVER (D19)
--	---	--	--

The Self-Charging Dock is Industrial-line ground infrastructure — not a vehicle, not an airframe, a fixed station a working platform returns to. A machine approaches, is captured and seated, has its battery and payload replenished, and launches again — largely unattended, cycle after cycle, for most of an operator's working day.

It exists because of one arithmetic fact stated plainly by the line's own engineering: a working machine's day is fly, return, refill, fly again — and when working sorties are short, as heavy-payload sorties usually are, the machine spends its day on the ground unless the ground is fast. Utilisation is flight time divided by flight time plus turnaround; as turnaround falls toward zero, utilisation rises toward one, regardless of how long any single sortie runs. That is the number the dock is built to move, and it is why Canadian Shield calls the dock the Industrial line's commercial hinge rather than one more platform on the roster.

It does not fly, spray, seed or lift. It is the piece of infrastructure that lets everything on the roster that does those things do them for an entire shift instead of a few sorties — serving the Seeder, the Sprayer and Spot Sprayer, the Cargo Mover ladder, and the rest of the Industrial series as each platform's own dock interface matures.

THE GOVERNING INSIGHT

TURNAROUND, NOT FLIGHT TIME, CAPS THE DAY.

Ten more minutes of flight is the wrong lever if the machine then sits on a tailgate for twenty. The dock is the answer to the actual bottleneck: it does not make any airframe fly longer — it makes the ground stop being the slow part.

HOW IT WORKS

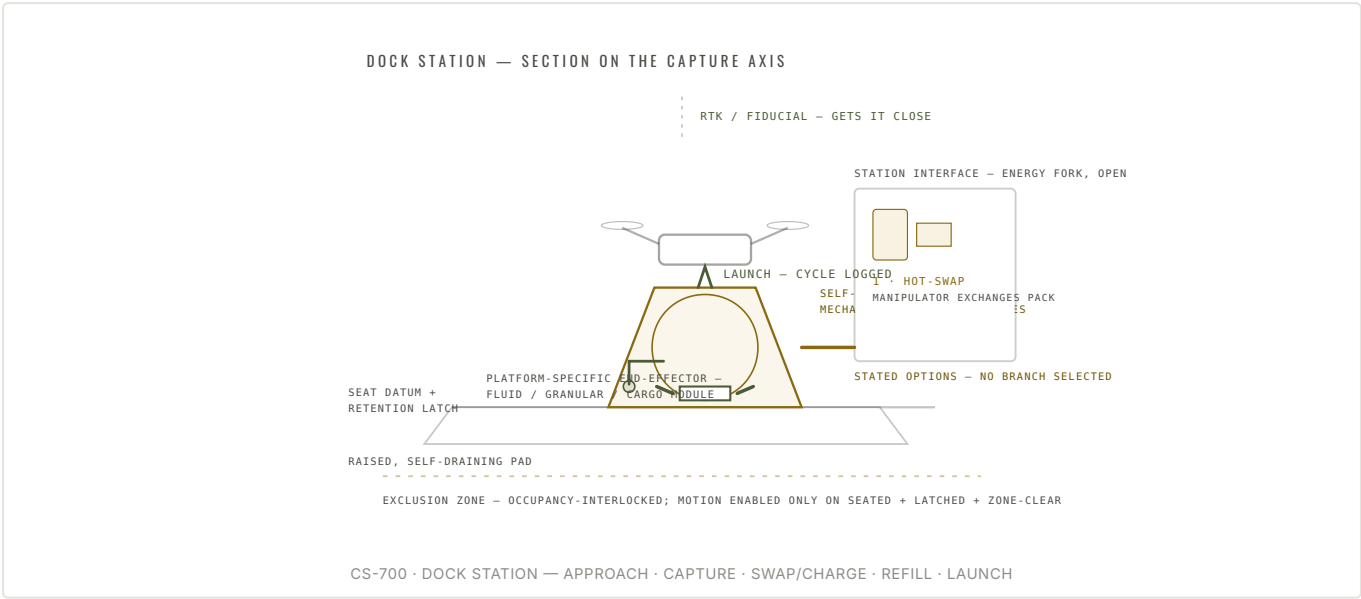
MECHANISM

APPROACH GETS YOU CLOSE. THE FUNNEL FINISHES THE JOB.

