CANADIAN SHIELD
A DIVISION OF SIG | SUSTAINABLE INFRASTRUCTURE GROUP

INDUSTRIAL · CS-530

TOUCH THE WALL.
PULL FROM THE GROUND.

A contact-tolerant aerial platform sets the hook. A ground-anchored winch does the pulling.

PLACE · CLEAR · PULL

PATENT PENDING

RADIO AND GNSS PERMITTED — CIVIL WORK MACHINE

MECHANICAL SCALING ONLY — NO ENERGETIC TOOL, EVER

≥5 KN	30 M	4	0
GROUND-WINCH WORKING PULL — LOAD-LIMITED, GROUND-REACTED	TOP OF THE WORKING FACE ENVELOPE — 5 TO 30 M	TOOL HEADS ON ONE COMMON INTERFACE — HOOK, PICK, RAKE, INSPECTION	ENERGETIC DEVICES ANYWHERE IN THE SYSTEM — EVER

OVERVIEW

THE TRADE IS OLD. THE ROPE IS THE PROBLEM.

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Scaling is the trade of pulling loose rock off a face before it falls on someone — and today it is done by workers on ropes and lift baskets, with a pry bar, under the exact rock they are there to remove.

The Rock Scaler is Canadian Shield's answer: a caged, contact-tolerant aerial work platform paired with a ground-anchored winch station. The aircraft flies the tool to the wall and braces against it on thrust-preloaded standoff legs; the winch, safely anchored on the ground, delivers every large force through a load-limited pull line. Where every other aerial platform in the estate is built to avoid touching anything, CS-530 is built to touch the wall — deliberately, repeatedly, and instead of a person.

It sits in the Industrial Series (CS-5xx), the surface civil line, alongside Seeder, Washer, Coater and Dredger — work machines named for the work they do, sharing the fleet's moulded-structure manufacturing base and its consumable-tooling economics. Highwalls above highways, quarry benches, open-pit walls, rock cuts: wherever a face sheds, this machine is bought to stand in for the person on the rope.

THE ARCHITECTURAL READ

A SUPERB POSITIONER — AND A TERRIBLE PRESS.

A multirotor braced on a wall can hold tens of newtons; breaking a keyed slab loose takes thousands. So the design refuses to pretend otherwise: flight does the reaching and placing, the ground winch does the pulling, and the reaction force routes into the anchor — never the airframe. The machine never lifts rock. Gravity is the co-worker.

