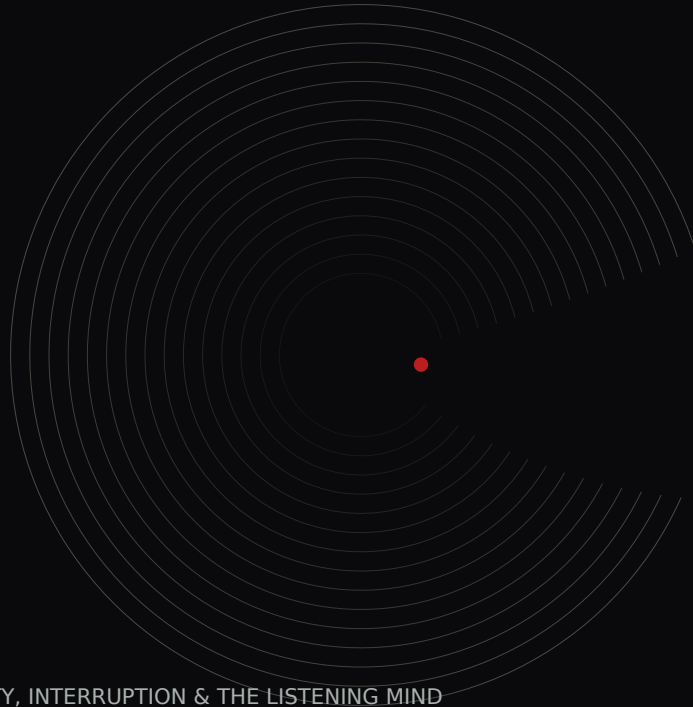


KLAAT

Atlas of the Living Interval



BOOK I / CONTINUITY, INTERRUPTION & THE LISTENING MIND

To the reader

The score was never the origin. Amastacia, the agave drone, and Ankora, the elk-hide pulse, existed as instruments before they acquired a shared vocabulary. Their encounter became KLAAT: a practice that learns from its own repetitions without promising to reproduce an identical experience for every listener.

This edition begins as literature and returns repeatedly to the question of evidence. A conceptual drawing is not a measured waveform. A bodily report is not an accelerometer. A recorded listener response is not a universal conclusion. Keeping these distinctions in place does not impoverish the work. It makes its unknowns worth exploring.

What follows is Book I, revised from the original thirty-one-leaf literary study, with new field letters and ten newly drawn schematic plates. Book II preserves the extended scientific folios of the existing research edition, including technical arguments, limitations, and bibliography. The two books are intended to be read alongside each other, not mistaken for the same kind of claim.

Experience-led creation. Science-informed refinement.

An index of conditions

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The sound came first.

Before there was an atlas, there was a breath held against a hollow column of agave. A note gathered in the room. Not a perfect tone, not an electronic constant, but a living sound with an edge, a grain, and the audible effort of its making.

A drum entered. One strike divided the sound into a before and an after. Another strike made the interval imaginable. With the third, the ear could begin waiting for the fourth. Nothing supernatural had occurred. Something stranger had: a mind had begun building time around an expectation.

KLAAT began in this encounter between a sound that continues and a gesture that interrupts. Its two principal instruments are Amastacia, an agave didgeridoo pitched in C-sharp, and Ankora, an elk-hide frame drum. Their materials are ancient in kind, but their relationship here is particular: the pressure of a breath, the weight of a hand, the body of a room, and the willingness to remain with a sound long enough for it to change.

This book is an attempt to learn the shape of what is happening without pretending to possess its final explanation.

A practice, not a doctrine.

There is no single frequency hidden inside KLAAT that unlocks the nervous system. There is no universal tempo that commands trance. There is no evidence that a listener who feels vibration has experienced one particular biological event. The instrument does not become more extraordinary when we give it powers it cannot be shown to have.

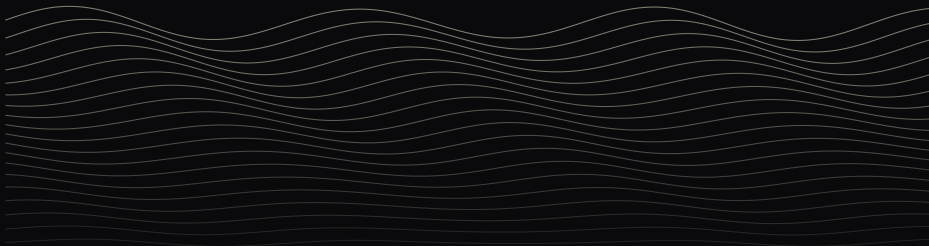
Yet these exclusions do not leave us with a small art. They leave the real mystery unobstructed. Sound reaches us through pressure, reflection, memory, anticipation, movement, and attention. A stable drone is not static. Repetition is not identical experience repeated. The same acoustic event can belong to different stories in different bodies and different rooms.

The pages that follow describe an emergent discipline: a way of making, noticing, naming, testing, and transmitting relationships between sound and experience. The field remains open. Its grammar is provisional; its symbols are invented here and must earn their use in performance; its research claims can be revised by evidence.

The system must grow from the music. The music owes the system nothing.

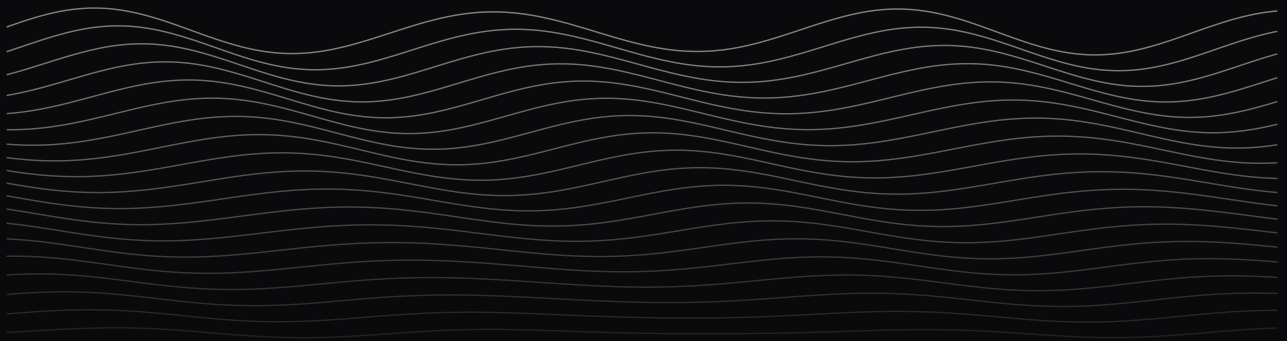
I

THE HELD FIELD



AMASTACIA / CONTINUITY

PLATE I / THE HELD FIELD



Schematic relationship / not instrument data

The invariant is not stillness

You can watch the outline of a held note in a waveform editor. On a sufficiently long view, it looks like a ribbon pulled straight across the screen. Zoom in. There are cycles. Zoom out differently. There are swells, an altered balance of overtones, places where the lip struggled for an instant and found the vibration again. A line is an efficient way to draw duration. It is a poor way to draw life.

Amastacia is a particular instrument: agave, a resonant air column, a mouth at one end and a changing room at the other. The label C-sharp identifies its familiar pitch region. It does not identify every component of its output, and it predicts no universal effect in a human body. That distinction matters aesthetically. Once the musical instrument has been allowed to be an actual object, the specificity of its sound becomes more interesting than an imagined secret hidden inside a frequency.

The invariant is not stillness

Consider the work of the lips. They do not pour a note into the tube; they participate in a moving system. The vocal tract alters the relationships among harmonics. Pressure and timbre fluctuate. Circular breathing can make the field seem unbroken without abolishing the body's ordinary need for air. Every adjustment has the possibility of becoming music. Not every adjustment will be perceived, and not every fluctuation will be expressive. Technique exists so the player can begin choosing among them.

If this field has a rule, it is a provisional one: describe the continuity without drawing it dead. We are not trying to discover an ideal permanent tone. We are learning the forms of motion that can belong to something that seems to remain.

A line that refuses to be still.

Amastacia can occupy a single tonal center while producing a succession of changing internal events. The fundamental gives the listener something to return to. Above and around it, harmonics gather and recede, the vocal tract reshapes the sound, breath alters its envelope, roughness appears, and the human edge of the instrument remains audible.

A line on paper usually represents duration as an unbroken stroke. It cannot show how much activity may take place inside that continuity. The first task of KLAAT notation is therefore to resist the dead straight line. A held sound should appear held, but never inert.

The drone can be heard as a floor beneath other events, yet it may also become the most active participant. A shift in the overtone structure can feel like movement even when the drum has stopped. A brief roughened articulation can sharpen the air without changing the musical tempo. The breath itself makes interruptions too fine to count as conventional beats.

A line that refuses to be still.

C-sharp names the pitch of this particular instrument. It is a condition of KLAAT's sound, not a claim about the biological privilege of that note. Its meaning was acquired through encounter, not assigned by a frequency chart.

The difference between presence and stillness.

Listening to a continuous sound changes what the ear treats as new. At first, the drone announces itself as an object: a pitch, a volume, a timbre. With time, it becomes a condition. The listener begins to notice what occurs within it: tiny fluctuations, accents from the mouth, the interaction between tones, the way a room emphasizes one part and swallows another.

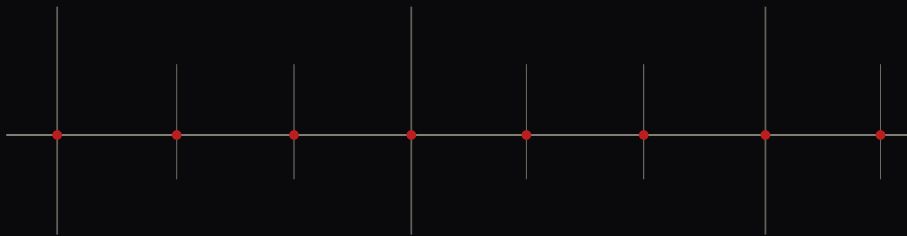
The shift is not guaranteed, and there is no reason to expect everyone to experience it. Some listeners become absorbed; others grow restless. That difference belongs inside our account, not outside it.

KLAAT treats continuity as something composed with, rather than a state one enters on command. The performer can sustain the sound and still leave enough openness for unexpected events. The hand does not have to solve the breath. The breath does not have to mirror the hand.

An anchor is not an instruction to remain in place. It is what makes departure legible.

II

THE FIRST DIVISION



ANKORA / EVENT

The future made audible

There is an instant after the third drum strike when the fourth has become possible. Nothing in the air contains that future impact. The listener has made a model of the interval and may begin anticipating its return. The drum has not changed the room's clock; it has offered the mind a pattern with which to organize time.

This is one of the reasons a stroke can be meaningful without being loud. Its force may lie in confirmation, deviation, or absence. A withheld strike is felt most clearly after a reliable figure has taught someone what to wait for. To another person, arriving with no memory of that figure, the same silence may be ordinary. Expectations are learned relationships, not properties deposited inside the beat.

Ankora gives KLAAT the capacity to make such relationships visible to the ear. A struck hide has an attack, a grain, and a decay. Its pattern can set up an anchor while subdivisions multiply around it. The surface may become dense without the inferred beat becoming faster. A person can nod to the larger interval while registering each close strike. This discrepancy is not an error in counting. It is the beginning of an expressive grammar.

The future made audible

The temptation is to turn that grammar into a schedule: now the listener will become absorbed, now the music will become activating, now the next threshold will appear. But the listener is not under the player's command. The only thing the performer can determine is the offered event. What the event becomes in memory, anticipation, or movement remains an encounter.

The first strike makes a past.

Ankora is an elk-hide frame drum. Its attack is brief when compared with the continuous field surrounding it, but the consequences endure. One strike can become an event. Two can become an interval. Repetition encourages the listener to form a prediction about what comes next.

A steady pulse is not a command. It is an agreement the ear may accept. Once learned, even an omitted strike can become meaningful; absence is heard against an expectation. The performer does not always have to add sound to create an event.

This is one of KLAAAT's central distinctions: pace, density, accent and force are not interchangeable. The number of anchor beats per minute may remain unchanged while smaller strokes accumulate between them. A piece may feel more crowded without getting faster. It may become more urgent through timbre instead of volume.

A rhythm is therefore better understood as a living hierarchy than as one number printed beside a metronome.

A recoverable path.

The ear can tolerate complexity differently when a recurring reference remains available. An attack that returns at a recognizable interval gives the listener a way through a dense surface. Additional accents can cross the center of that pattern. They can compete with it, conceal it, or illuminate it after a pause.

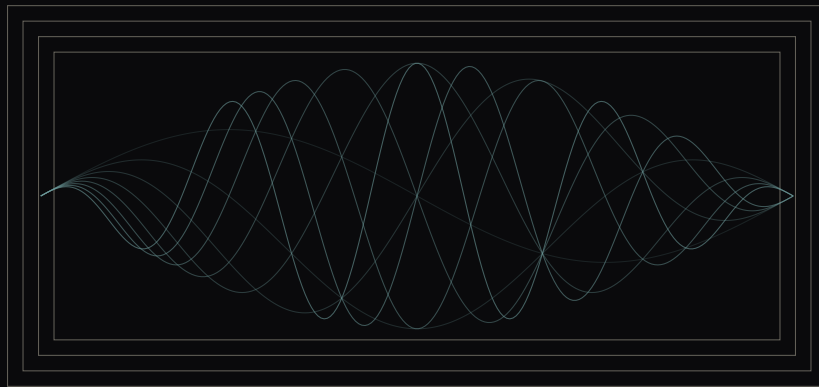
The relationship is not universally soothing or universally activating. Context matters: sound level, personal preference, expectation, duration, room acoustics, and what the listener is doing. KLAAT is interested in the tension between a recognizable ground and the instability that can grow around it.

The recorded pulse of one early performance was approximately 137 beats per minute. That is useful as a calibration reference for that recording. It is not an optimal tempo for humanity, and it should never become a law of the practice.

The beat returns. What returns with it may be changed.

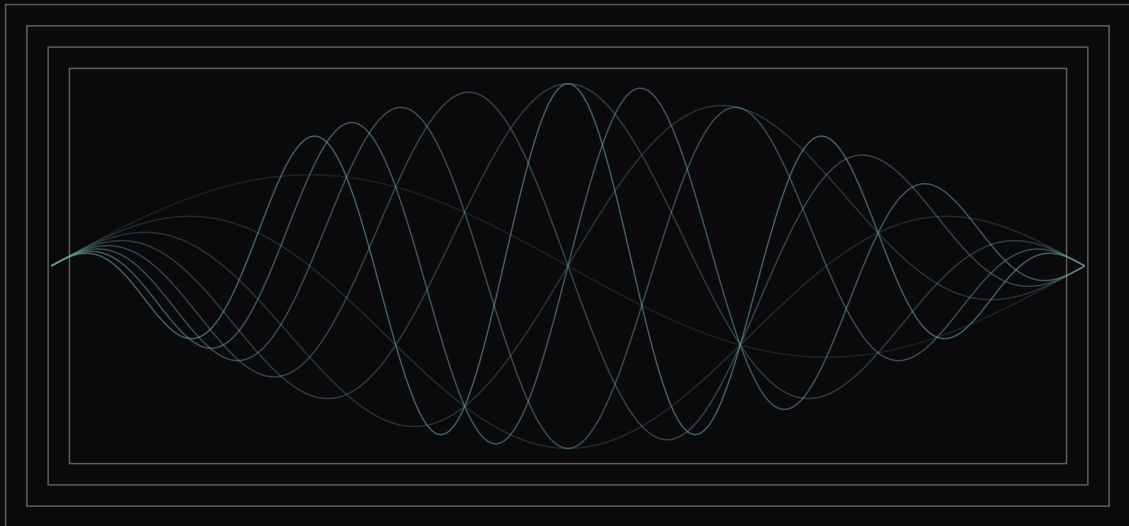
III

THE DISTRIBUTED ROOM



ACOUSTICS / POSITION

PLATE III / THE DISTRIBUTED ROOM



Schematic relationship / not instrument data

A map without a center

A venue does not contain one version of a performance. Stand close to a wall and a low component may gather. Cross the floor and a related frequency may nearly disappear. An upper overtone seems to detach from the fundamental. A drum decay lasts longer where the surfaces return it, shorter where bodies and materials swallow it. There is no privileged seat from which the entire room can be measured by listening alone.

This is why the field map must be drawn as a distribution rather than a circle around a central audience. The placement of Amastacia, the direction of the drum, the reflecting surfaces, and the positions of listeners all affect the delivered sound. A report of chest pressure in one location cannot certify an equivalent sensation across the room. Nor does a strong acoustic room mode automatically establish mechanical vibration in the floor beneath a listener.

A map without a center

The recording introduces another geography. A microphone fixes a viewpoint; a playback system imposes a new set of capabilities and omissions. Headphones may carry subtle breath texture while failing to supply the bodily pressure remembered from the venue. A small speaker may keep rhythmic structure and pitch identity but alter the listener's sense of weight. The recording is not dishonest for being a different encounter. It becomes dishonest only when we pretend nothing changed.

The artistic question therefore changes. Instead of asking how to transport an entire room unchanged, we ask which relationships are necessary for the work to remain recognizably KLAAT, and which relationships belong uniquely to being there.

The room does not listen evenly.

A drone enters a room and is no longer only the performer's sound. Walls reflect it; dimensions favor some frequency regions and weaken others; furniture absorbs or scatters energy; a floor or chair may move. What one listener hears near a corner is not identical to what another hears closer to the center.

This is a measurable fact of acoustics, and one of the most fertile artistic conditions of KLAAT. A room is not a passive container. Its shape participates in the performance without intention. To move through it is to move through different versions of the same source.

The diagram opposite is conceptual, not a survey of an actual venue. Pale contours indicate regions of relative acoustic difference; they do not claim that a particular pressure field has been measured. A future version of this atlas can place real microphone positions, sound-pressure maps and instrument recordings alongside the artistic plates.

The room can be called an instrument in poetry. In science, it is better called a distributed acoustic system. KLAAT needs room for both descriptions, provided they are not mistaken for each other.

The small speaker problem.

There is another room inside each recording: the playback system. A phone may preserve the identity of a low note through its upper harmonics while failing to reproduce much of its low-frequency pressure. The melody of an instrument can survive in miniature when its physical weight does not.

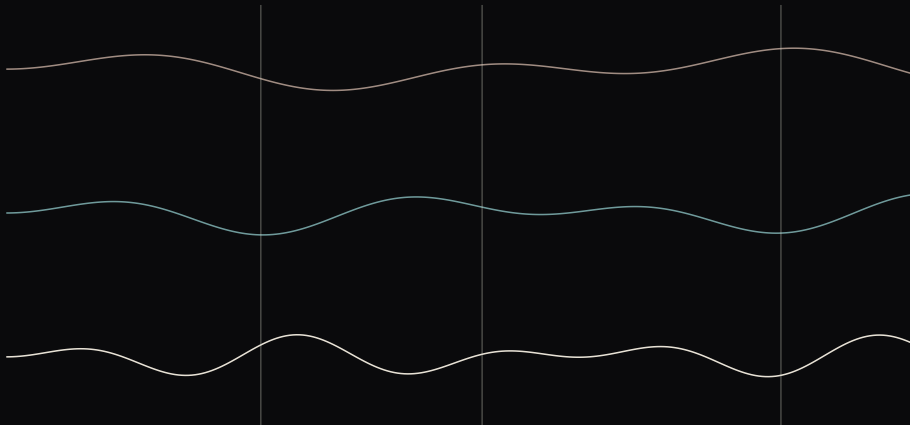
This raises a practical question for any music built around breath, drum and resonance. What must survive when the bass disappears? It may be the rhythm of the air itself. It may be the roughness, a vocal inflection, a recognizable spacing of attacks, the slow rise of a texture, the way one event reveals another.