Finding and seating a machine on the dock, repeatably, in Canadian weather, is a layered problem. Approach guidance — RTK GNSS or an optical fiducial marker on the pad — gets a descending machine close. From there, a mechanical self-centring funnel does the last centimetres: passive, powerless, and — deliberately — the committed authority for final capture. A cone sized for the smallest platform on the line does not seat the largest, so funnel geometry is scaled to the biggest served tier, not the average one.

Once seated, a retention latch fires — an interlock input, not a convenience, because nothing else on the dock is permitted to move until it reads true. From there the machine is serviced through one generic station interface: mechanical index, power, data and, where fitted, a fluid or granular manifold. Energy replenishment is where the design deliberately keeps three doors open at once — the dock does not force a winner between hot-swap, fast-charge and contact/inductive charging, because the discriminator is a duty-cycle model, not a preference.

Everything downstream of the latch — manipulator motion, fluid lines, chemistry fills — is guarded and hardwired: motion is enabled only when the machine is seated, latched, and the exclusion zone reads clear, independent of whatever is running the day's schedule.



1 · APPROACH RTK GNSS or an optical fiducial guides the machine close.	2 · CAPTURE The self-centring funnel absorbs the remaining error and seats it.	3 · SWAP/CHARGE The open energy fork — hot-swap, fast-charge or inductive.	4 · REFILL A platform-specific end-effector tops battery and payload alike.	5 · LAUNCH The latch releases; the cycle is logged; the pad clears for the next.
--	--	--	---	--

THE CENTRAL OPEN FORK

THREE WAYS TO PUT ENERGY BACK IN. NO WINNER DECLARED.

The drawing package is explicit: the energy-replenishment method is the package's central trade, and no branch is selected. All three are stated as the design's options, each with a real cost the others do not carry.

1 · ROBOTIC HOT-SWAP

TURNAROUND BOUND BY MECHANICS

A guarded manipulator exchanges a depleted pack for a charged one from a heated magazine. Turnaround is bounded by mechanics, not chemistry — but it only works if every Industrial airframe carries the same pack interface: mechanical envelope and latch, electrical connector, one fleet-wide standard, not a part.

2 · FAST-CHARGE IN SITU

TURNAROUND BOUND BY CHEMISTRY

The seated machine charges where it sits — no manipulator, no swap mechanism. Turnaround is bounded by charge rate and thermally limited, and fast-charge demands short, high power peaks that a rural single-phase site service may not have on tap.

3 · CONTACT / INDUCTIVE

TOLERANT, BUT STILL CHARGE-BOUND

Contact plates or inductive coupling forgive the residual misalignment the funnel would otherwise need to correct for. Inductive transfer is lossy — efficiency is still to be characterised, and the waste heat is real — and the branch remains charge-rate-bound like fast-charge.

A mixed fleet is on the table too — hot-swap at flagship docks, fast-charge at lighter satellite pads — but that is a trade study, not a decision made on this page. Selection follows the duty-cycle model in Specifications below, not a preference stated here.

SPECIFICATIONS

CAPABILITIES & SPECIFICATIONS

SELF CHARGING DOCK CS-700

DESIGNATION & ROLE

Designation	CS-700 · Self-Charging Dock
Role	Turnaround-to-zero ground station — self-charging & self-loading dock
Served platforms	Seeder (CS-510) · Sprayer / Spot Sprayer (CS-560/561) · Cargo Mover (CS-600, all tiers) · rest of the line as each platform's own dock interface matures

CAPTURE & ALIGNMENT

Approach guidance	RTK GNSS or optical fiducial marker — gets a machine close
Final capture	Mechanical self-centring funnel — passive, powerless, the committed last-centimetres authority
Funnel sizing	Scaled to the largest served tier, not the average one
Retention	Latch fires on seat; reads as an interlock input — nothing else on the dock moves until it's true