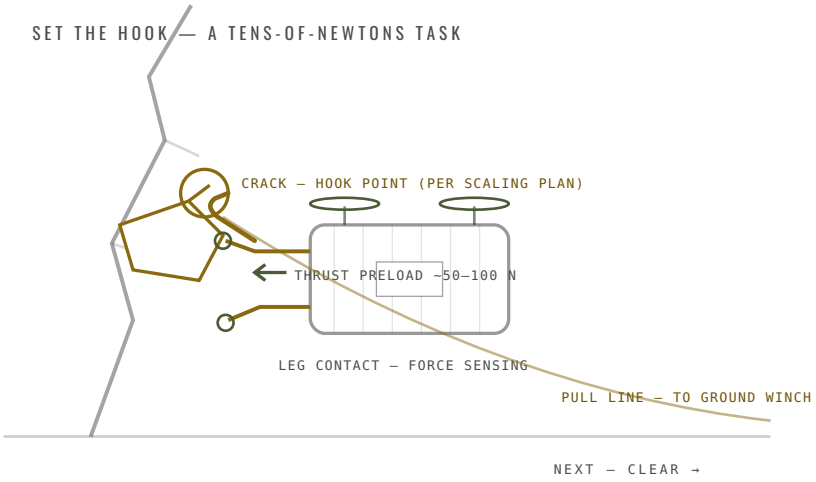
HOW IT WORKS

MECHANISM

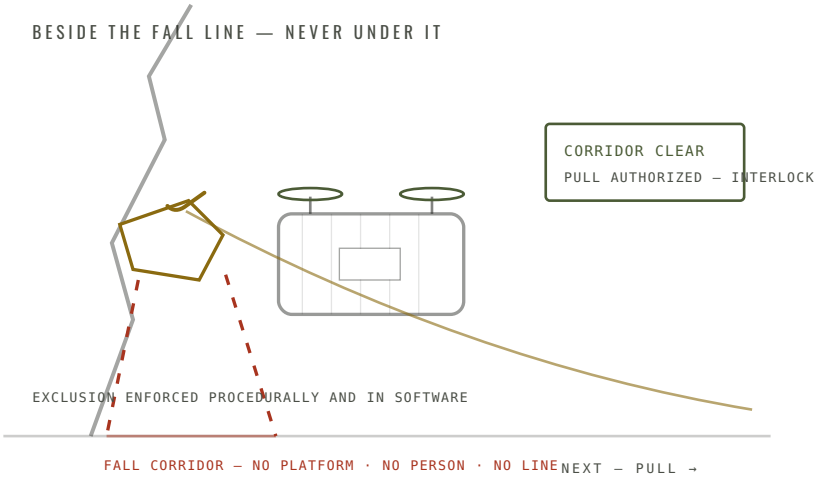
PLACE — FLY THE HOOK TO THE CRACK

Setting a hook is a tens-of-newtons task — exactly what a hovering platform is good at. The aircraft braces on its standoff legs and works the forged hook into the crack or slab edge the scaling plan calls out.

The cage takes the wall strikes and the falling grit; sacrificial panels are consumables by design. Contact legs carry force sensing, so the control loop blends thrust, leg preload and line tension into a steady braced stance beside an irregular face — a sustained contact allocation of ~50–100 N. Which rock gets a hook is never the machine's call: a qualified scaling authority marks the plan, the operator flies it, and the platform executes — it does not judge.



CS-530 · MOVE 01 — FLIGHT DOES THE REACHING AND PLACING



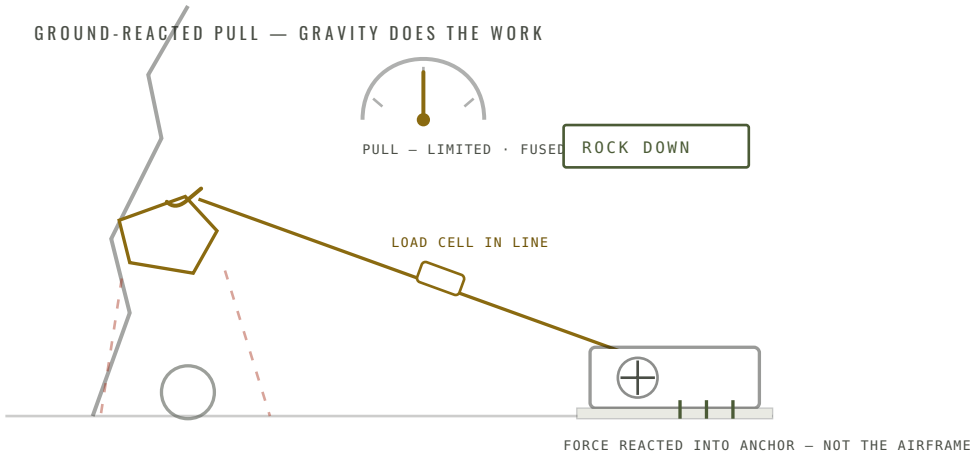
CS-530 · MOVE 02 — THE CORRIDOR EMPTIES BEFORE ANYTHING MOVES

MOVE 03 · PULL

PULL — THE FORCE LIVES ON THE GROUND

On the operator's command — and only then — the ground winch takes up the line. The pull is load-cell limited with a mechanical fuse behind it, and the reaction force routes into the anchor, never the airframe.

This is the split that makes the machine honest. A winch in the ≥5 kN class breaks the slab's bond; gravity brings it down inside the empty corridor; the load trace on the console tells the operator the hook is set, the pull is building, the block has gone. The aircraft, metres to the side, has carried none of it. A quick-release on the pull line fires if tension ever traps the platform — the line is never allowed to become a leash.



