

CHIMERA VISION

ENERGY / OIL PIPELINES

Intelligence that focuses the corridor.

Observe. Focus. Verify.



Future inspection concept

SECURITY + CONDITION AWARENESS

Oil-pipeline security and condition awareness.

A vision for connecting a broad patrol view to the evidence needed for the next decision. Chimera could help operators focus on corridor activity and visible asset changes, then propose purposeful follow-up for human approval.

LAND-BASED CORRIDORS / EXPOSED PIPEWORK / VALVES / PUMP STATIONS

Future inspection concept. For pipeline operations, physical security and maintenance teams. No recorded pipeline deployment or performance result is represented.

SECURITY AWARENESS

Understand the activity. Then check the context.

A patrol can reveal activity worth reviewing. The useful next step is to connect the observation to work permissions, access records and the responsible team.

01

CORRIDOR ACTIVITY

What is happening near the route?

Flag visible vehicles, equipment or activity for operator review. Keep the source view and location context; presence alone does not establish wrongdoing.

02

EXCAVATION EQUIPMENT

Is the work expected and authorized?

Compare activity with available work permissions and the agreed corridor plan. An image cannot establish exact buried-pipe location or confirm consent.

03

ACCESS POINTS

Has the access condition changed?

Review visible changes around gates, access roads and station entrances against approved baseline views. Request useful context before assigning significance.

04

PERIMETER CONDITION

Does the fence need a closer assessment?

Highlight apparent fencing damage or an altered boundary for a reviewer. Any permitted follow-up would document the condition; the concept does not pursue people.

— The next decision belongs to the operator.

Match the observation with permissions and operational context. Retain only the imagery needed for the approved inspection and review purpose.

Context: Canada Energy Regulator damage-prevention guidance [1].

CONDITION AWARENESS

Spot a change. Build the evidence to assess it.

Visible observations can help prioritize a qualified review. They are questions to investigate, not a diagnosis of pipe integrity or proof that a release has occurred.

01

COATINGS + SURFACES

Is there a visible surface change?

Record apparent coating damage, discoloration or an unusual surface pattern on exposed pipework. Lighting, resolution and viewing angle affect what can be assessed.

02

PIPEWORK + SUPPORTS

Has a support or exposed section changed?

Compare useful views of supports and above-ground fittings. A changed appearance may justify specialist assessment; imagery alone cannot establish structural adequacy.

03

GROUND + EXPOSURE

Does the route need a condition review?

Observe erosion, ground disturbance or a newly exposed pipe section. Relate the view to asset records and prior observations before deciding the appropriate response.

04

POSSIBLE RELEASE INDICATORS

Does this require an emergency response?

Unusual liquid pooling, staining or an oily sheen may require escalation. An image does not identify the substance or establish its source. Treat a suspected release under emergency procedures.

 Suspected release: emergency procedures take priority.

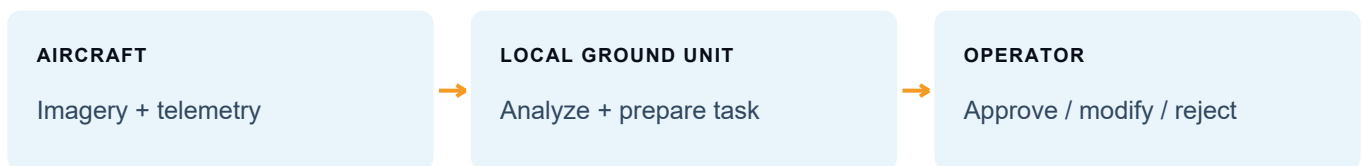
Do not automatically fly closer. Follow the operator's emergency procedures and established safe response, notification and aircraft instructions.

Context: PHMSA release recognition [2] and specialist integrity inspection [4].

OBSERVE. FOCUS. VERIFY.

A proposed loop. A human decision at its centre.

The aircraft collects evidence; a local ground unit prepares the next observation; the operator decides whether and how the mission should change.

**01****OBSERVE****Capture the agreed view**

Fly the authorized route and collect available imagery with its time and location context.

02**IDENTIFY****Propose the evidence needed**

Local analysis could surface a concern and prepare a specific question for follow-up.

03**AUTHORIZE****Approve, modify or reject**

The operator reviews the target, permissions, operating constraints and any emergency trigger.

04**COLLECT****Request an appropriate view**

Use supported camera controls or an approved safe viewpoint only when authorized and suitable.

05**REASSESS****Record and escalate**

Review the new evidence, record the disposition and route the issue to the responsible team.

An integration to validate, not an assumed capability.

Local analysis depends on accessible aircraft data and supported interfaces. Establish link-loss, abort and emergency behavior with the flight system before a trial.

THE QUESTION DETERMINES THE SENSOR

More pixels are useful. The right evidence is better.

A credible inspection proposal states what a sensor can observe, the conditions it needs and the conclusions that require a different method.