ENERGY REPLENISHMENT

Method	Stated open fork: (1) robotic battery hot-swap (2) fast-charge in situ (3) contact-plate / inductive charging
Discriminator	The duty-cycle model in the drawing package — no branch is selected on this page
Common pack standard	A fleet-wide battery-pack interface — mechanical envelope, latch, electrical connector — is the prerequisite for the hot-swap branch

PAYLOAD & SERVICE INTERFACE

Interface	One generic station interface — mechanical index, power, data, and fluid/granular where fitted
End-effectors	Platform-specific: liquid skid for Sprayer/Spot Sprayer, granular hopper/chute for Seeder, cargo-module shuttle for Cargo Mover off its own keel-plate standard
Design rule	A new platform family means a new end-effector, never a new dock
Cross-contamination control	Dedicated fill circuits per chemistry class, or a validated rinse/purge cycle between fills; a per-fill chemistry log is kept on every branch

SITE & STRUCTURE

Pad footprint	Raised, self-draining pad sized to the largest served tier plus manipulator reach — a sizing output, not a published figure
Exclusion zone	Occupancy-interlocked perimeter sized to failure-drift cases, not rotor radius alone; detection means (fence / scanner / mat) under evaluation
Weather & cold-soak	Heated battery magazine for cold-soak; pad-heating and funnel-liner strategy for snow, ice and mud under evaluation; enclosure format (open pad / canopy / full shelter) an open fork
Site power	Grid, generator, or solar-plus-storage — open per site; peak-demand shape differs by which energy-fork branch is selected

CONTROL & DATA

Interlock	Hardwired safety chain, independent of the scheduling computer — perimeter e-stop pillars plus remote e-stop; motion enabled only on seated + latched + zone-clear
Data & command	Every dock cycle logged — charge curves, pack serials, fill records
Human-in-the-loop	A Strategic Agent may advise scheduling; a person ratifies every irreversible action
Comms	Radio command-and-control and GNSS approach guidance

COMPLIANCE	
Patent status	Patent pending
Civil line	Ground infrastructure on the surface civil Industrial line — radio and GNSS permitted and used openly
Cargo scope	Services working carriers only — never stores, handles or loads any warhead, fuzing, energetic or terminal-effect content, in any variant, ever (D19)
Standing	Nothing on this page is a specification, offer, commitment or price

SOURCE: DRAWING PACKAGE CSH-DWG-DOCK-001 R0.2 · DIMENSIONS PUBLISH WHEN THE SIZING MODEL CLOSES.

TURNAROUND — THE GOVERNING ARITHMETIC

$$U = T_{\text{FLY}} \div (T_{\text{FLY}} + T_{\text{TURN}})$$

We do not publish a minutes-to-turnaround figure, because on this dock that number is not a property of the dock alone — it is the output of a duty-cycle model whose inputs are still being gathered, sortie by sortie, branch by branch. What we will state is the shape of the answer: as turnaround approaches zero, utilisation approaches one, for any flight time at all. As turnaround grows past flight time, utilisation falls below one-half and keeps falling — and at that point, adding aircraft rather than speeding the dock becomes the only fix, at real fleet capital cost.

- ✓ Sortie length & work rate per platform
- ✓ Energy-fork branch — swap or charge rate
- ✓ Refill time — battery, fluid, granular or cargo
- ✓ Fleet queue wait at the hold points
- ✓ Seasonal cold-soak & weather-enclosure load
- ✓ Site power service — peak vs. average

THE TRADES, STATED

THE LINE'S COMMERCIAL HINGE, BUILT ON THE SAME SHOP FLOOR.

Canadian Shield's house thesis is that manufacturing is the decisive capability, and that a fleet is bought for daily output, not for any single machine's spec sheet. The dock is where that thesis becomes an economic argument: precision capture plus energy and payload replenishment, pushing fleet utilisation toward one.

The overlap with the rest of the line is structural, not incidental. The guarded manipulator, the hardwired interlock chain and the control cabinet draw on the same machinery-safety engineering as the rest of the estate's ground and industrial equipment; the generic station interface is deliberately one standard reused across every served platform, so a new Industrial-line member costs a new end-effector, never a new dock. And the dock is the reason a common battery-pack standard across the families is a design driver rather than an afterthought — the hot-swap branch cannot exist without it.