KLAAT should be made for the particular room in which it happens, then studied again when carried elsewhere. No device is a transparent window. Translation is part of the work.

There is no single KLAAT experience. There are encounters made under particular conditions.

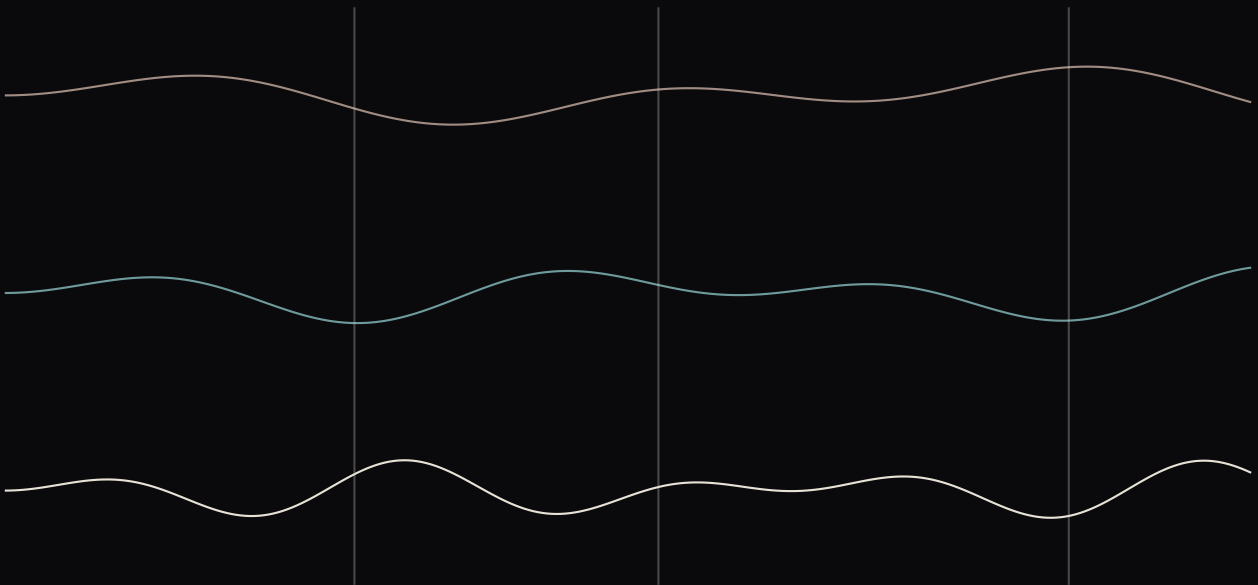
IV

THE BODY AS WITNESS



AUDITORY - TACTILE

PLATE IV / THE BODY AS WITNESS



Schematic relationship / not instrument data

The body's report

If someone says the drone moved through their chest, the first obligation is to listen carefully to the sentence. A sentence like that may report vibration at the skin, changes in breathing, an emotion given a physical location, or a sensation whose pathway the listener cannot distinguish. The report is evidence that an experience occurred. It is not yet evidence for a specific mechanism.

Airborne sound reaches the ear. Mechanical motion may reach the body through a floor, seat, or other point of contact. Those routes can coincide and contribute to one perceptual event. They can also be separated. A listener in shoes on a hard floor receives a different contact condition from someone seated on a padded bench. The body participates in the venue's acoustic geography, but not every body participates in the same way.

The body's report

We will need words for these differences. Heard. Felt. Inferred. Measured. They should not collapse into the convenient single word vibration. A microphone records pressure changes at its position. An accelerometer can record mechanical motion at its attachment point. Neither tells us directly whether a particular listener found the passage moving, frightening, or reassuring. That part requires the listener's own testimony.

A future KLAAT study could place physical measurements beside unprompted listener descriptions, without asking the participants first to locate a presumed 'resonance' in the body. The most unexpected reports may emerge precisely because the questions were not written to confirm the metaphor. A serious artistic discipline leaves room for the listener to describe what the artist did not anticipate.

Where did the sound go?

A listener may point to the chest, the floor, the throat, or an apparently moving line through the body. Such descriptions deserve attention. They are data about lived experience. They are not, by themselves, a map of the physical route vibration traveled.

Airborne sound reaches the ear. Some environments also transmit mechanical vibration through surfaces in contact with the body. Perception integrates hearing, touch, expectation, posture and memory. The same language of 'feeling the sound' can refer to different combinations of these processes.

KLAAT refuses two temptations here. The first is to dismiss sensation because it cannot immediately be instrumented. The second is to proclaim a hidden physiology every time a sensation feels vivid. A stronger practice records what occurred, asks what might explain it, and leaves room for an experience that exceeds its current account.

When people describe intensity, warmth, pressure, movement or altered attention, we will listen closely. We will not quietly translate those words into a diagnosis, a brainwave, or evidence of healing.

The listener completes nothing.

There is a phrase we should avoid: that the listener completes the composition. It makes a seductive claim about artistic wholeness that KLAAT does not need. The sound is already an event. The listener does not finish it; the listener lives through a particular version of it.

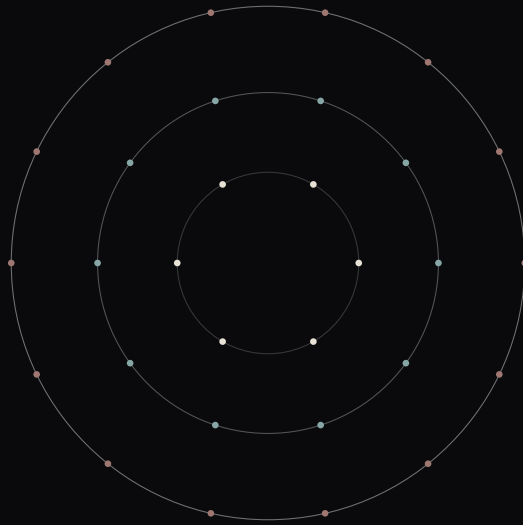
Some will hear cycles that were not deliberately composed. Some will lose count. Some will move. Some will remain still. A striking moment for one listener may pass almost unnoticed by another, even at the same point in the performance.

The task of documentation is not to eliminate these differences, but to make them legible. We can ask listeners what they noticed before telling them what they were supposed to hear. We can compare their accounts with the actual recording. We can discover what the performer intended and what the room allowed.

An experience is evidence of an experience. A mechanism requires another kind of evidence.

V

THE UNEQUAL CLOCKS



TIME / MEMORY

Three times inhabit one duration

There is the number of minutes a performance lasts. There is the time in which the performer negotiates breath, hand, fatigue, anticipation, and the next decision. There is the time a listener later remembers: an interval that vanished, a repetition that felt endless, a return that seemed inevitable although nobody planned it. These clocks can disagree without any of them being defective.

A high density of attacks does not by itself produce a high perceived beat rate. An event repeated at a fixed tempo does not guarantee a stable sensation of duration. The mind groups events, adjusts its attention, notices some transitions, and misses others. Memory changes the scale. A passage may become a chapter only when the listener tells the story afterward.

This makes duration an artistic material but not a lever that ensures a particular state. Fifteen minutes can be oppressive, absorbing, pleasantly uneventful, or too short. Familiarity sometimes opens attention toward tiny changes; sometimes it makes the music fade from notice. The player cannot select the outcome simply by remaining with the pulse for longer.

Three times inhabit one duration

KLAAT's developing architecture—Ground Anchor, Threshold Gate, Rising Pulse, Return Path—should therefore be treated as vocabulary for possible relationships, not a fixed four-step recipe. A return may happen early. A threshold may never appear. A listener may hear a different boundary from the one the performer intended. Those departures do not disprove the architecture. They tell us what a useful grammar must be able to accommodate.

More events do not make faster time.

A drum can remain at the same underlying pace while the space between its main strikes fills with smaller sounds. The listener may feel acceleration. Yet the organizing pulse has not moved. We need a vocabulary able to describe this without reducing every increase in energy to a change in tempo.

KLAAT calls the persistent reference the anchor and the changing frequency of audible attacks the density. Accent describes which events carry weight. Grain describes the quality of an attack or the texture within the sustained sound. These are working terms, not discoveries of new universal laws.

Duration allows these dimensions to exchange importance. A sparse pattern may be heard as steady until a nearly inaudible accent redefines its grouping. A cluster of strikes can become a new background. Silence between attacks may gain more force once the listener has learned a richer expectation.

The atlas records relationships rather than insisting that any one configuration must produce a prescribed state.

The chapter no one composed.

Long performances contain a peculiar form of storytelling: listeners sometimes report beginnings, passages and returns the performer never marked. These private chapters may be encouraged by repeated motifs, changing textures, fatigue, attention, or the act of remembering the work afterward.

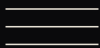
If a passage feels as though it lasted for ten minutes, that does not tell us its measured duration. If a return feels inevitable, that does not prove it was planned. Such differences are not errors to correct. They are part of how time becomes experienced rather than counted.

KLAAT should preserve the distinction between the event clock, the performer's clock and the listener's clock. None can substitute for the others. Their divergences are among the most interesting things the music can reveal.

The clock counts. The mind organizes. The body endures. Their stories sometimes meet.

VI

MARKS FOR A LIVING SOUND



FIELD



STRIKE



DRIFT



RETURN

SYMBOL / RELATION

Symbols must pay rent

A mark printed on a dark page can appear ancient even when it was drawn yesterday. That visual authority is seductive. KLAAT has no need for counterfeit antiquity. The symbols are new, and their youth is an advantage: we can demand that each one prove useful.

The FIELD is the continuous condition. The STRIKE identifies an attack. The DRIFT describes change within continuity. The RETURN names a recognizable condition reappearing after it has been left. These do not describe what a listener must feel. They are notes about musical relationships, available to be tested against real performances. If a mark cannot help the performer remember, compare, or teach something audible, it should be changed or abandoned.

Notation should admit disagreement. A listener may hear a return where the performer intended only another drift. That difference can be written down. A diagram could preserve three accounts on one page: the sound event, the player's annotation, and the listener's map. None must be made identical to the others to be valuable.

Symbols must pay rent

There is also an important absence in our marks. We have not yet supplied a verified catalogue of Ankora's stroke timbres with repeatable audio examples. Until one exists, the vocabulary must remain provisional. Five attractive stroke symbols would not become a teaching system merely by appearing next to five invented names. The discipline will grow when sound, symbol, and demonstration are allowed to correct one another.

The need for marks.

An instrument can be learned by imitation. A practice begins to travel when its recurring distinctions can also be named. The words do not replace the sound. They give a musician something to remember, alter, question and teach.

We begin with four primitive marks. The FIELD denotes an audible continuity. The STRIKE marks a discrete attack. The DRIFT shows that a recurring relationship has changed without vanishing. The RETURN points to a recognizable condition appearing again after departure. None is sacred. None means 'trance.' Their value is practical: can they help a player remember what occurred, or discover a new way of playing?

A field can contain several drifts. A strike can occur without becoming an anchor. A return can be delayed, partial or disputed. Such distinctions matter more than ornamental complexity. If a sign never helps us hear, perform, or think, it should be discarded.

We are not inventing a counterfeit antiquity. These marks are contemporary instruments of attention, made openly and revised through use.

A grammar is not a script.

A script tells a performer what happens next. A grammar describes how elements may relate. The difference is the difference between memorizing a sentence and learning to speak.

The earliest KLAAT studies might use plain operations: sustain a field while varying its grain; establish an anchor without filling every subdivision; exchange strong and weak accents; let an established pattern lose its certainty; bring back a former condition without reproducing its first appearance.

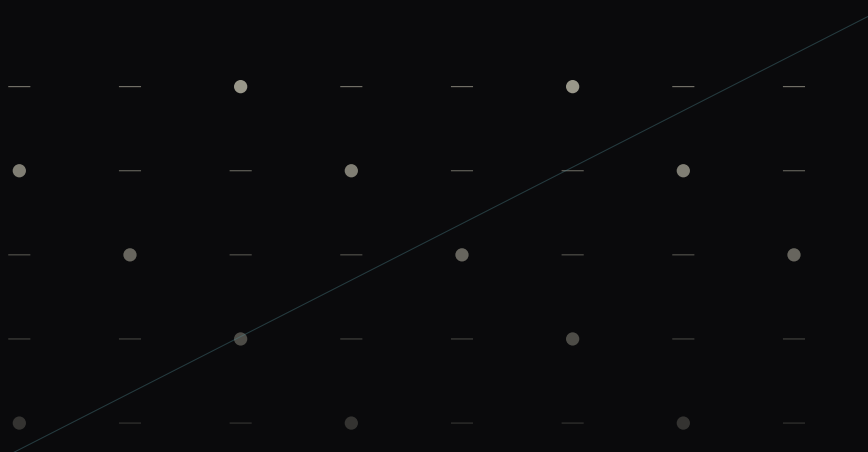
These operations can be combined. The outcome should not be guaranteed. The point of the notation is to sharpen awareness, not to standardize surprise.

A mature vocabulary would grow through recordings, performance notes, experiments and, eventually, teaching. Its names would be assigned to reproducible musical relationships, not to unverified claims about what every listener must feel.

The moment the notation becomes more important than listening, it has failed.

VII

A LANGUAGE CAN BE TAUGHT



LEARNING / TRANSMISSION

Apprenticeship is a verb

The study of ceremonial and traditional drumming does not yield a universal shamanic tempo. It yields something more demanding: practices situated within particular communities, histories, musical systems, and methods of learning. Spoken stroke syllables in one tradition do not belong to the same cultural structure as named rhythmic cycles in another. Learned ritual cues and improvisational formulas are not free-floating secrets waiting to be detached and renamed.

The legitimate lesson for KLAAT concerns how musical knowledge travels. Repetition can teach a pattern. Language can help a learner remember it. A cue acquires meaning through shared experience and reliable use. A skilled practitioner learns not only to reproduce a form but to recognize when a transformation is appropriate. Such learning can take years because it combines technique, judgment, community, and context.

Apprenticeship is a verb

Our task is to build our own practice from our own performances. If a closing gesture is necessary, invent it with Ankora and Amastacia; record it; ask new listeners whether they recognize its function; see how recognition changes with exposure. If a spoken stroke lexicon becomes useful, let its sounds and names arise from actual Ankora technique. Refer to the traditions that stimulated the question, but do not claim descent from them.

A discipline becomes credible through what it can transmit. That does not require a claim to ancient authority. It requires clear distinctions, sustained practice, careful listening, honest acknowledgement, and the willingness to change what cannot be taught.

What the drum traditions teach.

The investigation of KLAAT eventually led outward, toward musicians who have long developed structured relationships between rhythm, apprenticeship, context and belief. What emerged was not a universal secret beat. It was a family of very different practices, each situated in its own history.

Research on Newar dhimay pedagogy describes spoken stroke syllables and patterned transformations performed forward, backward and in mirrored forms. Work on Kham-Magar ritual speech describes how learned formulas can support long improvisational utterance. Korean jangdan shows how a named rhythmic cycle can hold internal organization far richer than a metronome number. These are different cultural systems, not pieces of one hidden global method.

The transferable insight is not a repertoire we can simply claim. It is a developmental principle: sound becomes generative when distinctions are learned so deeply that they can be recombined with judgment. To borrow that principle honestly means naming the traditions, studying their contexts and composing our own material.

KLAAT will not describe itself as an inherited Indigenous lineage, or rename a borrowed ceremonial pattern as its own discovery.

The lesson of the callback.

Michael Harner's modern Core Shamanism offers a very different example. Its characteristic journey-drumming format employs an extended steady rhythmic passage and a conspicuous closing or return cue. The cue acquires meaning partly because listeners learn what it is meant to announce. This is not proof that a given beat rate induces a universal neurological state.

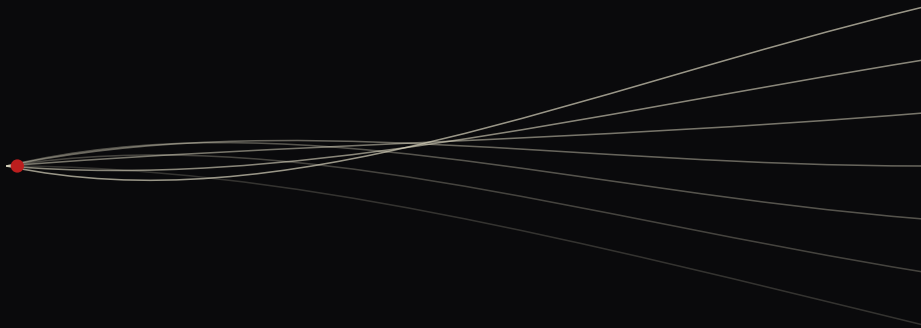
For KLAAT, the interesting phenomenon is learned musical information. A sound can function as a signal once it belongs to a shared practice. A particular return, omission or change in grain might later become recognizable to experienced participants without needing spoken instruction every time.

The existence of a cue does not require copying Harner's method. We can develop original sonic relationships, observe whether anyone actually recognizes them, and revise the language when the evidence disagrees.

The goal is not to reproduce someone else's ceremonies. It is to understand how a musical system becomes coherent and transmissible while remaining accountable to the cultures and people from whom we have learned.

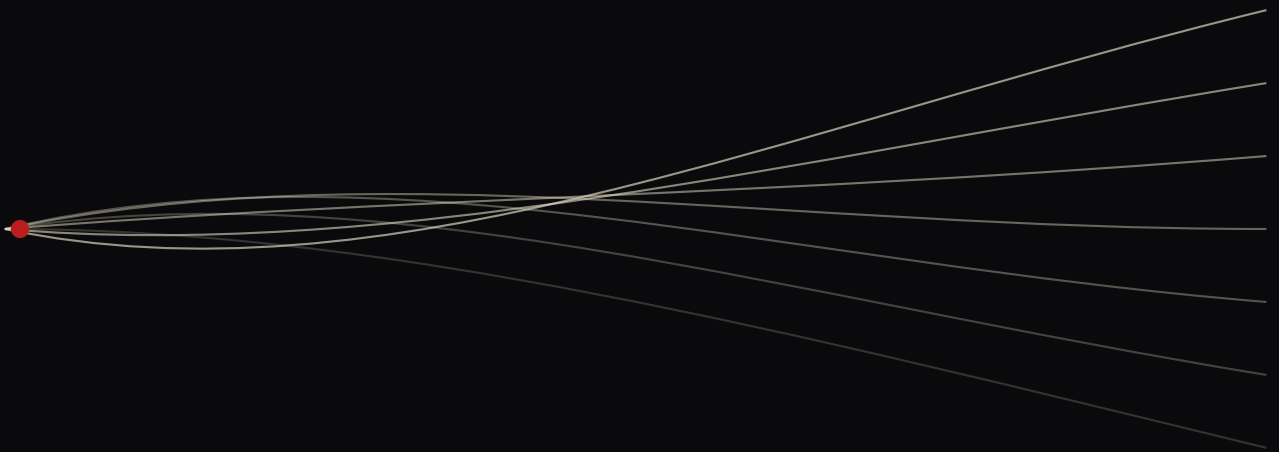
VIII

THE FORM STAYS OPEN



SKILL / IMPROVISATION

PLATE VIII / THE FORM STAYS OPEN



Schematic relationship / not instrument data

A form that can refuse itself

An improvised performance does not become more rigorous by being forced to resemble a diagram prepared in advance. The diagram comes afterward. It is our attempt to describe how the event unfolded, including the details that defeated our expectations.