CS-530 · MOVE 03 — EVERY LARGE FORCE ROUTES THROUGH THE GROUND

SPECIFICATIONS

CAPABILITIES & SPECIFICATIONS

ROCK SCALER CS-530

DIMENSIONS & MASS

Platform all-up weight	**15–25 kg class**
Configuration	**Caged, contact-tolerant multirotor work platform · ground winch station · pull line and tool heads · operator console outside the fall zone**
Role	**Close-proximity rock-face scaling — highwalls, quarry benches, open-pit walls, rock cuts**

PERFORMANCE

Working face envelope	**5–30 m**
Winch working pull	**≥5 kN class — load-cell limited, mechanical fuse, ground-reacted**
Sustained contact force	**~50–100 N, braced stance**
Block class, hook + winch	**0.3–0.5 m · ~70–340 kg; larger blocks are a qualified-person call, outside scope**
Winch energy	**Full 5 kN × 2 m pull ≈ 10 kJ; a 100-pull day ≈ 0.3 kWh — 2 kW-class drive**
Productivity	**No single figure published — governed by rock condition, wall height, block-size distribution, hook-set success and wind**

POWER, CONTROL & COMMS

Power & endurance	**Work sessions on 50 m-class power-over-tether — endurance is not battery-limited; battery reserved for short repositioning hops**
Navigation & comms	**Radio control, telemetry and GNSS permitted — surface civil line; hard-line comms over the tether primary during pulls**
Control authority	**Every pull individually human-commanded from outside the fall zone; no autonomous tool actuation, ever**
Corridor interlock	**Fall-zone exclusion loaded into the console and interlocked with pull authorization — until the corridor reads clear, the winch will not turn**

TOOL HEADS

Hook / claw — base	**Passive forged hook or cam-claw on the winch line, flown into place — the primary path for slabs and keyed blocks**
Percussive pick	**5–15 J/blow · 15–25 Hz — braced stance only, light chipping and edge trimming; never intact rock**
Scaling rake	**Rigid tined bar dragged across the face, gravity-assisted — clears gravel-to-fist scale between hook cycles**
Inspection head	**Camera and lighting for before/after photogrammetry — face survey and drummy-zone flagging for the qualified person; no removal**
Interface	**One work frame, one common mechanical/power/telemetry interface — heads swapped like blades, wear parts consumable**

MATERIALS & CONSTRUCTION

Load path	**Moulded GF-nylon**
Cage panels	**Sacrificial rPET — consumable by design**
Wear parts	**Forged and machined steel — hooks, tines and tips replaced from stock**
Tooling	**Moulded structure on the group's own 5-axis-cut dies — the manufacturing base the family shares**

SAFETY ARCHITECTURE

Fall corridor	**No platform, no person, no line inside it during any pull — enforced procedurally and in software**
Force routing	**Reaction into the ground anchor, never the airframe — the machine never lifts rock**
Line release	**Quick-release on the pull line if tension ever traps the platform**
Scaling judgment	**Which rock is loose, keyed, or must not be pulled is a qualified scaling authority's regulated call — the machine executes a plan, it does not generate one**

COMPLIANCE	
Patent status	**Patent pending**
Classification	**Civil work machine — Industrial line; commercial radio, telemetry and GNSS permitted on this line**
Energetic content	**None — mechanical scaling only: hook, pry, pick and rake on rock that is already loose; no energetic tool of any kind, ever**
Blasting scope	**Explosive rock-breaking is a separate licensed trade — permanently outside this machine's scope**

CONTACT FORCE IS A BRACED-STANCE ALLOCATION; WINCH ENERGY IS STATED FOR A FULL 5 KN × 2 M PULL. SCALING OUTPUT DEPENDS ON ROCK CONDITION, WALL HEIGHT, BLOCK-SIZE DISTRIBUTION, HOOK-SET SUCCESS ON REAL CRACKS, AND WIND BESIDE THE FACE — ASK WITH YOUR FACE DATA IN HAND AND WE WILL WORK THE ESTIMATE WITH YOU, VARIABLE BY VARIABLE. RPAS OPERATION NEAR WORKERS, OHS AND MINES-ACT ACCEPTANCE, AND LIFTING-EQUIPMENT RULES VARY BY JURISDICTION; PERMITS AND APPROVALS BELONG TO EACH JOB AND ARE NEVER IMPLIED BY THIS PAGE.

