AISCT® ECOSYSTEM • AURORA • SAL • PETRO • DSS PLATFORM

One Ecosystem. Three Instruments. One Standard of Certainty.

AISCT® — Artificial Intelligence Site Characterization Technology — is where physical instrumentation meets environmental decision-making.

The AISCT® ecosystem is a complete field characterization platform. Aurora, Sal and Petro each address a specific class of contaminant with purpose-engineered hardware. The DSS ties them together — aggregating data, applying AI interpretation, enforcing QA/QC, and delivering the decision-grade outputs that close sites.

Every component was built to address the documented failures of the instrument it replaces. Not an incremental improvement — a fundamental re-engineering of how field data is produced, interpreted and defended. Units deploy individually or together; the platform is contaminant-agnostic.

PRECISION. PROBABILITY. PREDICTION. — THE THREE PRINCIPLES BEHIND EVERY READING

Precision

Every measurement is produced under the same conditions — same temperature, same volume, same protocol. Precision is what makes results comparable sample to sample, site to site and operator to operator.

Probability

High-density data creates a population that can be evaluated statistically. Instead of asking what one sample said, you ask what the distribution says about the site. Probability replaces guesswork with stated confidence.

Prediction

Field results are reported against the applicable criterion in real time — and, where a correlation applies, they predict the laboratory outcome. Decisions that once waited weeks are made while the crew is still on site.

THE ECOSYSTEM AT A GLANCE

AISCT® Aurora™
VOC and CVOC vapour screening with AI-driven laboratory correlation

AISCT® Sal™
Ion-specific chloride screening in soil and water, mg/kg and mg/L

AISCT® Petro™
Solvent-extraction PHC screening, F1/F2/F3 resolved separately

DSS Platform
The intelligence layer — aggregation, analytics, QA/QC, reporting

THE INSTRUMENTS — ONE CONTAMINANT CLASS EACH, ENGINEERED FROM FIRST PRINCIPLES

AURORA™

Vapour screening that correlates

AI-integrated headspace vapour screening for VOCs, chlorinated solvents, BTEX and gasoline-range hydrocarbons. It replaces the conventional bag method with a standardized, reproducible, quantitative process aligned with CCME Volume 1 Section 5.5.1, US EPA and other references.

Conventional bag methods control none of the variables that drive a vapour reading. Aurora holds sample mass and chamber volume fixed, maintains 30–35 °C equilibration, automates timing and agitation, and passes the result through a model trained on laboratory-confirmed pairs.

Targets	VOCs, CVOCs, BTEX, F1 and volatile F2
Principle	Temperature-controlled headspace with AI predictive modelling
Performance	>90% (r^2) vapour-to-laboratory correlation
Regulatory	CCME Vol. 1 ss. 2.2, 2.8, 3, 5.5.1; US EPA

SAL™

Ion-specific salinity screening

AI-integrated, ion-specific screening for chloride — with sodium capability being introduced — in soil and water. It replaces bulk electrical conductivity with a precision array of Ion Selective Electrodes measuring the parameter regulators evaluate.

An EC meter responds to every dissolved ion: background minerals, moisture, temperature, matrix. Sal measures chloride directly, under a standardized dry-bath extraction enforced at 25 °C, and reports both mg/kg and mg/L with a probability-of-exceedance evaluation alongside each result.

Targets	Chloride (Cl^-); sodium (Na^+) being introduced
Principle	Potentiometric ISE array — ion-specific, not bulk EC
Performance	>90% decision accuracy; up to 40 samples/hour
Regulatory	Alberta Tier 1; CCME CSQG; AER Directive 058

PETRO™

Field extraction that matches the lab

AI-integrated PHC screening by solvent extraction, capturing the extractable hydrocarbon fraction directly rather than inferring it from what volatilizes. Petro resolves F1, F2 and F3 separately, each against its own fraction criterion.

This matters most in extractable hydrocarbon scenarios — the programmes where F2 and F3 criteria, not volatiles, drive the decision. Diesel and lubricating oil impacts screen far cleaner than they are under a vapour method, because volatility and not extractability governs the reading.