Circular breathing becomes part of this freedom. The more reliably the player can coordinate it, the less attention must be spent rescuing the drone. The hand can make decisions without every gesture requiring a conscious calculation. Expertise may increase available choice, not reduce the music to obedience. A stable technique makes room for unstable ideas.

This also explains why the performer's account is not the listener's account. The player feels the mouth, breath, hide, fatigue, and impending gesture. The listener receives a sound mediated by the room and by their own history. Flow in the performer may coincide with absorption in the listener; the coincidence must not be taken for a transmission mechanism. It can only become an empirical question once both perspectives are gathered independently.

A form that can refuse itself

The four names—Ground Anchor, Threshold Gate, Rising Pulse, Return Path—are useful only if a performance remains free to violate them. They should help someone notice what happened, not force a musician to act out a predetermined ceremony. The system must grow from the music. The music owes the system nothing.

Four names, no commandments.

Earlier KLAAT work used four names: Ground Anchor, Threshold Gate, Rising Pulse and Return Path. They remain useful when a performance can genuinely be heard through that lens. One may establish a regularity; one may unsettle it; one may thicken the pulse; one may reveal an earlier condition again.

But these are not required movements, universal psychological stages, or a promise about listener experience. A performance may begin in density. It may refuse the gate. It may never return. A valuable notation must be capable of documenting what actually happened, including the event that defeats its categories.

Improvisation is not the absence of discipline. It is the ability to remain responsive while carrying a body of practiced technique. Breath and hand may enter into temporary agreement, then separate. Density may emerge from listening rather than a predetermined curve.

The living rule is simple and difficult: preserve a capacity to notice. Do not let the desire for a named structure prevent the music from contradicting it.

The performer is not the audience.

There are moments when playing becomes nearly automatic: breathing continues, the hand moves, and choices appear less like decisions than like attention taking shape. Such states can be artistically significant without proving that the listener is having the same experience.

The performer has access to muscle, breath pressure, effort, technical challenge and intention. The listener has access to an acoustic event filtered through a location, a body and a history. Their experiences can intersect, but they cannot be substituted for one another.

We can document both. After an uninterrupted performance, the player can describe moments of freedom, strain, transition and surprise. A listener can describe the recording without being told the intended arc. The distance between those accounts might reveal more than a score that claims to predict them.

A discipline grows stronger by allowing its maker to be surprised by the evidence.

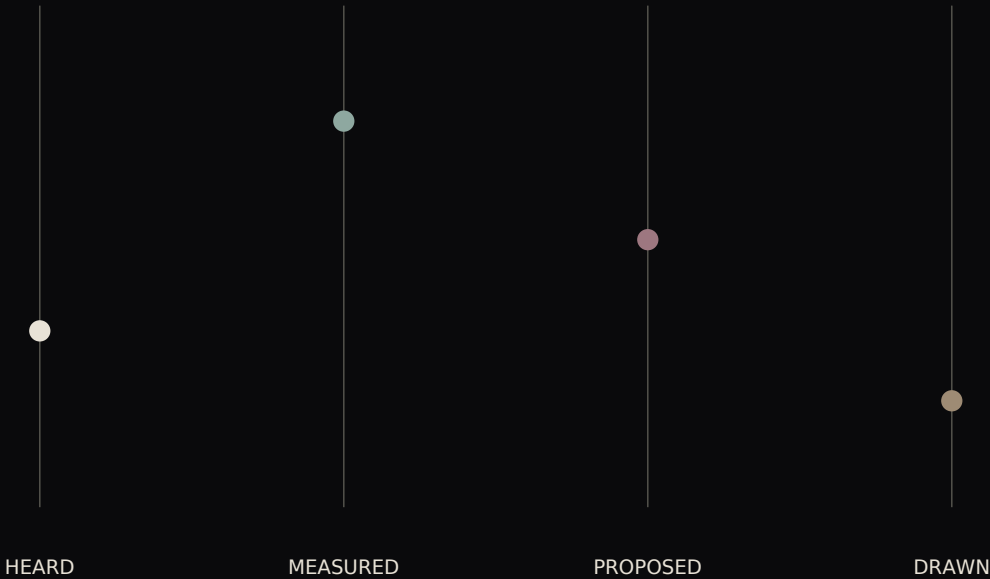
IX

WHAT THE ATLAS CAN KNOW



KNOWLEDGE / METHOD

PLATE IX / WHAT THE ATLAS CAN KNOW



Schematic relationship / not instrument data

The border of a claim

The moment KLAAT becomes an object of research, language needs a second discipline. A listener may say a pattern was hypnotic. The musician may describe a trance-like sense of flow. A researcher may measure a stable beat rate. These statements can coexist. They must not be presented as proof of the same event.

We have strong general research on musical prediction, acoustic resonance, attention, auditory grouping, and multisensory perception. We also have a particular artistic practice whose effects have not yet been established through KLAAT-specific controlled studies. The question is how to connect the two responsibly. The literature offers mechanisms worth investigating; it does not automatically certify our own outcomes.

A useful experiment starts after the performance and avoids telling the listener what to find. Let a participant describe where a passage changed. Compare that description with the recorded signal. Present the same music under different playback conditions. Ask the performer to annotate the experience separately. Document uncertainty and failures. The surprising absence of an expected effect is a finding, not a disappointment to hide.

The border of a claim

The Atlas must remain a place where a claim can become more exact without becoming less imaginative. The drawings may be poetic. The reports may be subjective. The measurements must have methods. The hypotheses must be vulnerable to contradiction. This arrangement is not a compromise between art and evidence. It is how each protects the freedom of the other.

Four kinds of statement.

KLAAT can remain artistically strange while being exact about the status of its claims. An OBSERVATION records an event we witnessed or heard. A MEASUREMENT reports a quantity gathered by an instrument or procedure. An INFERENCE offers a possible explanation. A FICTION or METAPHOR makes an image without claiming it is a mechanism.

Those categories should accompany the atlas invisibly enough not to burden every page, but clearly enough that a reader can always find the boundary. A ring drawn around a drum stroke may represent an audible expansion. Unless calibrated to actual audio, it is not a pressure map. A field of dots may represent increasing attack density. Unless tied to timestamps, it is not a transcription.

The scientific manuscript that preceded this atlas established substantial literature-led foundations. It did not establish that KLAAT itself reliably induces trance, entrains a brain, treats disease or causes particular physiological changes. Those questions require recordings, measurements and listener studies.

The first responsibility of this atlas is not to resolve the mystery. It is to keep the mystery honest.

The experiment begins after the music.

A performance should first be allowed to exist on its own terms. Then it can become an object of study. We can record uninterrupted sessions and mark the events that felt important without editing the work to fit a favored theory. We can invite listeners to describe what they heard before providing our vocabulary. We can compare accounts across rooms and playback systems.

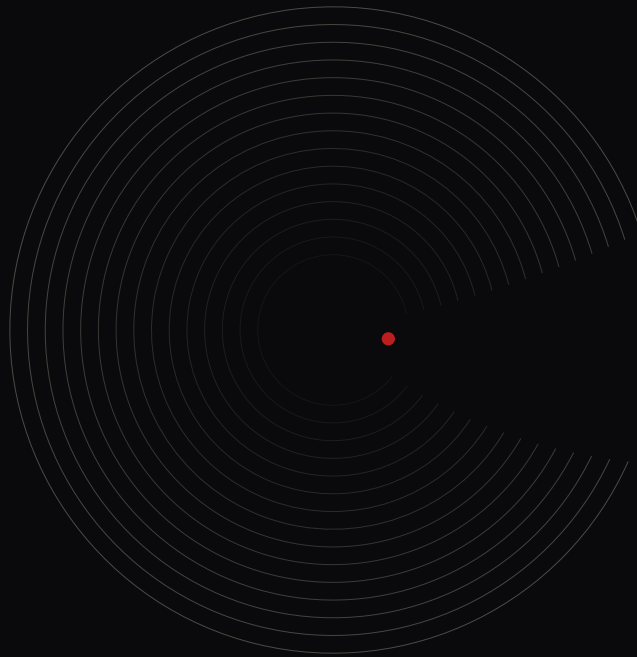
The earliest questions are modest and consequential. Can a listener identify a stable pulse under growing density? Do independently heard transitions align with the performer's intended changes? Which elements of KLAAT survive small speakers? Does repeated listening produce consistent new observations, or merely confidence in familiar descriptions?

The answers may disappoint a theory and deepen the art. That is a result worth having. The purpose of inquiry is not to announce KLAAT's power but to discover what its actual materials can support.

Let the sound remain free to contradict the page.

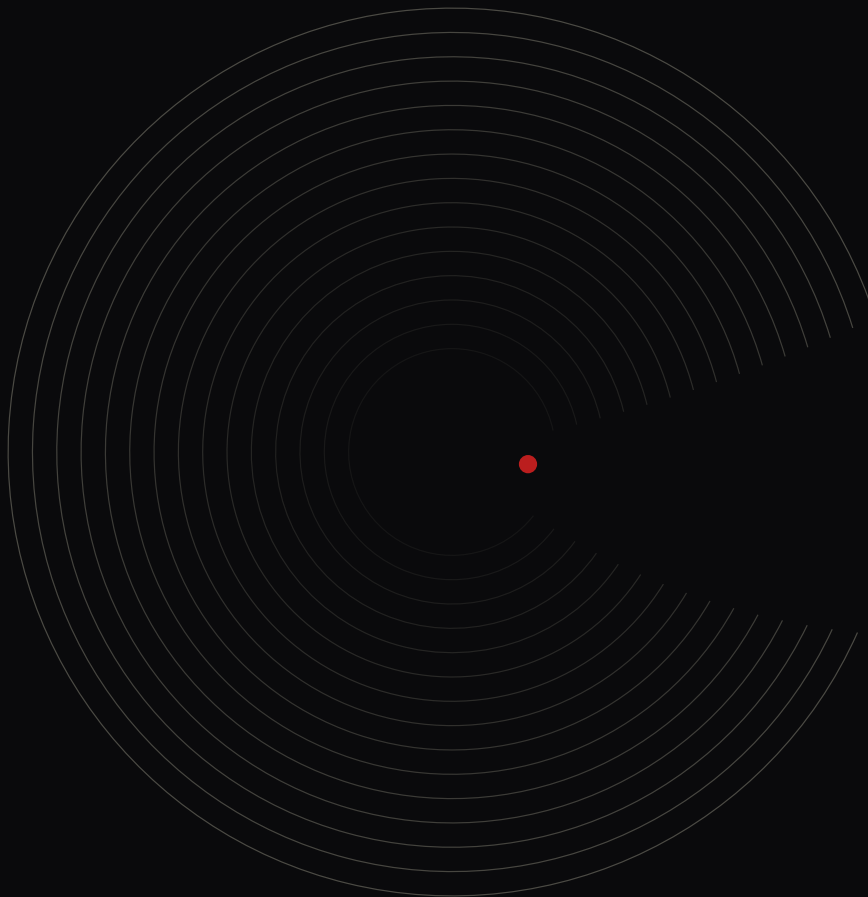
X

AN UNFINISHED RETURN



THE NEXT ENCOUNTER

PLATE X / AN UNFINISHED RETURN



Schematic relationship / not instrument data

The unfinished return

A book invites an ending because paper has a last page. A performance offers no such guarantee. The final strike may be followed by reverberation, by a breath, by the listener's expectation that the pulse should continue, by the memory of an interval that has now changed its meaning.

The field has gained names but it is not complete. The marks are provisional. We have not yet documented a full inventory of the instrument's expressive gestures, nor published the blind listener studies that would allow more confident claims about KLAAT-specific perception. These are not humiliating omissions. They are the honest boundaries of a young discipline.

What should remain after the book is not a doctrine but a way of approaching sound: begin with the actual event; listen closely; let an observation become a question; follow a question into research; return to the instrument with more possibilities, not more commandments. Nothing in that cycle requires the music to prove an extraordinary neurological claim in order to be worth making.

The unfinished return

The next recording may disagree with this Atlas. The next listener may hear a different chapter. The next performance may open a relationship for which none of these marks is useful. The response should be gratitude rather than defense. A living system survives because it can be revised. The sound came first. It should always be permitted the last word.

The work remains open.

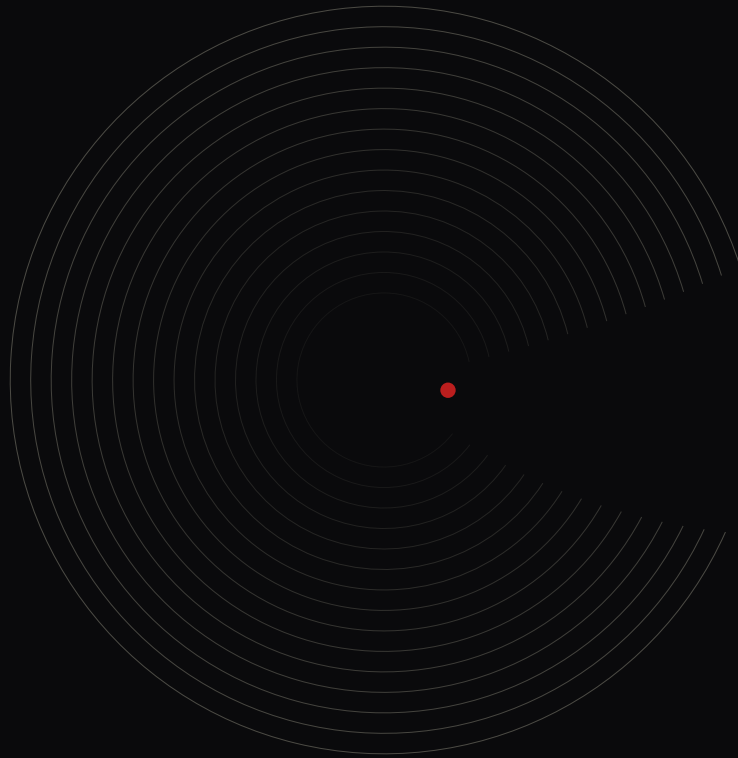
The final strike ends before the room becomes silent. Some part of it may continue as reverberation. Some part persists as a remembered interval. The drone may fall away, but the listener can still anticipate another sound that will not arrive.

KLAAT is a practice of attending to such relationships: what continues, what interrupts, what is learned, what changes under repetition, and what remains unknown when the measurable event has ended.

This atlas is not the definitive vocabulary of those relationships. It is the first careful arrangement of marks, statements and questions around them. The names may change. The diagrams may become more exact. The body of recordings will grow. Future participants may hear structures that its maker never intended.

A discipline is not made enduring by declaring itself complete. It becomes real through repeated use, honest revision and work strong enough to invite another person into the inquiry.

The sound came first. It should always be permitted the last word.



*The sound came first.
The sound must keep the last word.*

THE EXTENDED FIELD

What sound allows us to ask

A research companion to the Literary Atlas.

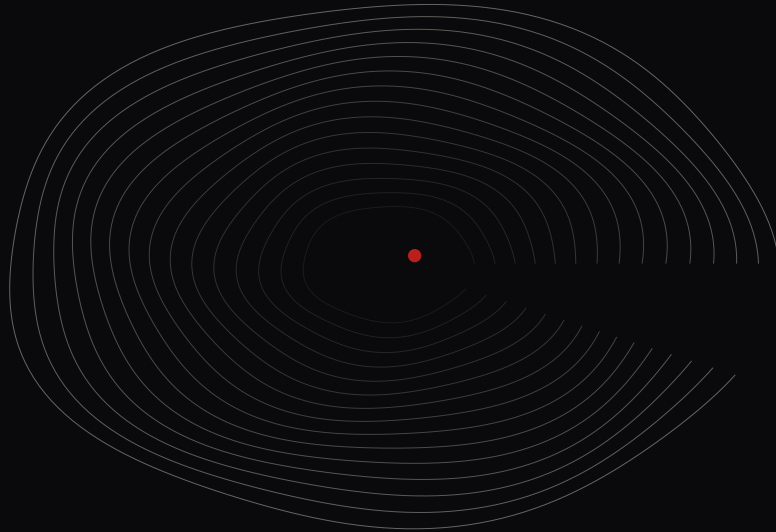
Twenty-eight chapters across nine territories.

Source synthesis: KLAAT research sessions 1–93.

Scientifically conservative; no KLAAT-specific
trance, therapeutic, or neural effects established.

I

Foundations: What Resonance Actually Means



PART I / 1 OF IX

Editorial Note

KLAAT began as an artistic practice, not as a scientific hypothesis. The sound existed before the terminology. The physical act of playing existed before there was a research ledger. Amastacia - the C# agave didgeridoo - and Ankora - the elk-hide frame drum - were already producing a world of sustained vibration, breath, pulse, texture, repetition, bodily effort, and room interaction before any attempt was made to explain why that world could feel absorbing, activating, ancient, heavy, or difficult to reduce to ordinary musical categories.

The purpose of this manuscript is therefore not to reverse-engineer a scientific score for KLAAT. It is to understand what the music is already doing, what parts of that experience can be measured, what parts remain subjective, and where attractive explanations become stronger than the evidence supporting them.

The first requirement is terminological discipline. KLAAT works with resonance, low frequencies, repetition, breath, bodily sensation, altered attention, and rhythmic persistence. Every one of those areas is vulnerable to language that sounds scientific while collapsing different phenomena together. "Frequency" can mean the acoustic pitch of Amastacia, the repetition rate of Ankora, a modulation rate, a room mode, a mechanical vibration frequency, or a neural oscillation. "Resonance" can mean a literal physical response of a room or structure, a metaphor for emotional recognition, or an unsupported claim that an organ or nervous system is being tuned. "Entrainment" can mean motor synchronization, perceptual prediction, stimulus-locked neural activity, respiratory coupling, or a vague promise that the entire organism has been pulled into one frequency.

KLAAT Research has spent ninety-three sessions separating those meanings. That work is not a detour from the art. It is what allows the art to remain strange without becoming sloppy.

Resonance Without Frequency Magic

1. The word that caused the problem

Resonance is one of the central words in KLAAT, and one of the easiest words to misuse.

In everyday language, resonance can mean that something "lands," that an idea feels true, that a sound evokes memory, that a room comes alive, or that a listener feels physically implicated in what they hear. All of those uses are legitimate as artistic or phenomenological language. None of them, by itself, is a physical definition.

In acoustics and mechanics, resonance is narrower. A physical system has modes - patterns in which it tends to respond. When an external force drives the system near one of those natural modes, the response can become disproportionately large compared with nearby frequencies. The exact behavior depends on geometry, mass, stiffness, damping, boundary conditions, and the way energy enters and leaves the system (Fletcher & Rossing, 1998; Kinsler et al., 2000; Pierce, 2019).

That definition immediately changes how KLAAT should think about "frequency." A frequency does not carry a universal property by itself. It interacts with a system.

A room might reinforce part of Amastacia's spectrum because one of its dimensions supports a standing-wave pattern near that frequency. A floor panel might buzz because its mechanical properties make it easy to excite within a narrow range. A hollow object might suddenly become loud when one harmonic aligns with one of its resonances. Those are physical resonance phenomena.

None of them implies that the same frequency will produce the same effect in another room, another object, or another body.

This is the first scientific boundary KLAAT needs to retain permanently:

FREQUENCY IS NOT EFFECT. FREQUENCY + SYSTEM + COUPLING + LEVEL + TIME = RESPONSE.