Up here, the estate's radio boundary runs the permissive way. The no-radio rule governs the defence, underground and tethered platforms without exception — but the Industrial line is the surface civil exception, and the dock uses both radio and GNSS openly: commercial RF for command and telemetry, and RTK GNSS as one layer of the approach-guidance stack that gets a returning machine close enough for the funnel to finish the job. A farm yard is not a jammed battlefield, and the dock is not priced or engineered like one.

DEPLOYMENT

SET THE PAD. LET THE FLEET DO THE REST.

The dock is infrastructure, not a mission profile — its day is a repeated loop, not a sortie. Here is what that loop looks like end to end, from the first pad set to the deliberate moment a person is allowed to walk up to it.

01 · INSTALL

PAD, POWER, PROVEN INTERLOCKS

The dock is sited on a levelled, self-draining pad and commissioned against the site's chosen power branch — grid, generator, or solar-plus-storage. The weather mast goes up, the hardwired interlock chain is proven independently of the scheduling computer, and no aircraft is cleared to approach until the exclusion zone reads clear on demand, every time.

02 · TURNAROUND CYCLE

APPROACH, CAPTURE, REFILL, LAUNCH — ON LOOP

The day's real work happens here, on repeat: a machine on approach guidance is captured by the funnel, seated and latched, its battery and payload replenished through the station interface, then released to launch. Queued machines hold at the fleet's hold points outside the exclusion zone until the pad clears — largely unattended, cycle after cycle.

03 · MAINTAIN

THE DELIBERATE-ENTRY CASE

Scheduled service and wear-liner replacement enter through a declared safe state, not a shortcut: rotors stopped, manipulator parked, packs de-energised, fluid lines depressurised — a lockout/tagout analogue the dock presents before a person crosses the zone. Magazine and fluid or granular stores are restocked on the same visit.

Scenario illustrates the design intent of the operating loop. Turnaround times, swap and charge rates, and queue behavior are exactly what the test program exists to measure — and the duty-cycle model, not this page, sets those numbers when they are ready to publish.

FAMILY CONTEXT

THE FLEET IS THE RAZOR. THE DOCK IS THE PIT STOP.

A Seeder, a Sprayer or a Cargo Mover earns its keep in the air, not parked on a tailgate. The dock is the piece of infrastructure that turns a platform's flight-hour economics into a day-rate economics — one generic interface, reused across the whole roster, so utilisation compounds across the fleet instead of resetting per machine.

THE FAMILY

RELATED SYSTEMS

CS-710 · GROUND INFRASTRUCTURE

RELAY CHAIN

Packable comms-relay nodes — the line's other piece of ground infrastructure.

CS-C001 · CONSUMABLE

FIBRE SPOOL LINE

Guidance-fibre cassettes — the wired backup when radio can be denied.

CS-510 · SERVED PLATFORM

SEEDER

One of the working platforms the dock's generic interface is built to serve.

CS-560 · SERVED PLATFORM

SPRAYER

Liquid-skid end-effector platform on the dock's served roster.

CS-600 · SERVED PLATFORM

CARGO MOVER

The mover ladder — served off the dock's cargo-module shuttle interface.

Self-Charging Dock CS-700: patent-pending, civil ground infrastructure on the Industrial line, where radio and GNSS are permitted. Services working carriers only — no warhead, fuze, energetic or terminal-effect content, in any variant, ever. The energy-replenishment method (battery hot-swap, fast-charge or contact/inductive) remains an open design fork; no branch is selected on this page.



TURNAROUND TO ZERO

SELF CHARGING DOCK · INDUSTRIAL · CS-700

The fleet is the razor. The dock is the pit stop.

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 Self Charging Dock 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.

Self Charging Dock CS-700

Self-Charging Dock CS-700: patent-pending, civil ground infrastructure on the Industrial line, where radio and GNSS are permitted. Services working carriers only — no warhead, fuze, energetic or terminal-effect content, in any variant, ever. The energy-replenishment method (battery hot-swap, fast-charge or contact/inductive) remains an open design fork; no branch is selected on this page.

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