Targets	TPH; F1/VPH, F2/LEPH, F3/HEPH
Principle	Solvent extraction mirroring laboratory PHC methodology
Performance	>90% (r^2) extraction-to-laboratory correlation
Regulatory	CCME s. 5.5.1 and PHC criteria; CSA Z769

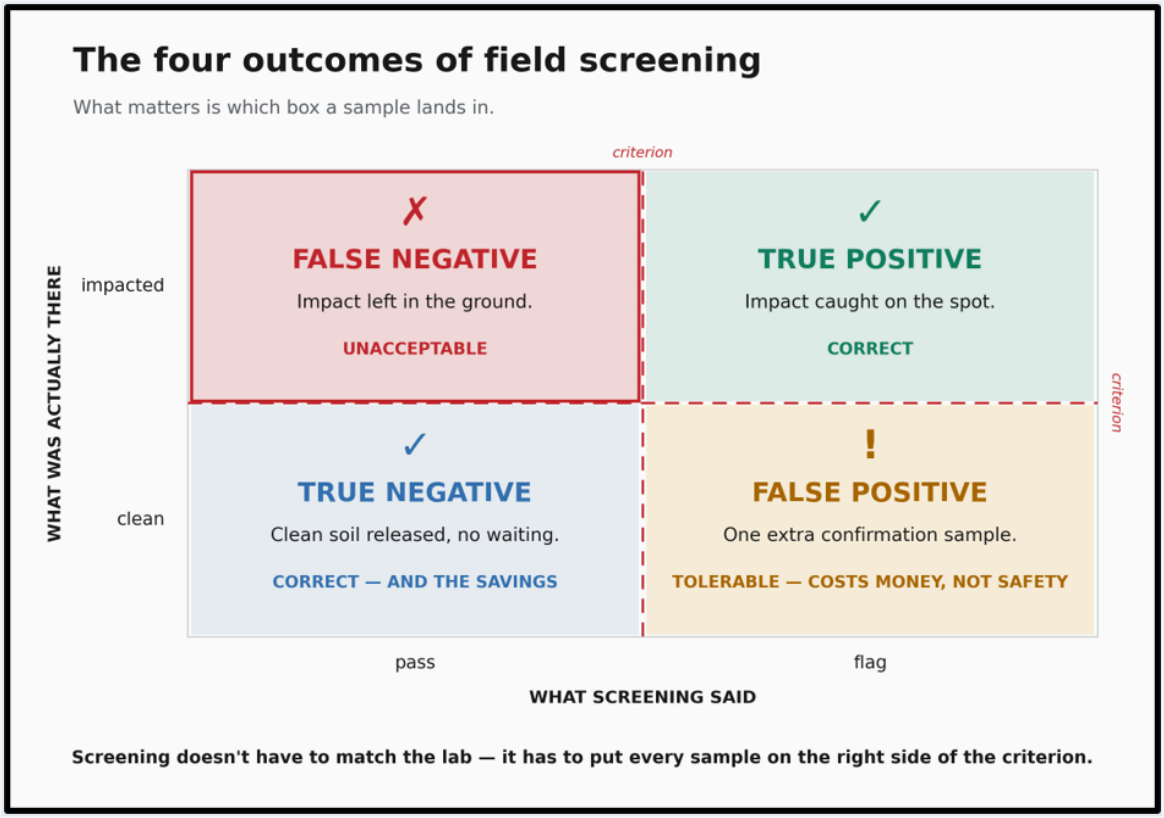
THE DSS PLATFORM — WHERE FIELD DATA BECOMES DECISIONS

Three precision instruments generate data volumes that would overwhelm any conventional workflow. The Decision Support System was built to manage that reality — and without it, AISCT® is a collection of instruments rather than a site intelligence platform. One live data set serves the field technician, the project manager, the client and the regulator, each at the resolution their role requires.