Even that formula is only conceptual, but it is much closer to reality than the idea that a named frequency contains a predetermined biological meaning.

2. Why C# matters artistically but not mystically

Amastacia is a C# agave didgeridoo. That pitch is part of her identity. It determines a fundamental region and a harmonic scaffold. It affects how the room responds, how other sounds relate to the drone, and how Paul's vocal tract and embouchure interact with the instrument. It can become symbolically important because it is the sound KLAAT has grown around.

What the research does not support is a claim that C# is intrinsically therapeutic, spiritually privileged, neurologically optimal, or naturally tuned to a particular organ.

That distinction does not diminish the instrument. It does the opposite. It relocates meaning from a generic internet claim to the actual artistic history of Amastacia.

C# matters because this instrument is C#. It matters because Paul has spent time inside that sound. It matters because listeners hear its harmonic consequences, because rooms respond to its spectrum, because recordings carry or fail to carry parts of its energy, and because the drone functions as a stable perceptual reference around which other change becomes meaningful.

That is a richer claim than "C# heals X." It is also testable.

3. Resonance versus forced vibration

One of the most useful corrections in the research archive is the distinction between resonance and ordinary forced vibration.

If a floor moves because Ankora is struck nearby, that does not automatically mean the floor is resonating. A driven system can move at the forcing frequency simply because energy is being applied to it. Resonance is the special case in which the response is enhanced because the forcing lies near a natural mode (Fletcher & Rossing, 1998).

This matters because KLAAT often produces visibly or physically compelling vibration. It is tempting to see every rattling object, vibrating chair, or moving floor as proof that the environment has "resonated with" the performance. Sometimes that may be literally true. Sometimes the structure is simply being driven.

The difference can be investigated by changing the spectral content while holding overall level approximately stable. If an object responds dramatically only in a narrow band of Amastacia's harmonic configurations, resonance becomes more plausible. If it responds broadly whenever the sound is loud enough, ordinary forced vibration may explain more.

This is an example of how the research should behave: not by taking poetry away from the event, but by refusing to mistake poetry for mechanism.

4. The room is a resonant system; the body is not one simple resonator

Rooms are relatively straightforward examples because their dimensions create measurable acoustic modes. At low frequencies, wavelengths are large enough to interact strongly with room geometry. A listener can move through a room and receive substantially different low-frequency pressure and spectral balance because they have moved through a spatially nonuniform sound field (Kuttruff & Vorländer, 2025; Pierce, 2019; ISO 3382-1:2009).

That is literal resonance.

The human body is more complicated. Different tissues, body segments, postures, contact surfaces, and sensory receptors respond differently across frequency. There is no scientifically useful single "body frequency" that replaces those variables. Whole-body vibration and seated-body biodynamics show frequency-dependent responses that vary with axis, posture, support, and loading (Fairley & Griffin, 1989; Wu et al., 2022; Yin et al., 2026; ISO 2631-1:1997).

KLAAT therefore rejects blanket statements such as "the body resonates at X hertz."

The scientifically defensible alternative is more interesting: different parts of the listener-environment system may respond differently to different components of KLAAT. Feet in contact with a vibrating wood floor can receive one mechanical signal. The pelvis on a chair can receive another. The ears receive airborne pressure. The skull can receive some bone-conducted energy. The brain integrates these streams into one experience.

The felt whole can be unified even when the physical pathways are multiple.

5. Why low frequency feels special without being magical

Low-frequency sound often feels physically consequential because several ordinary properties converge.

First, the auditory system is less sensitive to very low frequencies than it is through much of the midrange. Producing a low tone that feels equally loud can therefore require substantially more acoustic energy than producing a tone in a region where hearing is more sensitive.

Second, low-frequency wavelengths are long. In enclosed spaces they interact strongly with room dimensions, generating large position-dependent changes.

Third, strong low-frequency sound can produce tactile or pressure sensations under some conditions, while structure-borne vibration can reach the body through floors, seats, or other contact surfaces.

Fourth, humans often associate low-pitched events with large physical causes - large objects, heavy impacts, distant machinery, thunder, engines, bodies, architecture. Perception is never only an oscilloscope reading.

Together these factors can make low sound seem massive or bodily. But "lower" is not a universal synonym for "more physical." Tactile and whole-body responses depend on frequency, magnitude, body site, posture, and interface conditions; controlled music studies also show that an added tactile channel can alter movement and aesthetic response without establishing a universal "more bass = more body" rule (Hove et al., 2020; Fairley & Griffin, 1989; ISO 2631-1:1997).

The KLAAT correction is simple:

LOW ACOUSTIC PITCH != TACTILE INTENSITY.

Amastacia's fundamental, Ankora's pulse rate, and the mechanical vibration spectrum at a listener's body are separate measurements.

6. The first major implication for KLAAT

The mature research position is that KLAAT should stop asking, "What does this frequency do?" and instead ask, "What system is this sound entering, and what survives the interaction?"

The same Amastacia performance enters a room, a microphone, a floor, a listener's ears, a listener's feet, a recorder, a pair of headphones, and a phone speaker differently. Each pathway filters the event.

This changes how KLAAT thinks about authenticity. The "real" experience is not one immutable waveform. The live event is a relationship among performer, instrument, room, listener position, body contact, attention, and duration. A recording is another relationship. A small speaker is another. None is automatically fraudulent, but they are not equivalent.

The research begins by keeping them separate enough to compare.

Sound Is Not One Frequency

1. The category error at the center of sound mysticism

Many weak claims about sound begin with one simple mistake: several different kinds of periodicity are treated as though they are the same thing.

A low note has a frequency. A repeating drumbeat has a rate. An amplitude modulation has a rate. A room mode has a frequency. A floor vibration has a spectrum. A respiratory cycle has a rate. A neural oscillation has a frequency.

They can be numerically similar while remaining physically different. Standard acoustics, rhythm-perception, and physiological measurement treat these as different variables rather than interchangeable meanings of the word "frequency" (Kinsler et al., 2000; McAuley & Semple, 1999).

This is more than a semantic distinction. KLAAT contains all of these temporal layers at once.

Amastacia may produce a fundamental in the neighborhood of a low C#, plus a ladder of harmonics and noise. Ankora may strike roughly 137 times per minute during a particular reference performance. Breath introduces slower physiological cycles and faster acoustic gestures. The room adds resonant frequencies and reverberant decay. The listener may group the drum into half-time or other metrical levels. The waveform may contain amplitude fluctuations unrelated to the nominal beat. A chair may vibrate in a frequency band that does not equal either the drone pitch or the beat rate.

The richness of KLAAT comes partly from these layers coexisting.

The danger comes from collapsing them.

2. Carrier frequency versus event rate

Suppose Ankora is played at 137 beats per minute. Dividing by sixty gives about 2.28 events per second. That arithmetic does not mean Ankora produces a 2.28-Hz acoustic tone.

Each strike is a broadband event. Its waveform contains energy across many frequencies determined by the hide, frame, strike location, force, room, and microphone. The 2.28-per-second figure describes how often those events recur.

A listener can perceive that recurrence as a pulse. The nervous system can predict when the next event is likely to happen. The body may synchronize movement at the same rate, half the rate, or another related level. None of those outcomes requires a literal 2.28-Hz pressure wave to exist in the air.

This distinction is foundational because the phrase "the brain is being driven at 2.28 Hz" sounds plausible until the measurement categories are separated.

There might be neural activity that becomes phase-related to recurring auditory events. That is an empirical neural-response question. It is not demonstrated merely by converting BPM into hertz.

3. Beat versus meter

Beat itself is not only a physical property of the sound. It is a perceptual organization.

Listeners infer temporal regularities. They group events. They may hear one level as the main pulse while perceiving faster subdivisions and slower groupings simultaneously; perceived beat level can shift with tempo and metrical subdivision rather than being read directly from one physical event rate (McAuley & Semple, 1999; Repp & Bruttomesso, 2009/2010).

A fast Ankora pattern can therefore support a slower bodily movement. Someone might nod, sway, or tap at half-time while still perceiving every strike. Another listener might lock onto a faster subdivision. The acoustic event train is the same; the chosen metrical level differs.

This is why 137 BPM should remain a historical calibration feature of one important KLAAT recording rather than becoming a doctrine. The same nominal tempo can be perceived through different metrical organizations, and listeners bring their own spontaneous movement preferences into the experience.

KLAAT's pulse is a relationship between delivered events and inferred structure.

4. Beats and amplitude modulation

Two nearby acoustic frequencies can interact to create periodic changes in amplitude. For example, components at 70 and 74 Hz can produce a four-cycle-per-second beating pattern in the resulting amplitude envelope.

That four-per-second fluctuation is real as temporal modulation, but it should not be confused with a pure four-hertz acoustic carrier.

This matters for Amastacia because sustained drone is not temporally empty. The instrument's harmonic structure, vocalization, embouchure, oral-cavity changes, breath pressure, and room reflections can create slow and fast amplitude fluctuations inside what the listener calls "one note."

The drone can therefore have rhythm without becoming percussion.

That is one of the crucial conceptual steps in understanding KLAAT: continuity and eventfulness are not opposites.

Amastacia can remain continuously present while her internal temporal structure changes. Ankora can provide discrete attacks while its accents create larger-scale continuity. The two instruments approach time from different directions.

5. Roughness: when modulation becomes texture

As amplitude fluctuations become faster, the percept can shift from obvious slow beating toward roughness or grain.

Roughness is not simply dissonance in the everyday sense. It is associated with rapid temporal-envelope fluctuations and spectral interactions that can become perceptually salient; its meaning depends on acoustic context and should not be imported wholesale from alarm-vocalization research into KLAAT (Arnal et al., 2015).

Roughness matters because it offers one route to intensity that is separate from loudness and tempo.

Amastacia can become more urgent without becoming faster. A vocalized harmonic interaction, growl, unstable lip oscillation, or dense overtone region can change sensory texture. A listener may experience greater tension or activation even if average sound level changes little.

The research does not prescribe roughness as a technique. It establishes a vocabulary for recognizing what might already be happening.

6. The attack transient is a temporal event

Ankora reminds us that timing is not only about spacing between events. It is also about the shape of each event.

The first milliseconds of a drum strike carry strong information about timing and identity. Attack time is a major dimension of timbre, and recent work on compound musical sounds shows that perceptual timing can be dominated by sharp-attack components rather than by a simple physical-onset average (Caclin et al., 2005; Danielsen et al., 2026; Câmara et al., 2026).

This is why two passages with equal event rates can feel dramatically different in speed, force, and clarity.

The same principle extends to Amastacia. Breath articulations, tongue movements, pressure changes, and timbral shifts can create edges within continuity. Those edges may help a listener infer rhythm even when no new note begins.

KLAAT therefore contains at least two broad temporal channels:

- discrete event timing, carried strongly by Ankora's attacks;
- continuous-envelope timing, carried through Amastacia's articulations and spectral changes.

Their interaction may be more important than either alone.

7. Combination tones and auditory nonlinearity

The ear is not a passive microphone. Auditory processing is nonlinear. Under some conditions, combinations of tones can produce distortion products or perceived pitches not corresponding to a single strong component in the source spectrum.

This matters because KLAAT's spectral complexity can produce "phantom" elements that feel acoustically real to a listener. A low pitch may be inferred from higher harmonics. A combination tone may be perceived even when it is weak or absent in the original airborne spectrum. A beating pattern may be heard as a periodic phenomenon not equivalent to a separate pure tone.

These are legitimate psychoacoustic phenomena. They do not need metaphysical explanations.

In fact, the science makes them stranger in a better way: perception is an active construction.

8. Missing fundamental: the low note that survives

One of the clearest examples is the missing fundamental.

A harmonic series can imply a fundamental frequency even when the actual fundamental component is greatly attenuated or absent. Classic pitch experiments show that listeners can derive pitch relationships from harmonic information even when the physical fundamental is missing, although performance degrades as useful harmonic information becomes less favorable (Houtsma & Goldstein, 1972; Houtsma & Smurzynski, 1990).

This has direct consequences for Amastacia outside a full-range room.

A small speaker may fail to reproduce the deepest part of the drone. Yet listeners may still recognize Amastacia as low because upper harmonics preserve enough structure for the ear to infer the fundamental.

That does not mean nothing has been lost.

Pitch identity may survive while physical pressure, tactile contribution, fullness, warmth, spatial interaction, and timbral balance change. A phone can preserve "the note" while failing to preserve "the body."

This distinction is central to portable KLAAT.

The survival of identity and the survival of physical impact are separate questions.

9. A layered temporal model of KLAAT

The mature research suggests that KLAAT should be understood as a hierarchy of time scales rather than a single pulse.

At the fastest levels are acoustic fine structure, attack edges, roughness, and high-frequency modulations.

At intermediate levels are Ankora strikes, subdivisions, Amastacia articulations, and recurring rhythmic patterns.

At slower levels are meter, phrases, changes in density, breath cycles, perceived chapters, and the accumulation of familiarity.

At still slower levels are the listener's experience of duration, the performer's flow state, and the architecture of a long performance.

A scientific analysis that looks only at BPM misses most of the system.

A mystical analysis that labels every number "frequency" misses even more.

The Room Is A Distributed Instrument

I. There is no single seat called "the room"

Early KLAAT language said that the room is part of the instrument. That remains artistically useful, but the research eventually forced a more precise statement:

THE ROOM IS NOT ONE ROOM.

An enclosed space does not provide one uniform acoustic condition. It provides a field. Modern room-acoustics texts and ISO measurement standards explicitly treat spatial coverage and measurement position as part of defensible room characterization rather than assuming one point represents an entire performance space (Kuttruff & Vorländer, 2025; ISO 3382-1:2009; ISO 3382-2:2008).

At low frequencies especially, standing waves can create regions of reinforcement and cancellation. Reflections alter timing and spectral balance. Surfaces vibrate differently. Floors transmit energy unevenly. A listener near a wall or corner may receive substantially more low-frequency pressure than someone near a modal null. A person sitting in a resonant chair may receive a stronger mechanical input than someone standing a few feet away.

Two audience members can therefore attend the same KLAAT performance and receive materially different stimuli.

This is not a defect. It is a property of acoustic space.

It does mean that claims about "what the audience heard" should be treated cautiously if only one microphone position was measured.

2. Why sustained drone exposes the room

Amastacia is unusually suited to revealing spatial variation because sustained sound continuously excites the room.

A brief transient can pass before a listener has time to notice a stable spatial pattern. A drone remains. If part of its spectrum aligns with a room mode, that reinforcement can persist. The listener can move through peaks and nulls and hear the field transform without any change in the performer's intention.

This can make a venue seem alive.

A corner can bloom. A center position can hollow out. One harmonic can become dominant. Another can disappear. The same C# identity can feel heavy, nasal, thin, wide, pressurized, or strangely detached depending on position.

The poetic statement "Amastacia activates the room" therefore has a literal acoustic counterpart, but not in the mystical sense. The room's geometry filters and redistributes the energy she provides.

3. Reverberation is not simply "more resonance"

Room modes and reverberation are related to the room but should not be collapsed into one concept.

Reverberation describes the persistence and decay of sound energy in an enclosure after excitation, and standardized room-acoustic measurement treats reverberation time as a defined property requiring specified procedures and positions (ISO 3382-1:2009; ISO 3382-2:2008; Kuttruff & Vorländer, 2025). Its effects are especially important for Ankora because repeated drum attacks can overlap with the decay from earlier strikes.

In a live room, Ankora is not only playing the current strike. The room may still be carrying pieces of previous ones.

This can blur transient timing. It can thicken the pulse. It can make individual attacks less distinct while increasing a sense of continuous pressure or mass.

Whether that helps KLAAT depends on the actual aesthetic and passage. A reverberant environment might make the drum feel enormous and ceremonial. It might also smear the temporal clarity that allows the pulse to function as a reliable anchor.

The scientific point is not that one reverberation time is correct. It is that room decay changes the signal the listener receives.

4. Listener zones instead of one reference point

The research program eventually adopted a spatial-mapping principle: one microphone cannot stand in for an entire audience.

A useful KLAAT venue map can distinguish several kinds of positions:

- performer ear position;
- nearest listener position;
- representative center position;
- rear position;
- known low-frequency hotspot;
- and, when relevant, structural-contact positions such as a chair or platform.

This is not bureaucracy. It is how claims become reproducible. ISO 3382 standards likewise make measurement position/coverage part of room-acoustic characterization, while IEC 61672 specifies the performance requirements of sound-level meters used for acoustic measurements (ISO 3382-1:2009; IEC 61672-1:2013).

A strong low-frequency reading at one corner should not be generalized to the room. A comfortable average level at the center does not guarantee that the closest listener or performer is receiving the same exposure. A chair acceleration reading does not automatically describe a standing listener.

KLAAT's room is a distribution of conditions.

5. The listener changes the system

A room full of bodies is not acoustically identical to an empty room.

Audience members absorb and scatter sound. Furniture changes boundary conditions. Clothing and cushions affect higher-frequency reflections. A person sitting in a chair changes the mechanical loading of that chair. The support surface and body form a coupled system.

The exact magnitude of these effects varies, but the general principle is unavoidable:

THE OCCUPIED PERFORMANCE SYSTEM IS NOT THE EMPTY PERFORMANCE SYSTEM.

This becomes especially important if KLAAT later investigates structure-borne vibration. Measuring an unloaded chair or platform can be useful, but it does not directly tell us what a seated listener receives. Body mass, posture, contact force, feet placement, back contact, and footwear can alter transmission.

6. Airborne field versus mechanical field

A venue can contain at least two overlapping spatial maps.

The first is the airborne acoustic field: pressure levels and spectra across listener positions.

The second is the mechanical field: vibration of floors, chairs, platforms, or other structures.

These maps may correlate in some places and diverge in others.

A position with strong bass pressure is not automatically the position with strongest seat vibration. A floor panel may have its own structural modes unrelated to the dominant acoustic mode. A listener may hear powerful low-frequency energy without much direct tactile input, or feel a strong structure-borne pulse at a point where airborne level is not maximal.

This is why "the bass" is not a single thing.

KLAAT's physicality may emerge from the combination of fields, not from one field alone.

7. The room can help bind Amastacia and Ankora - or pull them apart

Spatial acoustics also affect how the two instruments relate perceptually.

Ankora's attacks depend on clear temporal edges. Amastacia's drone depends on sustained spectral presence. A room with long low-frequency decay may make the drum's impact persist inside the drone. A highly reflective space may emphasize upper harmonics and attack noise. A soft or heavily damped room may preserve timing while reducing bloom.

The room therefore participates in auditory scene analysis.

It can make Amastacia and Ankora seem more fused, more separate, more distant, more enveloping, or more local. These are perceptual outcomes, not simply reverberation numbers.

This becomes particularly important in live KLAAT because the performance is spontaneous. Paul is not only playing two instruments; he is hearing their interaction with the space and responding in real time. The room enters the improvisational loop.

8. The performer's room is not the audience's room

Paul occupies one acoustic position, usually very close to the instruments, while also receiving bone-conducted and mechanically coupled information unavailable to distant listeners.

He may hear a particular overtone strongly because of proximity or directivity. A listener across the room may hear a different balance. He may feel Ankora through his hands and body. The audience may receive the drum through air, floor, seat, or not tactually at all.

This is one of the recurring safeguards in the research:

PERFORMER EXPERIENCE != LISTENER STIMULUS.

That does not make one more real than the other. It means they are different datasets.

9. Recording removes the original room and creates another one

The moment KLAAT is recorded, the room becomes encoded imperfectly into microphones, placement choices, preamps, levels, processing, and the final mix.

