



SMART SWINE



SPM-01

Smart Piglet Monitor

Dual-axis vision for the farrowing crate.

One sealed unit watches the sow and her newborn piglets at once.



One in seven never reaches weaning

U.S. herds wean about 31.7 million piglets a quarter, and the farrowing room still loses roughly \$1.05 billion a year to stillbirth and preweaning mortality, at \$44 of value per weaned piglet. Two failure modes dominate the loss, and both are supervision gaps, not biology.

\$1.05B

annual U.S. farrowing-room loss
(stillbirth + preweaning)

1 in 7

born-alive piglets lost before
weaning (14–15% average)

~3 s

duration of the sternal-to-lateral
roll that crushes piglets

72%

of stillbirths happen during
farrowing — most are preventable

Crushing — about 30% of the loss

80% of crushing deaths happen in the first four days after farrowing, and 68% during one specific event: the sow rolling from sternal to lateral lying. The window is about three seconds long. No stockperson can watch every crate through every one of those windows.

Stillbirth — about 30% of the loss

72% of stillbirths happen during farrowing — the piglet is alive when labor starts and dies waiting. Piglets normally arrive ~15 minutes apart, so a stalled birth is survivable if someone notices in time. But more than half of sows farrow more than two days off their predicted date, so usually nobody is there.

Industry economics from USDA quarterly weaning volumes and published preweaning-mortality literature. Per-piglet value \$44.



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Two axes, one enclosure

Farrowing loss has two causes and they need two different kinds of sight. SPM-01 carries both.

FORWARD

Stereo depth module

Looks along the sow's body. Posture, respiration rate and the sternal-to-lateral roll that causes most crushing deaths.

DOWNWARD

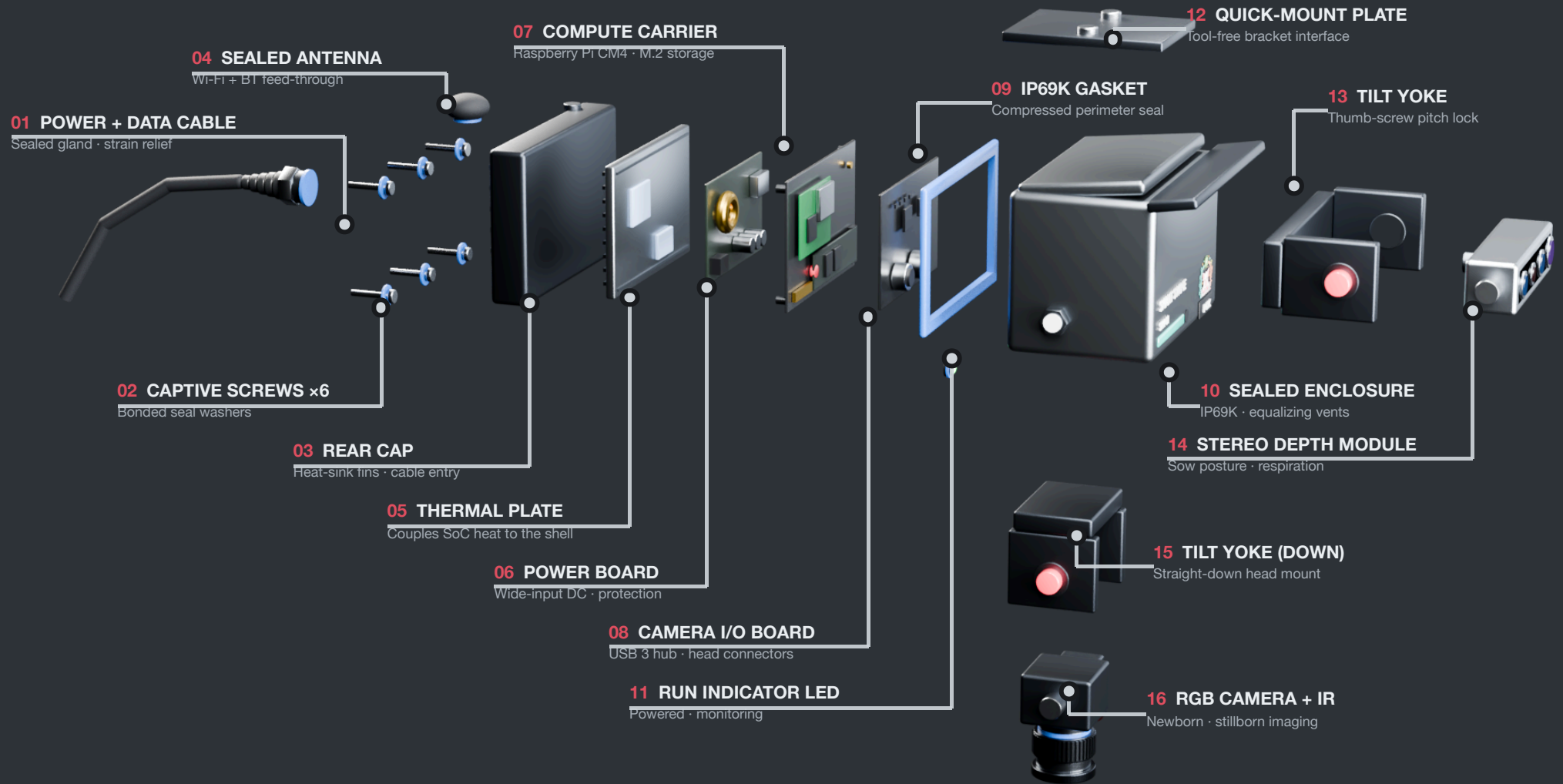
RGB camera + IR illuminator

Looks straight down at the perineal region and the landing zone. Newborn detection and stillborn discrimination need color and membrane texture, which depth cannot give.