Aggregation	Real-time ingestion from Aurora, Sal and Petro, organized by site, phase and sample location
Interpretation	Concentration estimates, exceedance probability, spatial distribution and contamination extent mapping
QA/QC	Calibration records, reference checks, blanks, duplicates and triplicates, enforced and logged automatically
Outputs	Threshold selection, sample flagging, depth profiling, laboratory correlation, AI-generated summary reports

HOW A SCREEN IS JUDGED — OUTCOME ALIGNMENT, NOT CONCENTRATION EQUIVALENCY

A field screen is not judged by how closely it reproduces a laboratory number. It is judged by whether it puts each sample on the correct side of the criterion — and, when it gets one wrong, by which kind of error it makes.



The two errors are not equivalent, and no screening programme should treat them as though they were. A false positive costs one confirmatory laboratory sample and some conservatively handled soil — recoverable. A false negative leaves impact in the ground, and surfaces later as a failed confirmation, a return mobilization and a live liability. This is why Triad practice sets the two bars asymmetrically: fewer than 5% false negatives, fewer than 20% false positives. AISCT® programmes are run against a tighter internal target of under 10% on both.

BUILT ON THE GUIDANCE, NOT AROUND IT

AISCT® does not ask a regulator to accept a new idea. Every core design decision references published guidance that has been in place for years.

- **CCME Guidance Manual, Volume 1 (2016)** — Section 5.5.1 recognizes headspace vapour and solvent-extraction testing as field analytical methods; Section 2.2 describes the phased investigation approach; Section 3 sets the QA/QC expectations; Section 2.8 covers data validation and interpretation.
- **U.S. EPA Triad approach** — systematic planning, dynamic work strategies and real-time measurement, with a field screen judged on known, managed uncertainty rather than laboratory-grade precision.
- **Alberta Tier 1 and AER Directive 058** — the salinity criteria and upstream petroleum requirements Sal is built to serve.
- **CSA Z769 and applicable provincial PHC guidelines** — the assessment framework Petro screening programmes are designed to support.

AISCT® operationalizes this guidance. The industry has had the roadmap for a decade; what it lacked was instrumentation capable of executing it at field scale.

HOW AISCT® IS USED — TWO WORKFLOWS, DETERMINED BY WHAT THE INSTRUMENT MEASURES

Aurora screens a vapour response and needs a site-specific correlation to translate that response into a laboratory-equivalent concentration. Sal and Petro measure concentration directly, so no correlation step is required before the data can be used.

AURORA — SCREEN, CORRELATE, THEN PREDICT

Aurora reports a vapour response. The programme's first task is to establish what that response means in laboratory terms on this particular site, after which every subsequent reading is predictive.

- Set up the project in the app and calibrate — guided, and minutes to complete.
- Screen at high density, including soils that look clean.
- Evaluate the distribution and select a working threshold before laboratory data arrives.
- Submit a targeted laboratory package chosen by the data rather than at random.
- Enter the results; the correlation model calibrates and the threshold becomes laboratory-grounded.
- Apply that threshold in real time through delineation, remediation and endpoint confirmation.

SAL AND PETRO — A CONCENTRATION YOU CAN USE IMMEDIATELY

Sal and Petro do not report a proxy that has to be converted. They report a concentration in the same units as the criterion — Sal both mg/kg and mg/L, and water measured directly; Petro mg/kg by fraction.

- Set up the project in the app and calibrate against certified standards.
- Screen at high density. Each result is compared directly against the target criterion.
- Act in the field — both instruments report a probability of exceedance alongside the concentration, flagging where variability warrants confirmation.
- Submit laboratory confirmation for the regulatory record, not to unlock the decision.
- Track remediation in real time against the same criterion, through to endpoint confirmation.

Get Started

Request a demonstration

All AISCT® equipment, consumables and supplies must be ordered through TRIUM. Procurement from unauthorized sources constitutes non-compliance with the AISCT® operating agreement.

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"Value is not the presence of a tool. It is the change in scope, cost, time or certainty that results from a decision made using information that would not otherwise have been available."

— The Why: Physical AI for Complex Environments