Playback then occurs in a new room or through headphones.

This is why Session 80 called the playback system the third participant. In practice there may be even more participants: the recording room, microphone chain, mix decisions, playback transducer, new room, and listener position.

A recording can preserve a powerful sense of KLAAT while radically changing the low-frequency field. It can reveal breath details that were masked live. It can sharpen Ankora attacks. It can lose floor vibration entirely. It can exaggerate room bloom if the microphones were placed to capture it.

The recorded work is therefore not a transparent window into the live event. It is a new delivery condition.

10. Acoustic mapping without turning the ritual into a laboratory

The research program developed increasingly detailed measurement safeguards because room claims can become false very quickly when location, metric, instrument capability, and calibration scope are ignored. IEC 61672 distinguishes class 1/class 2 instrument performance, IEC 61672-3 covers only a defined set of periodic tests, and NIOSH's smartphone guidance explicitly limits its performance claims to tested configurations (IEC 61672-1:2013; IEC 61672-3:2013; CDC/NIOSH, Sound Level Meter App).

The minimum useful acoustic record should state:

- where the microphone was;
- how long the measurement represents;
- which metric was used;
- calibration status;
- source distance and orientation when relevant;
- room and floor type;
- and enough information about the performance passage to know what was being measured.

The point is not to cover the room in sensors during every performance.

The point is to avoid making strong statements from weak measurements.

Hearing-exposure guidance also reinforces the need to record both level and duration rather than treating a momentary loudness impression as dose; for live entertainment, WHO recommends calibrated monitoring and venue/system optimization as part of safe-listening practice (NIOSH, 1998/current guidance; WHO, 2022).

KLAAT can remain artistically intuitive while research sessions use deliberate mapping when needed.

II. Venue choice as artistic choice

Once the room is understood as a distributed instrument, venue selection becomes more than logistics.

A venue can support different versions of KLAAT without requiring Paul to change the underlying artistic language.

A smaller, resonant wood-floored room may create strong structure-borne involvement and intimate reflections. A large concrete space may produce longer decay and pronounced low-frequency zones. An outdoor setting may reduce room-mode reinforcement while exposing the raw relationship between source and listener. A heavily treated studio may reveal articulation and timbre with much less spatial bloom.

None is automatically superior.

The research question is not "Which room is best?" but "What does this room contribute, remove, or transform?"

Part I – Synthesis

The first three chapters replace several early temptations with a more durable model.

KLAAT is not a frequency applied to a passive body.

It is a coupled system.

Amastacia produces a sustained spectrum that changes internally even when pitch appears stable. Ankora produces discrete transients whose pulse is perceived hierarchically rather than existing as one simple low-frequency tone. The room redistributes both. Structures may transmit mechanical vibration through separate pathways. The listener's position and body determine what arrives. Perception then reconstructs pitch, groups events, infers pulse, integrates modalities, adapts to repetition, and assigns meaning.

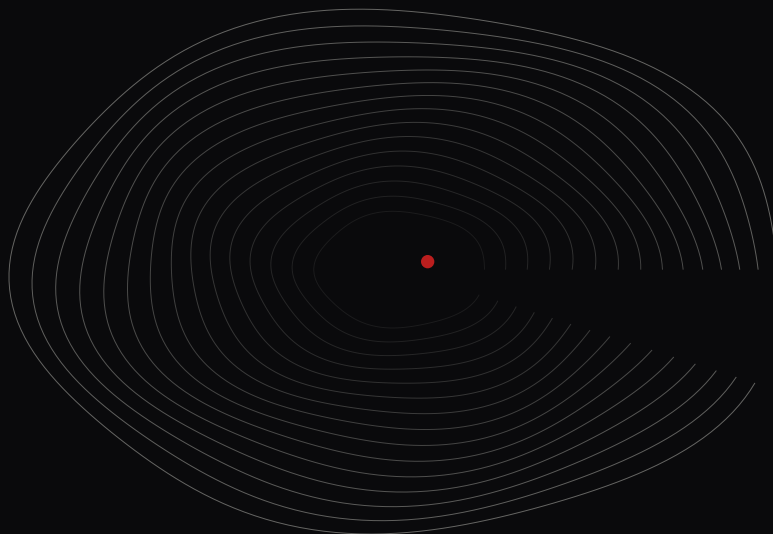
This is already enough to explain why the same KLAAT performance can feel radically different across rooms, positions, playback systems, and people without invoking a mystical frequency law.

It also provides a stronger foundation for everything that follows.

Part II turns inward to Amastacia herself: the drone as an acoustic field made from breath, harmonics, noise, roughness, masking, articulation, and perceptual continuity.

II

Amastacia: The Continuous Field



PART II / 2 OF IX

The Drone Is Not One Frequency

1. The illusion of simplicity

A drone is easy to describe badly.

It is tempting to say that Amastacia produces "a C# tone" and leave the description there. That statement is not false, but it is radically incomplete. A sine wave can be meaningfully described by one dominant frequency. A didgeridoo drone cannot.

Amastacia's sound begins with periodic lip vibration, but the radiated signal contains a family of harmonics, breath noise, transient changes, vocal-tract filtering, turbulent components, room interaction, and slow movement in amplitude and spectrum. Didgeridoo acoustics directly demonstrates how strongly vocal-tract resonances can reshape the radiated harmonic structure while the underlying drone persists (Tarnopolsky et al., 2005, 2006; Fletcher et al., 2006). Even if the listener experiences a stable pitch center, the signal carrying that pitch is continually changing.

This difference between perceptual stability and acoustic change is one of the most important facts in KLAAT.

A drone can remain "the same note" while becoming brighter, rougher, hollower, denser, breathier, more vocal, more nasal, more distant, or more urgent. It can carry motion without changing pitch. It can create a stable world without becoming static.

That is why KLAAT's drone should be understood as a field rather than a single frequency.

2. Fundamental and harmonic ladder

Any precise discussion of Amastacia must begin with a caution: her exact sounding fundamental, tuning drift, octave, and harmonic balance should be measured from actual recordings before numerical claims are attached to a specific take.

Still, the general acoustics are straightforward. If a hypothetical didgeridoo fundamental lies near 69.3 Hz, close to equal-tempered C#2, harmonic components would occur near integer multiples: roughly 138.6 Hz, 207.9 Hz, 277.2 Hz, and upward.

Those numbers are illustrative, not measurements of Amastacia.

What matters is the structure. A listener can experience one low pitch while receiving energy across a wide range of frequencies. The relative strength of those components determines much of the instrument's timbre.

This explains why "turning up the bass" is not equivalent to making Amastacia more authentic. The distinctive information may be distributed across the spectrum.

3. Vocal tract as an acoustic filter

Didgeridoo research is unusually useful here because it directly measures something KLAAT already experiences intuitively: the player's mouth and vocal tract reshape the drone.

Studies of skilled didgeridoo performance have shown that vocal-tract resonances can strongly modify the radiated spectrum. Tongue position, mouth shape, and related articulatory changes alter vocal-tract impedance and selectively emphasize or suppress groups of harmonics (Tarnopolsky et al., 2005, 2006; Fletcher et al., 2006).

In detailed measurements, important vocal-tract impedance/resonance effects occurred in the roughly kilohertz region above the drone fundamental, including strong formant shaping around approximately 1-3 kHz in the measured didgeridoo conditions (Tarnopolsky et al., 2005, 2006). Those frequencies are far above the fundamental, yet they can contribute strongly to the characteristic vowel-like motion of the instrument.

This is artistically important because it relocates expression.

Amastacia's identity does not reside only in the bottom octave. Much of her apparent speech, growl, breath, and interior movement occurs through the shaping of upper spectral regions.

A limited playback system may therefore lose deep physical weight while preserving a surprising amount of personality.

4. The drone is temporal

A sustained tone is often imagined as the opposite of rhythm. Amastacia contradicts that assumption.

Breath pressure changes. Articulation changes. Vocal tract configuration changes. Harmonic emphasis shifts. Noise enters and recedes. Lip oscillation is not perfectly static. The room adds reflections and decay.

These changes create envelopes - patterns over time.

Some are slow enough to feel like swells. Some are fast enough to become texture. Some become roughness. Some function almost like attacks within the continuous field.

This means a drone can contain temporal structure without becoming a sequence of discrete notes.

The research program eventually distinguished carrier from envelope. The carrier supplies periodic acoustic material and pitch structure. The envelope describes slower changes in level or spectral energy. Listeners can track both.

KLAAT therefore does not consist of "drone plus rhythm" in the simplistic sense of static tone plus moving drum. Both instruments carry time.

They simply carry it differently.

5. Stability as learned background

When Amastacia remains relatively stable, the listener's auditory system adapts to regularity.

That does not mean the sound disappears. It means predictability changes its perceptual status. Features that once demanded attention can become background. A later deviation can then feel disproportionately large because it violates a stable context.

This is one reason a subtle timbral change after several minutes of stability may feel more significant than a much larger change inside a constantly changing passage.

The scientific mechanism is not mystical. Sensory systems continuously adjust to regularities and emphasize deviations.

The artistic consequence is profound: minimal change can remain meaningful if the preceding context has made it meaningful.

KLAAT does not need constant novelty to remain alive.

6. The drone as an attentional object

A listener can also reorganize the drone without any change in the waveform.

Attention may shift from the fundamental to upper harmonics, then to breath noise, then to room reflections, then to the relationship with Ankora. The acoustic event remains relatively stable while the experienced object changes.

This is one reason long-form drone can support absorption for some listeners. The perceptual field contains enough internal structure to be re-entered from different angles.

But that outcome is not universal. Another listener may habituate, become bored, or redirect attention elsewhere.

KLAAT should therefore distinguish acoustic stability from perceptual sameness.

They are not the same thing.

7. The drone outside the room

Recording and playback expose this distinction dramatically.

A phone speaker may reproduce only a fraction of Amastacia's low-frequency pressure. Yet enough upper harmonics may survive for the listener to infer the same tonal center. This is related to the missing-fundamental phenomenon: pitch can be derived from harmonic relationships even when the physical fundamental is weak or absent, although pitch discrimination becomes less reliable as the available harmonic information becomes less favorable (Houtsma & Goldstein, 1972; Houtsma & Smurzynski, 1990).

That does not restore what the speaker failed to radiate.

Pitch identity can survive while physical weight disappears.

A small speaker may therefore preserve "Amastacia" as an auditory object while losing part of the live bodily experience.

This is not failure. It is transformation.

The research question becomes: which features of Amastacia are necessary for recognition, which are necessary for felt authenticity, and which are necessary for bodily presence?

Those may be three different sets of features.

Breath, Harmonics, Roughness, And The Human Edge

I. A machine could sustain a tone; Amastacia is not a machine

The difference matters.

KLAAT's drone is produced by a breathing body. The performer's lips oscillate. Air pressure varies. The vocal tract reshapes. Muscles fatigue. The mouth stores and releases air during circular breathing. Small changes leak into the sound.

Those irregularities are not necessarily defects.

They are evidence that the field is alive.

This does not mean every inconsistency is artistically desirable. Technique matters precisely because greater fluency gives Paul more choice over which irregularities remain and which disappear.

The research position is therefore neither "perfect the drone until it is machine-flat" nor "every imperfection is sacred."

It is: distinguish limitation from expression.

2. Circular breathing as coordination

Circular breathing is often described mystically because the sound seems to continue without interruption while the performer inhales.

Physiologically, the mechanism is practical. Air stored in the mouth temporarily drives the instrument while the player inhales through the nose. Cheeks, tongue, soft palate, oral cavity, and airway coordinate the switch. Lung-driven airflow resumes before the tone collapses.

Direct cine-MRI work with experienced wind musicians supports circular breathing as a coordinated, trainable motor sequence involving oral-cavity and airway control rather than a supernatural breath state (Peng et al., 2015).

That matters because the technique can be studied without dictating the music.

Useful questions include:

- Does the pressure collapse during the switch?
- Does the harmonic balance change?
- Is the inhale audible?
- Does the switch become harder while Ankora is being played simultaneously?
- Does fatigue increase unwanted discontinuity?

These questions concern freedom, not composition.

The goal is to make Paul more capable of following instinct.

3. The three breaths

KLAAT research eventually separated three different things that had previously been called "breath."

The first is performer physiology: Paul's actual inhalation, exhalation, pressure, and muscular coordination.

The second is acoustic breath: hiss, turbulence, swells, harmonic shifts, and articulation that listeners can hear.

The third is listener respiration: whatever happens in the listener's own breathing.

These are related only through evidence, not assumption.

A continuous Amastacia drone does not prove continuous pulmonary exhalation. An audible breath-like sound does not necessarily correspond to a full respiratory cycle. A listener describing the piece as "breathing" does not prove their breathing synchronized to the music.

This three-way separation is one of the most important safeguards in the entire KLAAT program.

4. Breath texture as information

Recording engineers often treat breath noise as something to remove.

KLAAT cannot assume that.

Breath turbulence, air-column noise, articulation, and small pressure changes may carry information about proximity, effort, fragility, aggression, continuity, or the human origin of the sound. Removing them could make the drone cleaner while making it less alive.

That does not mean more breath noise is always better.

A rough or turbulent sound can become fatiguing. A harsh capture can exaggerate noise in a way the live room did not. Microphone placement can make the same performance feel intimate or abrasive.

The important point is that "noise" is not automatically waste.

5. Roughness as one dimension of intensity

Roughness provides another example.

Rapid fluctuations and close spectral interactions can produce a grainy, urgent sensory quality. Research on human screams demonstrates that roughness can occupy a perceptually salient modulation regime, but that finding belongs to alarm vocalization and must not be converted into a universal emotional meaning for Amastacia (Arnal et al., 2015).

That evidence should be handled carefully.

It does not imply that Amastacia's roughness functions like a scream. It does not establish a universal activation band. It does not mean rougher is better.

What it does establish is that perceptual intensity can change without increasing BPM or average loudness.

That matters to KLAAT because Paul's playing already contains texture.

The research can later ask whether listeners consistently associate certain naturally occurring rough passages with activation, tension, attraction, aversion, or bodily energy.

It should not tell Paul to manufacture a target roughness value.

6. Harmonic movement and vowel-like identity

The vocal tract can create moving spectral peaks and valleys that listeners hear almost like vowel changes.

This is one of the reasons didgeridoo can seem vocal even when the fundamental remains stable.

These formant-like movements may be central to the archaeosonic quality of Amastacia. The instrument can sound at once nonverbal and speech-adjacent: a continuous tone with internal gestures suggesting voice without words.

That ambiguity matters aesthetically.

It also helps explain why upper-spectrum fidelity may be essential even when the project is associated with low frequencies.

If those formant gestures live partly in the kilohertz range, a recording that preserves only "bass" could lose the instrument's face while retaining its chest.

7. The human edge and expressive irregularity

Microvariation is inevitable in acoustic performance.

The important distinction is whether it constrains Paul or serves him.

If a circular-breath transition creates an unwanted collapse every time, technical development may increase freedom. If a gritty transition emerges in one performance because it feels right, smoothing it away in the name of science would violate the project's governing principle.

Technical fluency should expand the range of spontaneous outcomes.

It should not narrow them into laboratory regularity.

8. Breath and the listener's body

Music can influence breathing, but the evidence is context-dependent.

Music-related respiratory and cardiovascular changes have been observed under controlled listening conditions, and repeated listening can increase the timing coincidence of respiratory events relative to a track without changing respiratory period. Live-audience work likewise shows that similar physiological rates are not equivalent to synchronized breathing behavior (Bernardi et al., 2006; Sato et al., 2012; Tschacher et al., 2023). Similar breathing rates across listeners therefore do not prove synchronized inhalation.

KLAAT therefore has an interesting but unproven hypothesis: Amastacia's breath-shaped gestures may influence how listeners perceive or organize their own breathing even when they do not literally synchronize to Paul.

That can be tested later.

For now, the claim must remain modest.

Continuity, Masking, And The Sound That Survives

I. Continuity is partly in the signal and partly in the listener

Amastacia can seem uninterrupted even when the physical process producing her is not perfectly continuous.

Circular breathing contains transitions. The player changes air source. Pressure can fluctuate. Ankora may overlap the moment. Room reflections persist. A brief acoustic dip can be masked by other sound.

The listener may therefore experience continuity that is stronger than the literal signal continuity.

This is not deception.

It is ordinary auditory perception.

2. Masking: when one part of KLAAT hides another

Auditory masking occurs when one sound makes another harder to hear.

In KLAAT, the relationship can run both directions.

A dense Amastacia spectrum can hide parts of Ankora's decay or higher-frequency attack. A strong Ankora strike can temporarily obscure fine drone detail. Room reflections can increase spectral overlap. Playback compression can change which elements dominate.

This creates a simple but powerful lesson:

MORE SOUND DOES NOT NECESSARILY MEAN MORE INFORMATION.

Sometimes adding one element reduces access to another.

3. Masking as a perceptual gate

Early research framed masking as something that could be "used" compositionally. The mature editorial position is less prescriptive.

The useful insight is observational: listeners may report that one instrument seems to change even when only the other instrument changed.

For example, if Amastacia becomes spectrally denser, certain Ankora components may disappear. The drum itself has not changed. The received scene has.

This is important when analyzing authentic recordings. Apparent changes in instrument identity may arise from interaction rather than from changes at the source.

4. Auditory restoration

The auditory system can sometimes perceptually fill in interrupted sound when the interruption is masked by another event.

This phenomenon - auditory continuity or restoration - has been demonstrated in controlled psychophysical and neurophysiological experiments. Under suitable masking conditions, a physically interrupted sound can be perceived as continuing, with the effect depending on masker properties, context, and learned auditory-scene expectations (Riecke et al., 2007, 2008, 2009a, 2009b; Petkov et al., 2007).

For KLAAT, Ankora could theoretically mask a tiny Amastacia dropout around a breath transition. Room reverberation could also reduce the perceptual obviousness of a discontinuity.

The important word is theoretically.

KLAAT has not yet demonstrated restoration experimentally.

The point is not to claim that every seamless drone is an illusion. It is to recognize that "I heard no break" does not prove "there was no acoustic break."

5. Continuity versus integrity

This distinction helps clarify a deeper artistic question.

The goal of Amastacia may not be literal waveform continuity. It may be perceptual integrity.

A living acoustic field can survive small fluctuations if the listener still experiences one continuous object.

In fact, tiny variations may help preserve aliveness. A perfectly static signal can become perceptually backgrounded. Microvariation gives the ear new edges without requiring a new musical event.

This suggests a useful research distinction:

**SIGNAL CONTINUITY != PERCEPTUAL CONTINUITY !=
ARTISTIC CONTINUITY.**

The first is measurable. The second belongs to listeners. The third is an interpretive property of the work.

6. When the bass disappears but the field remains

Playback creates another continuity problem.

A small speaker may remove much of the fundamental while retaining upper harmonics, breath noise, attacks, and modulation. The listener may continue hearing "Amastacia" because enough pitch and timbral identity survives. Missing-fundamental work supports the pitch component of that possibility, while virtual-bass research shows that perceived bass enhancement and physical low-frequency reproduction are not the same problem (Houtsma & Goldstein, 1972; Houtsma & Smurzynski, 1990; Mu & Gan, 2015).

The field remains perceptually continuous across devices even though its physical content changes.

This is one of the strongest arguments against defining KLAAT solely by sub-bass.

Deep low-frequency reproduction may matter greatly to live physical presence, but the project's identity can also reside in relationships among breath, harmonic motion, noise, pulse, and expectation.