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WASHDOWN SURVIVAL — THE #2 CONCERN IN OUR PRODUCER SURVEY (71%)

Built for the washdown

Between batches a farrowing room is emptied and hit with a high-pressure, high-temperature wash — the treatment that kills barn electronics. SPM-01 treats it as a design input: a compressed perimeter gasket, six captive screws on bonded seal washers, membrane pressure-equalizing vents in both walls, a sealed cable gland behind five stages of strain relief, a rain lip over the optics and a self-draining top slope. Or skip the shower entirely — the quick-mount plate takes the unit off in seconds — sealed while it waits out the wash.

IP69K target

Designed to the close-range jet-wash profile of ISO 20653
— certification planned on production tooling

80–100 bar · 80 °C

14–16 L/min jets from 100–150 mm, at 0°, 30°, 60° and
90° — every face is a wash face

Tool-free demount

Off in seconds on wash day — or stay put and take the jet:
it is designed for both



Mounts to the crate itself

Two rubber-lined hooks hang on the crate's own rear rail and one cam lever locks the riser — on or off in seconds, no tools. The unit sits inside the crate envelope above the sow's rump. Sensor and crate share one rigid body, so nothing drifts out of calibration.

One unit
per farrowing crate

Tool-free
quick-release hooks + cam lever

Adjustable
pitch on each head, height on the mount



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One plate, four ways up

Every SPM-01 carries the same quick-mount plate — two bosses, two thumb knobs, no tools. The plate stays the same while the arm changes, so one unit moves between rooms and layouts.



Crate arm

The standard install. J-hooks hang on the crate's rear rail and a cam lever locks the riser.



Rail clamp

No arm at all. Two thumb-screw ring clamps grab a crate rail directly.



Overhead drop

A ceiling tube with a height collar, for pens without a usable rail.



Wall boom

A panel plate and boom arm, for solid-wall farrowing rooms.



EVERY MOUNT, SAME FREEDOM

Both heads tilt to meet the crate

Each optical head rides its own yoke with a thumb-screw pitch lock — aim the depth bar along the sow and the RGB head at the landing zone, whatever the room's geometry. The mount sets the height. The heads set the view. No tools on either.



Sealed, but never cut off

A washdown-rated metal shell is also a Faraday cage. So every signal path got the same treatment as every water path: engineered, then sealed.

THROUGH THE WALL

Sealed Wi-Fi + Bluetooth antenna

The radio's antenna lives outside the shell — steel base, compression O-ring, TPE dome — sealed like every other penetration. Wi-Fi carries alerts and data over the barn network. Bluetooth handles crate-side setup.

ALERTS THAT TRAVEL

The barn calls you

Crushing-risk postures and stalled farrowings are inferred on the unit in ~0.2 s per frame and relayed through the farm network to the herd team's phones — wherever the team happens to be.

LOCAL-FIRST

On-board M.2 storage

Every recording lands on the M.2 drive first. A network outage costs nothing, and footage stays on the farm until you decide otherwise.



Wi-Fi + BT

Sealed through-wall antenna feed

~0.2 s

Edge inference per frame, on the unit

M.2

On-board recording, local-first



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Your barn, in your pocket

Every SPM-01 streams into the Smart Swine app — our own, built for the farrowing room.

LIVE VIEW

Watch any crate in real time

Open the app and the sensor's video is live on your phone — from the office, the house or the road. An alert takes you straight to the crate that raised it.