RGB / VISIBLE IMAGERY

Visible context and surface appearance

Useful for documenting corridor activity, access changes, exposed pipework and visible surface conditions. Preserve the original frame and a wider context view.

Boundary: Cannot see through soil or establish internal corrosion, material identity or authorization from appearance alone.

COMPATIBLE THERMAL OBSERVATIONS

Temperature contrast for a defined question

A suitable payload may provide thermal contrast for a validated task. Interpretation depends on the asset, capture conditions, sensor setup and qualified review.

Boundary: Conventional thermal imaging is not generic oil-leak detection. A temperature pattern does not identify a substance or confirm a release.

SPECIALIZED SENSING + INTEGRITY WORK

A method selected for the suspected mechanism

Gas-specific optical gas imaging uses an appropriate spectral response for its target. Other concerns may require dedicated instruments or specialist integrity inspection.

Boundary: One gas camera does not visualize every gas or identify its exact species. Aerial observations do not replace in-line inspection or other pipe-wall assessment.

 The product and operating environment matter.

Sensor suitability, payload support and collection conditions must be established for the proposed task. No detection range, accuracy or coverage guarantee is made here.

Technical context: FLIR sensor guidance [3]; PHMSA in-line inspections [4].

TWO EXAMPLES. NO MEASURED RESULTS.

From an observation to a reviewable record.

These concept records show what useful evidence could contain. They are not reports from a pipeline deployment; no event, location, date or outcome is asserted.

A / PHYSICAL SECURITY

Corridor activity: check authorization

Source imagery	A patrol context frame showing equipment near the corridor; a linked detail view if authorized.
Time + location	Record actual capture time, route segment and location metadata; retain any uncertainty.
Question	Does the observed work match the permissions and work plan available to the operator?
Requested evidence	An appropriate view of the activity and its relation to the corridor, plus the relevant permission record.
Reviewer disposition	Illustrative state: awaiting authorization check. The responsible team records the actual decision and next action.

B / CONDITION AWARENESS

Exposed pipework: assess a change

Source imagery	A context frame and detail view showing an unusual surface or ground condition near exposed pipework.
Time + location	Record actual capture time, asset reference and viewing conditions; link the source frames.
Question	What is visible, how does it compare with a useful baseline, and which specialist should review it?
Requested evidence	A suitable comparison view or specialist assessment. Suspected release indicators trigger emergency procedures.
Reviewer disposition	Illustrative state: pending qualified assessment. No leak, internal corrosion or structural defect is confirmed.

Future inspection concept. Each record retains provenance, reviewer responsibility and evidence limits.

FROM POSSIBILITY TO A USEFUL TRIAL

Start with a question. Agree how to evaluate the answer.

The first goal is a reviewable demonstration on an agreed asset and task. Establish permissions and acceptance criteria with operations, security and maintenance teams.

01

DEFINE

Choose the inspection question

Select one visible condition or activity to investigate. Agree the reference information, who reviews it and what decision the evidence should support.

02

PREPARE

Match equipment and operating constraints

Confirm aircraft and payload support, data access, safe viewpoints, site permissions and capture conditions. Set link-loss, abort and emergency procedures.

03

COMPARE

Establish reference observations

Use qualified review and appropriate ground or specialist checks. Preserve source data and distinguish confirmed reference findings from unresolved observations.

04

REVIEW

Evaluate the complete evidence loop

Assess false alerts, missed observations, reviewer burden and whether the requested view helped answer the question. Record failures and unclear cases as well as useful ones.

 The success measure is a better-supported decision.

Agree evaluation criteria before collecting trial data. Report results with their conditions and limitations; this paper promises no detection rate, time saving or operating coverage.

Land-based physical security and inspection concepts only; no offshore, subsea or cybersecurity scope.

DISCUSS THE INSPECTION QUESTION

What would you need to see before deciding?

Bring a corridor, asset or review problem. We can discuss the evidence, supported equipment and operator workflow a useful demonstration would need.

BOOK A DEMO

info@chimera.vision

[View the whitepaper online](#)

TECHNICAL CONTEXT

[1] Canada Energy Regulator: Damage prevention

Context for activity near pipelines, locating buried assets and the need for work permissions.

[2] PHMSA: Pipeline Leak Recognition and What to Do

Possible release indicators and the priority of leaving danger, reporting and established emergency response.

[3] FLIR: Can You See Toxic Emissions with Thermal Cameras?

Why conventional thermal imaging and gas-specific optical gas imaging are different sensing methods.

[4] PHMSA: Fact Sheet: In-Line Inspections (Smart Pig)

Specialist tools used to examine pipe-wall conditions. Aerial imagery does not replace this work.

POSSIBILITY AND REAL EVIDENCE

This paper describes future possibilities, not a recorded pipeline deployment. Technical references support the distinctions made here; they do not endorse Chimera or establish its performance.

The separate [Strawberry 1 case study](#) is a real agricultural field record. It does not validate pipeline security, leak detection or industrial inspection performance.

References accessed 16 October 2026. | Revision 1.0 | Future inspection concept