That is why KLAAT can plausibly function as both immersive live art and an energizing everyday soundtrack.

The two experiences need not be identical to be related.

7. Repetition and continuity

Long-form repetition further stabilizes object identity.

A listener becomes familiar with the field. That familiarity can make small deviations more noticeable. It can also allow attention to drift without losing the sense of where the music is.

The research has called one version of this possibility "anchored wandering": the listener's thoughts move, but the acoustic world remains a recognizable reference.

That remains a KLAAT-specific hypothesis.

It is useful because it describes a state that is neither intense analytical concentration nor disengaged distraction.

The drone can remain present without demanding constant inspection.

8. Silence and the continuity after sound

Continuity can even survive the removal of sound.

After a sustained drone, silence is not equivalent to pre-performance silence. Expectation, adaptation, room decay, and bodily attention can make the absence feel active.

A listener may continue anticipating the field for a short period after it ends.

This does not mean the sound physically continues.

It means the perceptual system carries history forward.

KLAAT's long-form power may therefore depend partly on memory and expectation, not only on what is acoustically present at each instant.

Part II - Synthesis

Amastacia is best understood as a continuously maintained perceptual field whose apparent simplicity conceals several interacting layers.

There is the periodic source created by the lips. There is the harmonic ladder shaped by the instrument and vocal tract. There is breath noise. There are formant-like movements, roughness, articulation, and small instabilities. There is the room. There is adaptation. There is masking by Ankora. There is perceptual continuity. There is the possibility that pitch identity survives when physical bass does not.

This makes the drone an ideal KLAAT object: minimal on the surface, dense underneath.

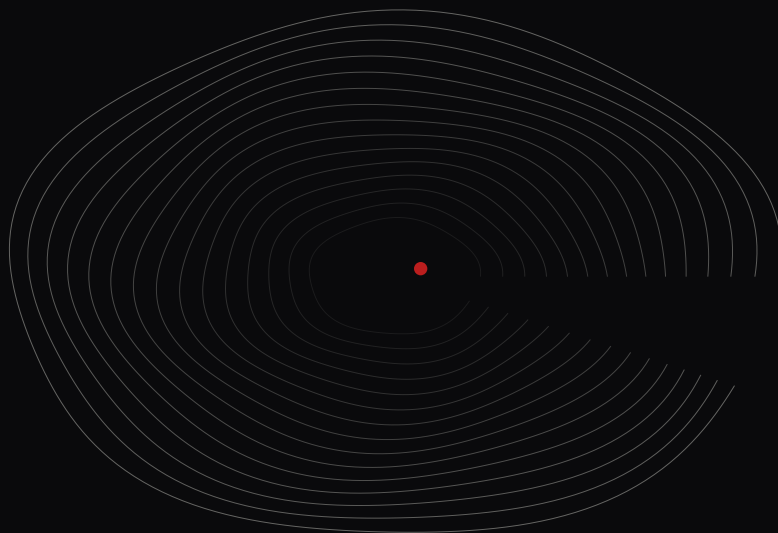
The science does not tell Paul what Amastacia should sound like.

It tells us why "one note" is an inadequate description of what she already is.

Part III turns to Ankora and to the temporal system created when pulse, meter, subdivision, prediction, omission, groove, and human timing enter the field.

III

Ankora: The Pulse And The Prediction



PART III / 3 OF IX

Beat, Meter, Subdivision, And The Internal Clock

1. Ankora is not a metronome

A frame drum can repeat regularly, but musical pulse is not identical to mechanical repetition. Ankora produces attacks. The listener organizes those attacks.

This is the first distinction that makes KLAAT rhythm interesting.

A strike pattern can contain a clear event rate while supporting several simultaneous perceptual levels: individual attacks, subdivisions, a main beat, slower groupings, and phrase-scale movement. Perceived beat level can shift with tempo, subdivision, and listener experience rather than being uniquely specified by the physical event train (McAuley & Semple, 1999; Repp & Bruttomesso, 2009/2010).

The physical pattern does not uniquely determine the perceived meter.

2. Why 137 BPM is a reference, not a law

One important KLAAT recording placed Ankora near 137 beats per minute. That number became useful as a calibration point because it described an actual performance.

The research later had to protect that observation from becoming mythology.

137 BPM is not a universal human tempo. It is not a biological optimum. It does not correspond automatically to a special neural state. It is not a "natural frequency" of the body.

At approximately 137 BPM, nominal beats occur roughly every 438 milliseconds. But listeners can organize them at half-time, double-time, or through accents that create larger patterns. The same event train can therefore support multiple experienced clocks.

The artistic importance of 137 BPM can remain entirely intact. It can be part of KLAAT's identity without becoming a claim about human physiology.

3. The listener arrives with timing preferences

Humans show spontaneous or preferred rates of self-generated regular movement under specific tasks, and individual performance tempos can show stable tendencies without constituting one universal human clock (Zamm et al., 2018). The preferred rate can vary between people and with task and context.

This means Ankora does not impose rhythm on an empty system.

The listener brings timing tendencies.

A pulse near one listener's comfortable movement rate may feel easy to inhabit. Another listener may naturally organize the same pulse at half-time. Another may not feel compelled to move at all.

That diversity is not noise in the data. It is part of the phenomenon.

4. Metric proximity is not the same as activation

Even if a listener's spontaneous motor tempo is close to Ankora's pulse, several outcomes remain separate:

- synchronization stability;
- preference;
- urge to move;
- actual movement;
- perceived energy;
- absorption;
- enjoyment.

A listener can synchronize easily and feel bored. Another can find the pulse difficult to tap yet compelling. Another may experience deep absorption while remaining physically still.

KLAAT therefore should never use "entrained" as a synonym for "affected."

5. Two speeds at once

Session 67 introduced a useful correction: event urgency and perceived beat are not the same speed.

Ankora can produce increasingly dense subdivisions while the listener continues hearing a slower underlying beat. The surface becomes busier without necessarily changing the clock beneath it.

This helps explain why an improvised passage can intensify while preserving temporal orientation.

The listener may hear:

STABLE ANCHOR + DENSE SURFACE.

That relationship is more informative than a single BPM number.

6. One drum can contain multiple layers

A single physical drum does not guarantee a single perceptual stream.

Accent hierarchy, timbre, dynamics, and timing can cause listeners to hear some strikes as anchors and others as surface detail. A stronger low strike may function as a main pulse while lighter articulations fill subdivisions. Different strike locations can create distinct timbral roles.

This matters for KLAAT because the music does not need additional percussion to become rhythmically layered.

Ankora can create hierarchy within one instrument.

But performer intent is not proof of listener perception. The only way to know whether listeners recover the same anchor is to ask or measure.

Repetition, Expectation, Omission, And Surprise

1. Repetition creates a model

Repetition is often discussed as though it simply makes a sound more familiar.

In KLAAT, repetition does more than that. It creates prediction.

Once Ankora establishes a recurring temporal pattern, the listener begins to anticipate when the next event should happen. Once Amastacia maintains a stable field, small changes become interpretable against that field.

A repeated sound therefore creates a reference against which future sound acquires meaning.

2. The missing strike

One of the clearest examples is omission.

After enough repetition, an expected Ankora strike can become perceptually present as an expectation before it physically occurs. If the strike never arrives, the absence itself can become informative; auditory-omission studies demonstrate measurable prediction-error responses to unexpected omissions under controlled sequence conditions (Prete et al., 2022).

Nothing has been added acoustically.

Yet something has happened perceptually.

This is why a missing beat can feel stronger than a normal beat. It is not because silence contains mysterious energy. It is because expectation has given the silence structure.

3. Prediction error needs prediction

Early versions of KLAAT research were tempted to turn this into a compositional recipe: establish, violate, resolve.

The mature position is more careful.

A violation only functions as a violation if the listener has learned enough regularity for the deviation to be meaningful.

Randomness does not maximize prediction error in a useful sense. If nothing is predictable, nothing can clearly violate a rule.

This leads to one of the strongest conceptual principles in the archive:

PREDICTION ERROR NEEDS PREDICTION.

4. The Prediction Budget

Session 53 introduced "Prediction Budget," explicitly as a KLAAT-specific analytical model rather than a standard neuroscience quantity.

The idea is simple: local unpredictability has force only while a higher-order model remains intact.

A stable pulse can support a surprising omission. A repeated contrast can become expected. A once-unusual accent can become part of the grammar. A device that worked as a surprise can change function and become a motif.

This means musical history matters.

The same event can have different effects at minute two and minute twenty because the listener's model has changed.

5. Surprise versus uncertainty

Later research sharpened the model further.

Surprise concerns how unexpected one event is. Uncertainty concerns how many possible continuations remain plausible. Predictability concerns the listener's confidence in what is likely to happen next. Experimental music-boundary work shows that predictive uncertainty can contribute to boundary perception independently of immediate event surprise (Hansen et al., 2021).

A loud unexpected strike can be surprising while leaving the broader pattern completely predictable.

A gradual Amastacia shift can be only mildly surprising while making the next few minutes feel uncertain.

These are different experiences.

KLAAT's spontaneous structure may often depend more on changes in the listener's model than on isolated dramatic events.

6. A deviant can become the new rule

This is one of the most important consequences of long duration.

If a displaced accent or missing strike begins recurring reliably, listeners can learn it. The "mistake" becomes grammar.

That is not failure.

It means expectation has moved up a level.

A passage can therefore evolve without needing greater loudness, faster tempo, or more notes. What changes is the rule governing what counts as normal.

7. The strike that never came versus physical impact

KLAAT research later separated predicted impact from delivered impact.

A listener may feel anticipation before an Ankora strike. If the strike is omitted, they may describe a bodily sensation of suspension or release. Predictive-timing research supports links between auditory expectation and motor-system engagement, but this does not mean a physical vibration occurred when the strike was omitted (Zalta et al., 2024; Prete et al., 2022).

The body can participate in expectation through motor preparation and attention without receiving a mechanical impulse.

This distinction protects KLAAT from turning a real perceptual effect into an unsupported claim about energy moving through the body.

8. The four-phase language after prediction research

Ground Anchor, Threshold Gate, Rising Pulse, and Return Path remain useful as descriptive language when a performance actually resembles them.

Prediction research gave those labels a possible retrospective interpretation:

Ground Anchor may correspond to a period in which regularities become legible. Threshold Gate may correspond to a change that alters the listener's model. Rising Pulse may contain increasingly complex relationships among anchor and variation. Return Path may reduce higher-order uncertainty and expose previously backgrounded elements.

But none of this means Paul should compose those stages deliberately.

The framework follows the performance.

Groove, Motor Invitation, And Human Microtiming

I. Groove is not movement

People often use "groove" to describe music that makes the body want to move.

Research forces a more precise distinction.

A listener can report a strong urge to move while remaining still. Neural or pupil responses to rhythm can change without measurable muscle movement. Actual movement can increase without a listener describing greater absorption. Enjoyment can rise independently of any of these.

KLAAT therefore separates at least four outcomes:

**PULSE CLARITY URGE TO MOVE ACTUAL MOVEMENT
ABSORPTION / FELT ENERGY**

They can overlap. They should not be collapsed.

2. Complexity does not have one universal optimum

Some groove experiments report an inverted-U relationship in which moderate syncopation or complexity produces strong pleasure/urge-to-move ratings, while other work shows that harmonic complexity, low-frequency amplitude, rhythmic layering, meter familiarity, and musical context substantially change the relationship (Witek et al., 2014; Matthews et al., 2019; Duncan & Orgs, 2024; Seeberg et al., 2025).

The conclusion is not "moderate syncopation is best."

The conclusion is that groove depends on the relationship among complexity, meter, sound source, listener learning, and context.

KLAAT does not need to chase an optimal groove formula.

CONTRADICTION BOX - THERE IS NO UNIVERSAL "RIGHT AMOUNT" OF RHYTHMIC COMPLEXITY

Some groove studies report especially strong responses at moderate syncopation or complexity. Other work shows that harmonic structure, rhythmic layering, bass content, meter familiarity, and genre can move that relationship substantially (Witek et al., 2014; Matthews et al., 2019; Duncan & Orgs, 2024; Seeberg et al., 2025).

The useful conclusion for KLAAT is not an optimum setting. "Complexity" is not one variable, and Ankora does not exist alone: Amastacia articulation, timbre, pulse clarity, and listener familiarity all change what a rhythmic pattern becomes perceptually.

KLAAT therefore studies whether a temporal anchor remains recoverable as the surface changes. It does not prescribe a target syncopation value.

3. Layer interaction matters

Recent groove work is especially relevant because it shows that the pleasurable urge to move can depend on how multiple rhythmic layers interact rather than on syncopation in one isolated layer (Seeberg et al., 2025).

In KLAAT, Ankora is the obvious pulse source, but Amastacia also contains breath articulation, harmonic movement, and envelope changes.

The listener may therefore receive multiple kinds of timing information even when only one instrument is "the drum."

This creates a plausible hypothesis: motor invitation may depend partly on how Ankora's attacks relate to Amastacia's articulations, not only on Ankora's strike sequence.

4. Human timing is not random error

There is a romantic story that imperfect timing makes music human.

There is an opposite engineering story that perfect timing makes music compelling.

Neither survives serious examination.

Controlled work shows that arbitrary or exaggerated microtiming deviations do not universally improve groove, while particular style-specific relationships can matter. In funk/swing experiments, original and quantized versions can both receive strong groove ratings, whereas certain manipulated deviations reduce them; in jazz, systematic downbeat delays can contribute to expert swing judgments (Kilchenmann & Senn, 2015; Nelias et al., 2022).

The lesson is not "imperfection is good."

It is "timing relationships are contextual."

5. When is partly made of what

A strike has more than one time.

There is the physical onset. There is the point where amplitude rises strongly. There is the envelope peak. There is the moment the listener experiences as the event's temporal center.

A sharp sound can dominate the perceived temporal center of a compound event relative to a slower-rising component, and realistic multi-instrument studies show instrument-specific sensitivity to asynchrony (Danielsen et al., 2026; Câmara et al., 2026).

This matters enormously for Amastacia and Ankora.

Ankora often provides a sharp transient. Amastacia's gestures can emerge gradually from an already sounding field. If listeners say the two "land together," their perceptual timing may not correspond to identical waveform onset.

6. Microtiming versus tempo drift versus rhythmic reorganization

A useful analysis must separate several phenomena.

TEMPO DRIFT: the underlying recurrence rate changes over a passage.

MICROTIMING: an event occurs slightly earlier or later relative to a defensible local reference.

TIMBRAL TIMING: attack or envelope shape changes the perceived timing center.

RHYTHMIC REORGANIZATION: the listener begins grouping the same events under a different pulse or meter.

A naive grid analysis can confuse all four.

That is especially dangerous for improvised KLAAT, where the music may deliberately - or instinctively - shift between pulse organizations without a written score.

7. The relationship between Amastacia and Ankora

The strongest question is not whether Paul is "on time."

It is what temporal relationship emerges between the two instruments.

Sometimes Ankora may feel like the clock and Amastacia like the field. Sometimes breath articulation may appear to lean into a strike. Sometimes a drum hit may feel late because its attack is rounded. Sometimes the instruments may fuse into one compound event.

These relationships can be analyzed after the fact without turning them into performance rules.

8. Technical fluency and freedom

Motor skill matters because KLAAT asks one performer to coordinate continuous breath-based sound with hand-struck rhythm.

Greater fluency can plausibly reduce the amount of attention spent merely keeping both systems functioning. Improvisation research shows expertise-related differences in the neural organization of creative flow, but it does not establish a simple "automaticity causes flow" mechanism for KLAAT (Rosen et al., 2024).

That creates a testable KLAAT question: does increasing coordination fluency actually increase Paul's reported freedom during authentic playing?

CONTRADICTION BOX - HUMAN TIMING IS NOT RANDOM ERROR

Microtiming research cuts against two simple stories at once. Mechanical precision is not automatically lifeless, and off-grid timing is not automatically groovy. Larger arbitrary deviations can reduce groove or quality, while specific relational timing patterns can support particular styles such as jazz swing (Frühauf et al., 2013; Kilchenmann & Senn, 2015; Nelias et al., 2022).

KLAAT should therefore separate unwanted coordination failures from expressive human timing. Technical practice can reduce limitations without forcing Amastacia and Ankora onto a grid. The research question is relational: when the instruments feel as though they lean toward, away from, or through one another, what acoustic and perceptual relationship actually produced that feeling?

But fluency should not be confused with grid-perfect timing.

The artistic goal is not to erase human timing. It is to reduce unwanted limitations so that timing can emerge from musical intention and embodied flow rather than technical struggle.

Part III - Synthesis

Ankora is not simply a drum that marks time.

It creates a temporal reference that listeners organize hierarchically. Repetition turns that reference into expectation. Expectation gives omission and deviation meaning. Accent and density create layers. The listener's own timing preferences shape motor response. Human microtiming and attack shape influence when events are perceived to occur. Amastacia can join that temporal system without becoming percussion.

The mature KLAAT rhythm model is therefore not "137 BPM causes entrainment."

It is:

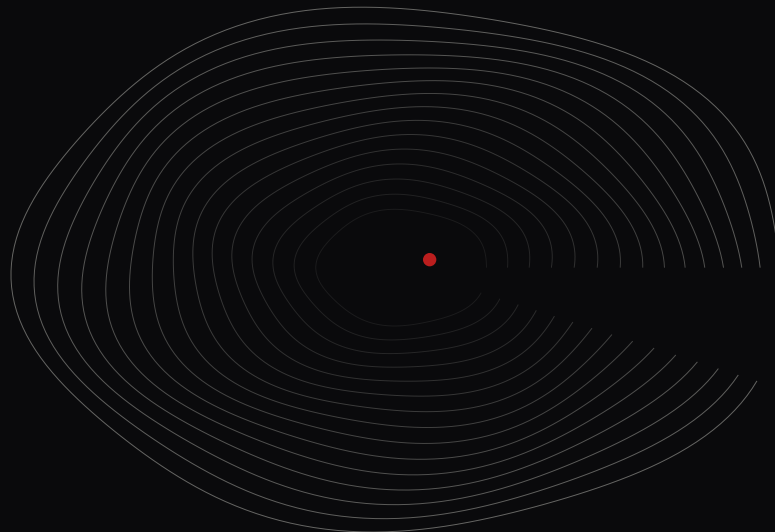
EVENTS -> GROUPING -> PREDICTION -> MOTOR POSSIBILITY ->
HISTORY -> REINTERPRETATION.

That sequence is rich enough to support activation without requiring a theory-driven score.

Part IV moves from auditory timing into the body: what actually reaches skin, feet, seat, bone, and posture - and why perceived bodily motion can be real even when its physical explanation is not what the listener imagines.

IV

When Sound Becomes Body



PART IV / 4 OF IX

Airborne Bass Versus Mechanical Vibration

I. "Feeling the bass" is not one phenomenon

KLAAT often produces descriptions such as heavy, physical, vibrating, chesty, pressurized, moving, or bodily. Those descriptions are artistically useful. Scientifically, they are not explanations.

A listener can experience bodily intensity through several routes:

- low-frequency sound heard through the auditory system;
- mechanical vibration transmitted through a floor, seat, platform, or other contact surface;
- bone-conducted sound under some conditions;
- motor anticipation and urge to move;
- interoceptive attention to sensations already present;
- perceptual attribution, in which a sound is experienced as located in or acting on the body even when local mechanical vibration is small.

These routes can occur together.

The first major body principle in KLAAT is therefore:

FELT MUSIC != ONE PHYSICAL CHANNEL.

2. Air pressure is not acceleration

A microphone measures airborne pressure fluctuations. An accelerometer measures motion of a physical structure.