AI SUMMARY

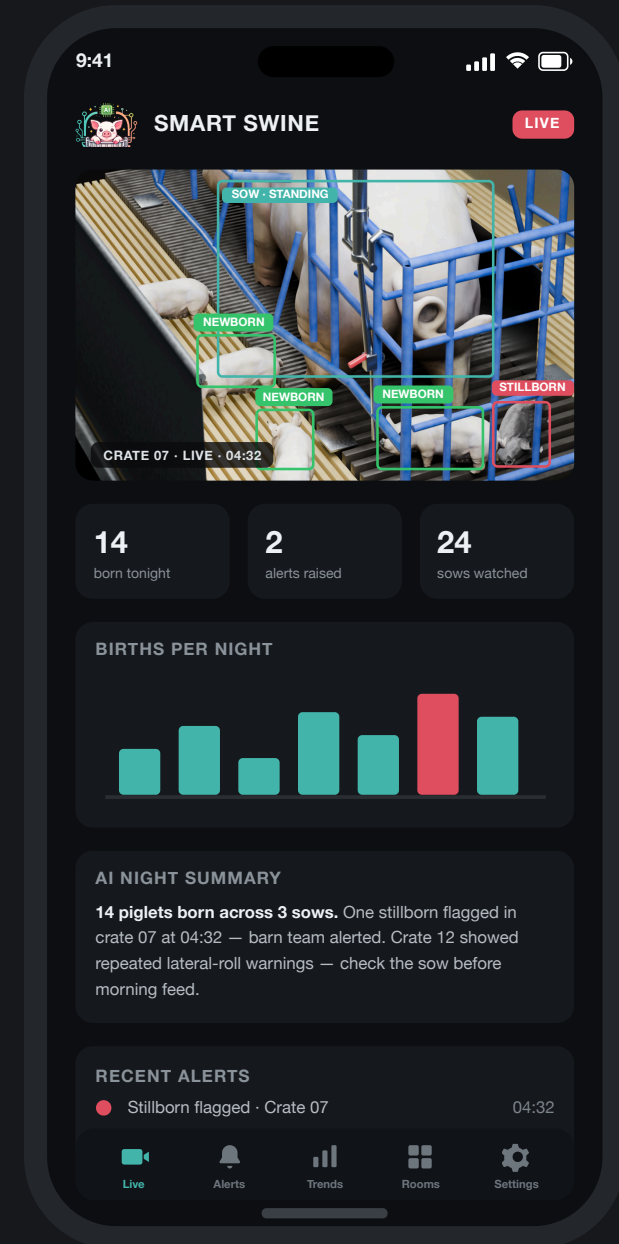
The whole night in three lines

The app pools video from every sensor and the AI writes the morning brief — births overnight, interventions that mattered, crates to check first. Read it with your first coffee instead of scrubbing footage.

ANALYTICS

Numbers you can act on

Births, birth intervals, posture patterns and alert history roll up into per-sow and per-room dashboards. Trends surface before they turn into losses, and everything exports.





What producers told us

Customer-discovery concept test, June 2026 — run online through U.S. pork-industry associations plus in-person field surveys (Qualtrics + paper). n ≈ 16–19 responses per question.

89%

call preweaning mortality a moderate-to-major problem

58%

run 8–15% preweaning mortality today

69%

open to a 2026 paid pilot

9

operations asked for direct follow-up — 8 shared contact details

The washdown mandate

Asked what worries them most about crate electronics, producers ranked unclear cost and payback first (76%), washdown survival second (71%) and hardware reliability third (41%) — all far ahead of false-alarm worries about the AI (29%). The sealing, the quick-release wash cycle and the mounting options on the previous pages are the direct answers.

A workable price window

Every respondent who named a price called \$1,499 or less a clear bargain. Resistance climbs past about \$2,000. 39% rated the system high value on first read and half sat at "some value" — an ROI story to win, not a concept to explain.

Small mixed sample — a concept test, not purchases. Shares are of the combined online + field sample. Warm-lead contact details are held confidentially.



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Buy it or rent it

Farms budget differently, so SPM-01 sells both ways. Either way the hardware is the same sealed unit — and either way it carries a lifetime warranty.

BUY THE UNITS

One unit per farrowing crate, yours outright. A unit is not tied to one crate — demount it at weaning, wash the room, hang it on the next batch. The quick-mount plate moves it between rooms and layouts as your barn changes.

RENT BY THE BATCH

The monitor earns its keep in a 10-day window around each farrowing — mount before the due date, demount at weaning. Rent units for the cycles you actually run and skip the capital line entirely. Try it on one room before you commit to the whole barn.

LIFETIME WARRANTY

Covered for life — bought or rented.

We designed this unit to take a pressure washer to the face, batch after batch, and we stand behind that. If an SPM-01 fails in normal farm service, we repair or replace it. That is what confidence in our own engineering looks like.



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Where the numbers come from

99.15%

sow-posture classification (unseen sow)

98.4%

breathing-signal classification (validation)

96%

stillborn precision

86%

newborn precision

~0.2 s

edge inference per frame

Validation

Vision models trained on 500+ hours of on-farm depth and RGB farrowing video.
Hardware validated in a 10-sow on-farm trial under IACUC oversight.

Support

Approximately \$1M in non-dilutive NSF and USDA-NIFA support (2026–2029), with university and industry partners below. Semifinalist, 2026 AI Venture Velocity Challenge — 531 teams across 160 universities to 27 semifinalists.



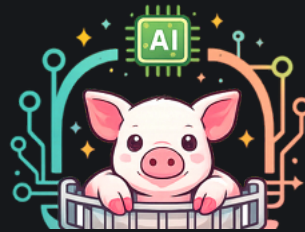
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About these images

All figures are concept industrial design. The sensing hardware reflects a prototype validated on farm. The articulating mount, the dual-axis arrangement, the mounting variants and the internal component layout are design proposals and not a production bill of materials.

Sow and piglet geometry: "Some Pig" by Austin Beaulier, licensed CC BY 4.0.



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