THE TRADES, STATED

THE MACHINE IS EXPENDABLE. THE ROPE CREW ISN'T.

Canadian Shield's defence fleet exists to keep people out of harm's way. The Rock Scaler is that same doctrine wearing a hard hat: the most dangerous minutes in the scaling trade are the ones spent hanging under loose rock — so send the machine.

The safety architecture is layered the way the estate always layers it: the person leaves the fall zone first; the force leaves the aircraft second; the judgment stays human always. Deciding which rock is loose, keyed, or must not be pulled remains a qualified geotechnical/scaling authority's regulated call — the machine executes a scaling plan, it does not generate one. And because this is the surface civil line, the platform keeps its radios and its GNSS receivers: ordinary RF control and telemetry are permitted here and stated as a feature, with hard-line comms over the tether primary during pulls.

Underneath it is the same sovereign Canadian manufacturing base as the rest of the fleet: moulded GF-nylon structure on our own 5-axis-cut tooling, deliberately cheap rPET cage panels, and forged tool heads run as consumables — the razor-and-blades economics the family shares, applied to rock. One industrial base, amortised across every line, all of it at home.

THE TRADE, RESTATED

A CAGE PANEL IS A CONSUMABLE. A SCALER ON A ROPE IS NOT.

Relative to a person under the wall, the platform is expendable — that is the product. It wears its strikes as line items: panels, hooks, tines and tips are replaced from stock, and the person who used to absorb that risk runs the console from outside the corridor.

DEPLOYMENT

A SHIFT, WALKED THROUGH.

A rock cut above a two-lane highway; the face has been shedding since the spring melt. Here is how the work goes — from tailgate to sign-off, with nobody under the wall at any point, and illustrative of how the machine is used rather than a job record.

01 · ARRIVE

ANCHOR, CORRIDOR, CONSOLE

The system arrives on one truck and setup is deliberate and short. The winch anchors — vehicle-mount on the truck or ground plate on the bench, set back clear of the face. The fall-zone exclusion is marked out and loaded into the console interlock. Then the platform flies the inspection head over the face; imagery goes to the qualified scaling authority, who marks the plan: these blocks, this order, this one we do not touch.

02 · WORK

PLACE · CLEAR · PULL — REPEAT

The platform goes to the wall on tether power and stays there. Hook cycles run the three moves: set the hook on a marked block, retire beside the corridor, the operator commands the pull and the winch brings it down — the load trace confirms each set, each pull, each release. Between hook cycles the rake head drags the face to shed gravel-to-fist scale fast, and the road under the work stays closed only along the corridor, not the whole cut.

03 · RECOVER

PROVE THE WALL, PACK THE TRUCK

The job ends the way every job in this estate ends — accounted for. A second photogrammetry pass documents the face; before/after imagery and the pull log go to the qualified person for sign-off. Panels, hooks and tips are inspected and replaced from stock — the consumables bin is the maintenance schedule. Line spooled, tether reeled, platform cased: the wall got scaled and no one roped up.

THE FAMILY

RELATED SYSTEMS

Rock Scaler CS-530 · patent pending · a civil rock-face scaling work platform on the surface Industrial line, where radio and GNSS are permitted. Mechanical scaling only — hook, pry, pick and rake on rock that is already loose; no explosive rock-breaking and no energetic tool of any kind, ever. Every pull is human-commanded from outside the fall zone; the judgment of what to pull rests with a qualified scaling authority outside the system boundary. Scaling near workers and public roads is a regulated activity; permits and approvals belong to each job and are never implied by this page.

TOUCH THE WALL.
PULL FROM THE GROUND.

ROCK SCALER · INDUSTRIAL · CS-530

A cage panel is a consumable.
A scaler on a rope is not.

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 Rock Scaler 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.

Rock Scaler CS-530
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