These measurements answer different questions.

A large low-frequency peak in a microphone spectrum does not prove a chair or floor is vibrating strongly. A large acceleration measurement on a platform does not prove a listener's ears are receiving high sound pressure. Either may contribute to a powerful experience, but one cannot substitute for the other.

This sounds obvious until the word "bass" begins collapsing them together.

KLAAT's research language therefore needs at least two physical channels:

**AIRBORNE ACOUSTIC CHANNEL MECHANICAL
CONTACT CHANNEL**

Subjective bodily sensation belongs to a third layer.

3. Low frequency and whole-body models

Whole-body vibration research often concerns defined mechanical-exposure conditions, but KLAAT cannot simply import those models into an acoustic performance.

The body responds differently depending on frequency, direction, posture, seat/back/feet support, and stimulus magnitude; seated-body apparent mass and multi-axis response change with these variables (Fairley & Griffin, 1989; Wu et al., 2022; Yin et al., 2026; ISO 2631-1:1997). Cutaneous vibration research often focuses on different frequency ranges and different receptor systems than classic whole-body vibration studies.

CONTRADICTION BOX - MORE LOW FREQUENCY IS NOT THE SAME AS MORE ABSORPTION

Low-frequency and tactile enhancement can increase movement, groove ratings, or other bodily responses in some conditions. Cameron et al. (2022) found more audience movement when very-low-frequency output was added during a live electronic-music concert, and Hove et al. (2020) found effects of added tactile stimulation in controlled music experiments. But those outcomes are not identical to absorption, trance, preference, or authenticity. Liapikou and Marozeau (2024) further showed that coherent tactile input could reduce preferred adjustable bass level in some headphone conditions.

Physical delivery is therefore a separable dimension of the experience. More bass may change the body without making the music more absorbing, and a portable version can remain artistically valid even when that dimension is reduced.

There is no magical 20-Hz line dividing "sound" from "body."

A frequency threshold used in one research context is not automatically the correct model boundary for KLAAT.

The correct question is: what spectrum actually reaches the relevant interface, and which body model is appropriate to that spectrum and delivery method?

4. Tactile thresholds depend on where and how

Vibrotactile perception varies strongly with body site, contact area, force, frequency, waveform, and posture.

A vibration easily detected by a fingertip may not be equally salient at the feet. A broad seat contact may distribute motion differently from a small actuator. Shoes can alter coupling. A cushioned chair can filter energy.

This is why KLAAT cannot derive "felt intensity" from one universal acceleration number.

The measurement has to describe the interface.

5. Sound can feel physical without large contact vibration

Auditory experience itself can carry bodily qualities.

Low sounds may be described as heavy or internal. Rhythmic sound can create motor readiness. Sudden transients can produce orienting responses. A listener can report a chest sensation without a sensor at the chest showing a matching local vibration.

That does not mean the sensation is imaginary.

It means phenomenology and mechanics are different datasets.

The body map produced by experience is not automatically a map of physical energy transfer.

6. The concert evidence

Research outside KLAAT shows that additional very-low-frequency content can alter behavior in a real musical setting. In a live electronic-music concert experiment, adding specialized very-low-frequency output was associated with an average 11.8% increase in tracked audience movement; a follow-up discrimination task indicated that the added condition was not reliably consciously identified (Cameron et al., 2022).

The finding is important because it demonstrates that playback conditions can change behavior without an obvious conscious report of "more bass."

But it does not identify the sensory pathway with certainty, and it does not prove trance.

The result justifies separating performance from delivery. A change in the sound system can change the listener without any change in Paul's playing.

7. Audio plus tactile can alter groove

Controlled studies have also found that adding bodily vibration to auditory music can increase tapping force, spontaneous movement, groove ratings, or enjoyment under specific conditions (Hove et al., 2020). A separate headphone study found that coherent tactile stimulation could reduce preferred adjustable bass level under some conditions, emphasizing that bodily contribution is not identical to simply demanding more acoustic bass (Liapikou & Marozeau, 2024).

Again, the useful conclusion is modest:

TOUCH CAN ADD SOMETHING TO HEARING.

The effect depends on stimulus, delivery, body location, and context.

KLAAT should not infer that more vibration is always better.

Contact, Coupling, And The Multi-Interface Listener

I. The floor is not the stimulus

KLAAT's early research review identified a crucial risk: measuring a vibrating floor and treating that value as though it were the vibration delivered to the body.

Between structure and sensation lies an interface.

A bare foot on wood is one interface. A shoe on concrete is another. The pelvis on a chair is another. The back against a seat is another. A standing listener and seated listener do not receive the same mechanical system.

This leads to a permanent principle:

**PLATFORM MOTION != BODY-DELIVERED MOTION !=
PERCEIVED VIBRATION.**

2. Coupling is part of the system

Mechanical transfer depends on contact force, area, material, posture, body mass, stiffness, damping, and frequency. Seated-body studies show that apparent mass and transmissibility vary with frequency, axis, backrest, and loading, demonstrating that the occupied support/body system cannot be represented by the unloaded support alone (Fairley & Griffin, 1989; Wu et al., 2022; Yin et al., 2026).

A vibrating surface does not simply inject its full motion into the body.

The interface filters it.

CONTRADICTION BOX - MAGNITUDE IS ONLY PART OF THE TACTILE STORY

A tempting model says that stronger vibration should simply create stronger embodiment. Crossmodal and biodynamic evidence makes that too simple. Auditory and tactile information can interact in feature-specific ways, while posture, contact, axis, and timing determine what mechanical input reaches the body and how it is perceived (Crommett et al., 2017; Chauvette et al., 2025; Fairley & Griffin, 1989; Wu et al., 2022).

If KLAAT eventually tests tactile delivery, acceleration magnitude alone will not be enough. Interface and temporal coherence belong in the record.

This means seemingly trivial performance details - chair type, shoes, floor construction, whether feet are flat, whether the back contacts the chair - can alter the physical stimulus.

If KLAAT later conducts bodily-vibration experiments, those details become experimental variables.

3. The body is not a mixer

The next correction is equally important.

Suppose vibration reaches the seat, feet, and back simultaneously. It is tempting to measure each location and add the numbers together as though the body simply sums channels.

Human biodynamics do not work that simply.

Different axes and contact points interact. Motion transmitted through one interface can change loading at another. The body itself alters the mechanical system. Phase relationships matter. Frequency matters. Posture matters.

The listener is not a passive container into which three vibration values are poured.

The occupied chair-plus-body system is a coupled mechanical object rather than a passive recipient of independent acceleration channels (Fairley & Griffin, 1989; Wu et al., 2022).

4. Empty seat versus occupied seat

This distinction changes measurement practice.

An unloaded chair can have a resonance that shifts when someone sits in it. A platform can respond differently when mass is added. The person's feet may create an additional path to ground.

Therefore:

UNLOADED MEASUREMENT != OCCUPIED CONDITION.

An empty-room vibration map is useful for exploration. It is not the final description of what a listener receives.

5. Frequency regime matters

KLAAT may deliver mechanically relevant energy across more than one frequency regime.

Low-frequency whole-body movement and higher-frequency cutaneous vibration can involve different perceptual and mechanical processes. A chair that moves slowly and strongly may feel different from a surface carrying faster fine vibration.

This is why the research introduced a Frequency Gate: identify the mechanical spectrum before choosing the body model.

The goal is not to create more categories than necessary.

It is to prevent the wrong literature from being applied simply because every phenomenon has been called "vibration."

6. Mechanical dynamic range

Tactile perception can adapt and mask itself.

Continuous vibration can make later changes less salient. A strong background vibration can obscure a smaller target event. This parallels auditory masking without being identical to it.

The practical insight is not "always create tactile silence before Ankora." That would become another theory-driven score.

The useful insight is that bodily salience depends on contrast and context, not only absolute magnitude.

A moderate impulse against a quiet mechanical background may be more noticeable than a larger impulse inside continuous vibration.

7. Safety and comfort

Physical intensity is not automatically artistic effectiveness.

KLAAT's bodily ambitions must remain subordinate to comfort, hearing conservation, and consent. Strong vibration can be unpleasant even when sound level is acceptable. High acoustic dose can accumulate even when the performance feels good.

The research program's safety layer therefore treats audience exposure and performer cumulative exposure separately.

Paul experiences rehearsals, sound checks, repeated takes, and performances. His dose is not the same as that of a listener attending one event.

Audio-Tactile Coherence And The Constructed Body Map

I. The body can bind what arrives through different senses

Music is often experienced as one event even though its information reaches the listener through multiple channels.

A drum strike can be heard through the ears and felt through a chair. Controlled work shows interactions between auditory and tactile temporal-frequency information, and recent timbre experiments found that combined auditory+tactile presentation improved discrimination for some temporal features including attack time and amplitude-modulation depth (Crommett et al., 2017; Chauvette et al., 2025).

This is the core of audio-tactile coherence.

The important variable may not be how much vibration exists in isolation.

It may be whether the vibration tells the same temporal story as the sound.

2. Temporal coherence

Ankora provides a clear example.

The auditory signal contains an attack and decay. A structure-borne impulse may reach the body through the floor or seat. If the two align closely enough, they may reinforce the impression of one physical event.

If the tactile component is delayed, smeared, or dominated by a structural resonance unrelated to the auditory strike, the listener may experience less unity even if mechanical magnitude remains high.

This gives KLAAT a better hypothesis than "more bass equals more body":

**TEMPORAL AGREEMENT MAY MATTER
INDEPENDENTLY OF MAGNITUDE.**

3. Hearing may carry hierarchy; touch may carry consequence

Some controlled rhythm research suggests audition may support higher-order beat organization more robustly than tactile stimulation in particular paradigms, while touch remains effective at conveying individual events and bodily impact.

KLAAT translated that into a provisional model:

**HEARING MAY CARRY THE CLOCK. TOUCH MAY GIVE
THE CLOCK A BODY.**

This is not a universal sensory law.

It is a testable division of labor.

4. Causal coherence

When sound and touch align, the listener may infer a common physical cause.

That inference can increase unity even when the channels are physically distinct.

This becomes especially relevant to Ankora because a drum is intuitively expected to create both sound and impact. A heard strike plus a coincident felt impulse is ecologically coherent.

Amastacia is different. Its sustained envelope may produce slower mechanical changes, and the listener may not interpret every tactile fluctuation as a discrete event.

This difference between instruments is part of what makes the combined system interesting.

5. The phantom path

One of the most important anti-mystical findings in the corpus concerns felt movement through the body.

Controlled tactile research shows that the nervous system can perceive apparent motion or intermediate locations that were not physically stimulated. The classic cutaneous-rabbit illusion produces phantom intermediate touches between actual stimulation sites, and fMRI work has shown somatotopically appropriate primary-somatosensory activity corresponding to illusory intermediate locations (Geldard & Sherrick, 1972; Blankenburg et al., 2006).

CONTRADICTION BOX - A FELT PATH CAN BE REAL WITHOUT BEING A FORCE PATH

The cutaneous-rabbit literature demonstrates that people can perceive touch at intermediate locations that were not physically stimulated, and fMRI work has shown somatotopically appropriate sensory-cortex activity corresponding to the illusory location (Geldard & Sherrick, 1972; Blankenburg et al., 2006).

That does not mean KLAAT produces the cutaneous-rabbit illusion. It establishes a more general safeguard: a body map can be perceptually real without functioning as a literal map of mechanical propagation. KLAAT can respect descriptions such as "it moved up my back" while still asking separately what the floor, chair, air, and body actually did.

This has direct consequences for KLAAT language.

A listener may sincerely report that vibration "moved up the body."

That report is phenomenologically real.

It does not prove that mechanical energy physically traveled along the exact perceived path.

The distinction is not a dismissal. It is a richer model of perception.

6. The body map is not an accelerometer

Session 69 generalized the same lesson.

A person's reported location of sensation cannot be treated as a direct map of measured local vibration.

Sound can alter somatic attribution. Attention can amplify an existing sensation. Crossmodal integration can shift perceived location. Interoception can make internal signals more salient.

Therefore:

REPORTED BODY LOCATION != LOCAL MECHANICAL SOURCE.

The two can correlate. They cannot be assumed identical.

7. Perceptual construction is not fake

This point matters philosophically for KLAAT.

Calling a sensation "constructed" does not mean it is unreal.

All perception involves interpretation.

The listener's experience of one continuous drone, one coherent pulse, one moving bodily path, or one unified Amastacia-Ankora organism may arise through sensory integration rather than literal one-to-one physical mapping.

That is not a weakness of the work.

It may be part of its artistic power.

8. When Amastacia and Ankora become one event

Auditory grouping research later returned to the same principle from another direction.

If Amastacia articulation and Ankora strike share timing, envelope, or other grouping cues, listeners may momentarily bind them into one event even though they remain physically separate sources. Auditory temporal-coherence work shows that coherent feature changes promote perceptual grouping, while harmonic/timbral cues can either reinforce or oppose that grouping (Elhilali et al., 2009; Micheyl et al., 2013).

The tactile channel can strengthen that unity if a coincident impulse arrives through the body.

KLAAT may therefore create moments where:

TWO INSTRUMENTS + MULTIPLE SENSES -> ONE PERCEPTUAL EVENT.

That is a much stronger claim than saying the instruments literally "resonate as one system."

It is also experimentally approachable.

Part IV - Synthesis

KLAAT's bodily dimension becomes scientifically stronger when "vibration" stops being treated as one undifferentiated force.

There is airborne sound. There is structure-borne motion. There are interfaces. There is the occupied body-support system. There is tactile perception. There is multisensory binding. There is interoceptive attention. There is perceived location and apparent motion.

The listener can experience one body while the physics involve many pathways.

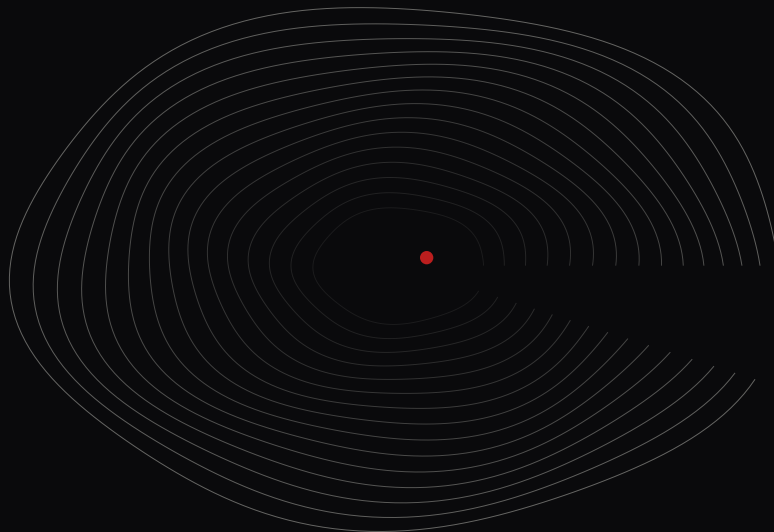
That is not a contradiction.

It is the central fact of embodied music perception.

Part V turns from the body's sensory channels to the listener's changing state of attention: absorption, imagery, habituation, familiarity, subjective time, and the spontaneous chapters that listeners discover inside music Paul never formally composed.

V

The Listening Mind



PART V / 5 OF IX

Attention, Absorption, And Mind-Wandering

I. Listening is not one attentional state

A person can listen closely to every detail, become absorbed in a larger sound world, experience vivid imagery, let attention drift, use music while doing another task, or feel distracted by the same recording.

These are different states.

KLAAT once risked treating "trance" as a catch-all term for any deep or altered listening. The research gradually replaced that with a more precise attentional vocabulary.

This matters because KLAAT is intended to function both as immersive acoustic art and as an energizing everyday soundtrack.

The same piece may support different modes of attention in different contexts.

2. Focused listening versus absorption

Focused attention means consciously tracking some feature of the music: Ankora's pulse, Amastacia's harmonics, breath, room reflections, or changes in texture.

Absorption is broader. A listener can be deeply involved in the experience without explicitly analyzing its components.

The distinction matters because a highly absorbed listener may be unable to describe exactly what changed. A technically attentive listener may identify every event while feeling little emotional involvement.

KLAAT should not equate analytic accuracy with depth of experience.

3. Imagery is not distraction

Music can evoke visual imagery, memory, imagined space, bodily metaphor, or narrative without words.

A listener whose mind generates imagery may still feel strongly anchored to the music.

This led to one useful KLAAT-specific hypothesis: anchored wandering.

In anchored wandering, thought moves away from explicit monitoring of the sound while the acoustic world remains a stable reference. The listener does not necessarily "lose attention." Attention changes target.

This is especially plausible for long-form drone and repetition, where continuity provides an environmental frame.

4. Mind-wandering can be welcome or unwanted

Research on music and attention is contradictory because studies ask different questions.

In some concert or ambient contexts, mind-wandering and imagery can occur as part of the listening experience; in sustained-attention tasks, preferred background music can alter mood/arousal and reduce some reports of unwanted mind-wandering; and music - especially lyrics - can interfere with certain cognitively demanding tasks (Deil et al., 2023; Kiss & Linnell, 2024; Hofbauer et al., 2024; Souza & Barbosa, 2023).

CONTRADICTION BOX - BACKGROUND MUSIC CAN SUPPORT OR INTERFERE

The background-music literature does not justify a universal "music improves focus" claim. Preferred music can improve mood/arousal and reduce some unwanted mind-wandering in sustained-attention tasks, while other music conditions interfere with reading, memory, or demanding cognition (Kiss & Linnell, 2024; Hofbauer et al., 2024; Souza & Barbosa, 2023).

KLAAT's everyday-listening goal is therefore an empirical program, not a productivity promise. The same recording may function well during walking, making art, repetitive work, or exercise and become intrusive during language-heavy or high-load tasks.

The correct variable is therefore not simply "mind-wandering."

KLAAT should distinguish:

- what attention moved toward;
- whether the shift was welcome;
- what the listener was trying to do;
- whether performance on an external task changed.

5. The orienting response

Small changes can pull attention back toward the sound.

The orienting response is not the same as startle. A change in timbre, spatial location, pulse, silence, or spectral balance can redirect attention without being frightening or loud.

This is one reason tiny events can feel important in a sparse field.

But an orienting response does not tell us whether the listener liked the event or became more absorbed.

Attention is not value.

6. Three causes of a "strong moment"

Later KLAAT research separated three mechanisms that can all make a moment feel unusually powerful:

PREDICTION - the event violates or fulfills a learned expectation. ATTENTION - the event captures or redirects focus. ADAPTATION / REPETITION - preceding stability changes the contrast against which the event is perceived.

These mechanisms can occur together.

If a listener says, "That moment hit me," the research should not assume which one caused it.

This is one of the strongest methodological lessons in the entire corpus.

7. Bodily attention and interoception

KLAAT's sustained sound can also redirect attention inward.

Interoception concerns perception and interpretation of internal bodily signals. A listener may become more aware of breathing, heartbeat, muscle tension, warmth, pressure, or vibration that was already present.

That does not mean KLAAT created every sensation it made noticeable.

The distinction between sensation, attention, and attribution matters.

A listener can genuinely feel more bodily engaged because attention has shifted toward the body.

8. Activation without distraction

KLAAT's everyday-use ambition raises a specific question: can the music increase energy while remaining compatible with ordinary activity?

The answer will almost certainly depend on task, volume, familiarity, and listener preference.

A piece that supports drawing or walking may interfere with reading dense technical material. A highly familiar passage may become easier to use as background than a new one. Ankora's attack clarity may energize one person and distract another.

There is no universal "productivity mode."

Familiarity, Habituation, And Listening Endurance

1. Repetition is not boredom

KLAAT relies on sustained and repeated material, which makes habituation an obvious concern.

Early research framed repetition mainly as a process that reduces response over time. Later work complicated that story.

Repeated exposure can reduce surprise while increasing familiarity, recognition, liking, or engagement. Experimental music studies have found increased liking after repetition even with unfamiliar or complex material, while other work shows that musical events and changes help sustain voluntary engagement (Margulis, 2013; Madison & Schiölde, 2017; Janata et al., 2018).

Boredom, sensory adaptation, learned familiarity, and reduced neural response are not the same thing.

2. Acoustic repetition is never exact in human performance

Ankora strikes vary slightly in timing, force, spectrum, and decay. Amastacia maintains a pitch center while breath, harmonics, noise, and articulation change.

The listener therefore encounters recurrence without literal duplication.

That matters because KLAAT's repetition is closer to living recurrence than to a looped digital copy.

The stable identity may support familiarity while microvariation preserves detail.

3. Adaptation versus familiarity

Sensory adaptation is a physiological process.

Familiarity is learned knowledge of the sound.

Engagement is a subjective relationship to the experience.

A listener can adapt to some acoustic features while becoming more familiar with others. Familiarity can make subtle events easier to detect because the listener now knows what "normal" sounds like.

This produces the stable-stimulus paradox:

**THE PHYSICAL STIMULUS CAN REMAIN SIMILAR WHILE
THE EXPERIENCE CONTINUES TO CHANGE.**

4. Repetition can increase liking

Some music research finds that repeated exposure increases liking or interest, including for unfamiliar and relatively complex material (Margulis, 2013; Madison & Schiölde, 2017).

CONTRADICTION BOX - REPETITION CAN ADAPT AND DEEPEN AT THE SAME TIME

Sensory adaptation, familiarity, liking, recognition, boredom, and absorption are not one process. Repetition can reduce novelty while increasing familiarity or aesthetic preference. Margulis (2013) found higher enjoyability, interest, and artistry ratings when repetitions were inserted into unfamiliar contemporary-art-music excerpts; other repeated-listening work also reports increased liking under tested conditions.

A repeated drone/pulse does not have one inevitable psychological trajectory. The proper question is what changes across listens: surprise, detail, pleasure, boredom, entry speed, imagery, bodily salience, or willingness to return.

Other work shows that the patterning of musical events and change contributes to voluntary listening and engagement (Janata et al., 2018).

These results are not contradictory.

Familiarity can deepen attachment while novelty prevents total predictability.

The balance varies by listener and context.

5. The listener learns where to listen

Repeated hearing also changes attentional strategy.

On the first listen, Ankora's pulse may dominate. On the third, a listener may notice breath noise, upper harmonics, or the room. On the tenth, the listener may stop tracking individual events entirely and experience the piece as a stable environment.

This is one reason repeated KLAAT exposure should be studied as its own phenomenon rather than treated as a degraded version of first-listen novelty.

6. Habituation can create contrast

When a feature becomes backgrounded, a small deviation can regain salience.

This does not mean the nervous system is "reset."

It means the comparison context has changed.

A quiet passage after sustained intensity can feel large because adaptation has shifted the listener's baseline. A single Ankora strike after a long absence can feel disproportionately important. A tiny Amastacia spectral change can emerge after minutes of stability.

7. Listening endurance

KLAAT is designed for durations longer than a typical short song.

The relevant question is therefore not only "Did the listener like the first minute?" but "What happens across twenty or thirty minutes?"

Possible trajectories include:

- increasing absorption;
- stable engagement;
- boredom;
- fatigue;
- attention moving in and out;
- deeper familiarity across repeated days;
- increased usefulness as background activity music.

No single trajectory should be assumed.

8. Everyday listening and ceremony are different contexts

A recording can serve two different artistic roles.

In focused listening, the listener may attend to detail, imagery, bodily sensation, and temporal development.

During daily activity, the same music may operate more like an energy field - present enough to shape mood or movement while leaving cognitive space for something else.

KLAAT does not need to choose only one identity.

It does need to study them separately.

Subjective Time And The Chapters No One Composed

I. The pulse is not the passage of time

Clock time is objective.

Experienced time is not.

A listener can accurately estimate that ten minutes passed while reporting that the experience felt unusually brief. Another can underestimate duration while describing the passage as expansive.

These are different judgments.

KLAAT therefore separates:

- actual duration;
- estimated duration;
- perceived speed of time passing;
- remembered number of events or sections;
- felt expansiveness or compression.

2. Attention changes time

When attention is directed toward timing itself, duration judgments can change.

When attention is absorbed by music or an external task, the passage of time may feel different.

The effect depends on whether duration is judged prospectively or retrospectively, what the listener attends to, and how many memorable events the interval contains.

There is no simple rule that "trance makes time disappear."

3. Meter can influence duration judgment

Experiments suggest that how listeners attend to rhythmic structure can influence duration estimation. Sensorimotor synchronization at different metrical levels and metrical-attention manipulations can change perceived duration even when physical excerpt length is controlled (Hammerschmidt & Wöllner, 2020; Wöllner & Hammerschmidt, 2021; Wang et al., 2024).

This is particularly relevant to KLAAT because Ankora supports hierarchical pulse.

Two listeners can hear the same event stream and organize time differently.

4. Memory reconstructs duration

Retrospective duration judgments can depend on remembered event structure and segmentation. Background-music experiments show that the number or organization of remembered musical units can bias duration reconstruction, while prospective musical timing studies can produce different directional effects (Bailey & Areni, 2006; Droit-Volet et al., 2010).

This creates a fascinating KLAAT possibility:

A performance can feel brief while it is happening yet expansive in memory.

Amastacia can create continuity. Ankora and spontaneous transitions can create landmarks. The listener may therefore experience low moment-to-moment time monitoring but rich retrospective structure.

This remains a hypothesis.

5. Chapters no one composed

One of the strongest late-stage insights is that listeners can perceive meaningful boundaries in music even when those boundaries are not periodically regular or explicitly signaled. Segmentation studies show that listeners use combinations of event density, pulse, timbre, intensity, phrase cues, and learned musical structure, with substantial individual disagreement preserved as part of the result (Phillips et al., 2020; Popescu et al., 2021; Dean & Taylor, 2026).

Changes in density, timbre, intensity, rhythm, register, or prediction can create perceived boundaries. Different listeners may agree approximately or disagree substantially.

This gives KLAAT a new way to think about form:

FORM CAN BE DISCOVERED AFTER PERFORMANCE.

6. Performer intention is not listener segmentation

Paul may experience a moment as a transition because of what he was doing internally.

A listener may hear the transition later. Another may not hear one at all.

A waveform may show a measurable change that no one experiences as meaningful.

These are separate layers:

PERFORMER INTENTION DELIVERED ACOUSTIC CHANGE LISTENER-DEFINED BOUNDARY REMEMBERED LANDMARK

The research should preserve all four.

7. The four phases become descriptive hypotheses

Ground Anchor, Threshold Gate, Rising Pulse, and Return Path emerged as a useful artistic architecture.

The mature research does not require every performance to contain four phases.

Instead, the framework can be applied retrospectively when it helps describe what happened.

If listeners independently hear a transition that resembles a Gate, that is evidence for that performance.

If they hear six meaningful sections, the research should not compress them into four.

If they hear one continuous arc, that is also valid data.

8. Boundary versus event

A loud strike is not necessarily a chapter boundary.

A subtle change in uncertainty may matter more.

Later prediction research showed that immediate surprise and predictive uncertainty are different. Musical boundary judgments can be influenced by uncertainty about what comes next independently of a single surprising event (Hansen et al., 2021). A performance may therefore cross into a new perceived state because the listener's expectations have changed, not because one dramatic event occurred.

This is why meaningful structure can emerge in improvisation without conventional song form.

9. Timestamp is not event

KLAAT methodology eventually recognized that not every meaningful event has one precise timestamp.

Some events are discrete. Some unfold gradually. Some are inferred only after a new state becomes clear. Some exist primarily in perception.

Annotation should therefore preserve uncertainty rather than forcing every event into one exact millisecond.

The reference record is a distribution, not a fake single truth.

Part V - Synthesis

The listening mind does not passively receive KLAAT.

It selects, predicts, adapts, imagines, remembers, reconstructs time, and organizes spontaneous sound into events.

That is why the same performance can produce radically different experiences without anyone being wrong.

A listener can be absorbed without analyzing. A listener can mind-wander without leaving the music. Repetition can deepen familiarity rather than flatten experience. Time can feel brief while memory becomes dense. Structure can be discovered after the performer has already moved on.

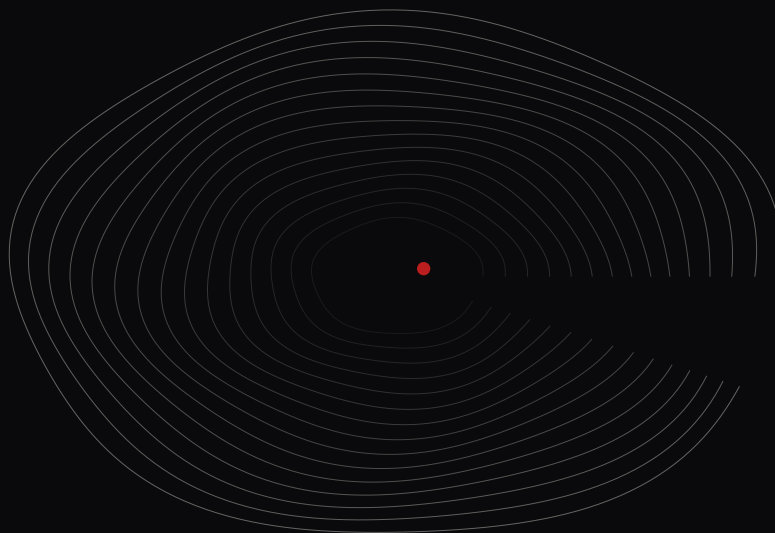
The research therefore shifts the central question from "Does KLAAT induce trance?" to a more useful set of questions:

WHAT DID THE LISTENER ATTEND TO? WHAT CHANGED OVER TIME?
WHAT WAS REMEMBERED? WHAT FELT BODILY? WHAT FELT
ENERGIZING? WHAT STRUCTURE EMERGED WITHOUT BEING
IMPOSED?

Part VI turns back to Paul - not as a proxy for the audience, but as the performer whose technique, flow, breath, timing, and coordination generate the acoustic world listeners later receive.

VI

The Performer



PART VI / 6 OF IX

Circular Breathing As Skill, Not Metaphysics

1. The continuous field has a body behind it

Amastacia can sound continuous, but the performer is not physically static.

Paul breathes, shifts pressure, stores air in the mouth, inhales through the nose, re-establishes lung-driven airflow, shapes the vocal tract, and keeps lip oscillation alive while the instrument remains sounding. The artistic effect can be seamless even though the motor system is cycling through distinct actions.

This is precisely why circular breathing belongs in the technical core of KLAAT.

It is not mystical. It is a coordination skill.

2. Circular breathing is a sequence, not a superhuman breath

Direct cine-MRI work in experienced wind musicians shows circular breathing as a coordinated sequence involving oral-cavity pressure, tongue/soft-palate control, and nasal inspiration rather than a single continuous pulmonary exhalation (Peng et al., 2015).

The player briefly uses stored oral air to maintain pressure at the instrument while inhaling through the nose. The lungs do not somehow inhale and exhale through the same pathway at once.

This clarification matters because KLAAT should never build spiritual claims on a misunderstood physiological mechanism.

The real mechanism is impressive enough.

3. Technical fluency expands artistic freedom

A skilled circular-breath transition can reduce one class of unwanted interruption.

That does not mean every transition should disappear.

KLAAT is a living acoustic practice. A rough inhale-adjacent articulation can become expressive. Breath noise can signal effort or intimacy. Pressure changes can produce timbral motion.

The point of technique is therefore not to sterilize the sound.

It is to make more outcomes intentional or at least available.

A performer with greater control can choose to remain smooth, allow grain, push pressure, leave space, or follow the improvisation without technical panic.

4. Breath mechanics and Ankora compete for coordination

Playing Amastacia alone is one motor task.

Playing Ankora alone is another.

Doing both while circular breathing creates a combined coordination problem. The performer must maintain lip vibration and pressure, time nasal inspiration, control oral-air release, strike the drum, manage attack force, and follow emerging rhythm.

This makes dual-instrument fluency a legitimate technical research problem.

The research should ask where interference appears:

- during nasal inhale;
- during pressure handoff;
- during denser Ankora passages;
- during rhythmic transitions;
- under fatigue;
- during changes in Amastacia articulation.

5. No prescribed coordination pattern

A scientific temptation would be to solve this by assigning fixed beat locations for breathing.

That would violate the governing principle.

The goal is not to teach Paul to inhale every eight beats. It is to strengthen the underlying skill so breathing can happen wherever the improvisation needs it.

Training can be structured without structuring the art.

6. Breath continuity is not listener physiology

Paul's respiratory cycle belongs to the performer.

The listener hears acoustic consequences.

Those consequences may include a swell, slight level dip, hiss, harmonic shift, or no obvious cue at all. The listener's own breathing may change for many reasons and cannot be inferred from Paul's circular-breath timing.

This separation protects both scientific accuracy and artistic freedom.

Flow, Automaticity, And The Player-Listener Divide

I. The performer's state is real

Paul often experiences KLAAT as a deep, trance-like flow state.

That experience deserves to remain central to the project.

The scientific mistake would be to treat it as direct evidence about the audience.

The performer receives motor commands, proprioception, respiratory effort, hand impact, bone conduction, instrument vibration, visual context, and a sense of agency that a passive listener does not receive.

The listener receives the acoustic event after it has traveled through a room or playback system.

These are different experiences of the same performance.

2. Flow is not a transferable substance

Improvisation research shows that spontaneous performance can differ from rehearsed execution in neural and cognitive terms. Jazz-improvisation studies have reported expertise- and flow-related differences in brain activity during spontaneous performance, supporting performer flow as a legitimate research target without establishing any direct listener transmission mechanism (Limb & Braun, 2008; Rosen et al., 2024).

CONTRADICTION BOX - FLOW IS NOT A SUBSTANCE THAT PASSES FROM PLAYER TO LISTENER

Improvisation research supports performer flow as a legitimate state to study, and live-audience research shows that listeners can exhibit shared physiological or behavioral dynamics. Those facts do not create a direct transmission pathway. Performer state, acoustic output, room/social context, and listener response remain separate variables.

The KLAAT question is stronger when phrased modestly: do Paul's high-flow performances contain repeatable acoustic features, and do independent listeners respond differently to those features? If the answer is yes, the result concerns the performance as mediator - not a transferred trance.

That supports the legitimacy of performer flow as a measurable state.

It does not show that flow is transmitted to the listener.

An absorbed performer can produce a recording that leaves a listener cold. A technically effortful take can still create a compelling acoustic result. A listener can enter deep absorption while the performer remembers struggling.

The relationship is empirical, not guaranteed.

3. What might carry flow outward?

If performer state matters to the listener, it must leave traces.

Possible traces include:

- timing relationships;
- dynamic contour;
- breath texture;
- reduced hesitancy;
- longer coherent gestures;
- more fluid transitions;
- different interaction between Amastacia and Ankora;
- changes in microvariation;
- changes in overall form.

These are hypotheses.

They can be compared across recordings without pretending that one waveform contains "flow" as a measurable substance.

4. Automaticity as technical freedom

As motor skills become practiced, some aspects can become more robust under competing attentional demands, although automaticity is not all-or-none and evidence depends on task and learning method. Dual-task research generally shows that simultaneous tasks initially interfere with one another and that practice can reduce some dual-task costs under specific conditions (Wulf et al., 2001; Strobach & Schubert, 2017; Kal et al., 2018).

That matters because explicit attention is limited.

If Paul must consciously manage every breath handoff and every Ankora strike, less attention remains for listening to the room, following emergent texture, or responding intuitively.

Automaticity can therefore be artistically useful.

CONTRADICTION BOX - AUTOMATICITY IS NOT THE ERASURE OF ATTENTION

Practice can reduce some dual-task interference and conscious control demands, but automaticity is not total, universal, or independent of the way a skill was learned (Wulf et al., 2001, 2010; Strobach & Schubert, 2017; Kal et al., 2018).

Technical fluency is valuable only insofar as it gives attention back to listening and emergence. If technique becomes rigid or narrows Paul's spontaneous choices, increased mechanical consistency would not count as artistic progress.

But automaticity is not the same as mechanical sameness.

A skilled action can be flexible and adaptive precisely because low-level control has become efficient.

5. Self-monitoring can help and hurt

Technical practice often benefits from deliberate correction, while well-learned motor control can become more efficient when attention is directed toward action effects rather than continual conscious control of body mechanics. Motor-learning reviews caution, however, that automaticity and dual-task robustness depend on task complexity, learning history, and attentional demands (Wulf et al., 2010; Kal et al., 2018).

Performance flow may therefore involve less explicit monitoring of some already-learned actions without implying that conscious attention disappears.

These two modes should not be confused.

KLAAT practice can contain periods of deliberate technical work followed by periods where those corrections are allowed to disappear from conscious attention.

The research serves the practice by identifying constraints.

The performance remains experience-led.

6. Two-sided reporting

The research program introduced a simple methodological principle:

PERFORMER REPORT + ACOUSTIC RECORD + LISTENER REPORT SHOULD REMAIN SEPARATE.

After an authentic take, Paul can rate effort, freedom, continuity, and flow.

Independent listeners can report absorption, energy, urge to move, imagery, or interest.

The recording can be analyzed for timing, spectrum, continuity, or structural features.

Only then should relationships among the three be explored.

7. Flow and subjective time

Performer flow often includes altered time experience.

Listener absorption can also alter passage-of-time judgments.

Those similarities are interesting but do not prove shared state.

Two people can both say "time disappeared" for different reasons.

KLAAT should preserve the parallel without collapsing it.

Two Instruments Becoming One Living System

1. One performer, two instruments, multiple roles

KLAAT's core difficulty is also one of its strengths.

Paul is not simply switching between Amastacia and Ankora. He is maintaining a continuous breath-driven field while generating a discrete hand-struck pulse.

One instrument asks for continuity. The other asks for events.

One depends heavily on air pressure, lips, tongue, and vocal tract. The other depends on arm movement, hand contact, timing, and rebound.

Their coexistence creates a whole-body coordination problem.

2. Coordination does not require synchrony

The instruments do not need to align on every event to belong together.

They can remain independent streams. They can briefly couple. They can alternate foreground roles. They can produce compound moments where a breath articulation and drum strike are heard as one event.

The mature research therefore rejects the idea that "better coordination" means tighter synchronization everywhere.

Coordination means the performer can control or tolerate the relationship without losing either instrument unintentionally.

3. Auditory grouping and compound events

Listeners use timing, timbre, harmonicity, attack shape, and temporal coherence to organize complex sound. Auditory-scene research shows that coherent temporal changes can promote grouping, while harmonicity and timbre can also support or oppose stream separation (Elhilali et al., 2009; Micheyl et al., 2013; Iverson, 1995).

Amastacia and Ankora can therefore remain two clear sources while still forming one coherent musical world.

At some moments, aligned gestures may be bound into one perceptual event.

That distinction matters:

ONE EVENT != ONE SOURCE. ONE WORLD != ONE EVENT.

KLAAT can be unified without erasing difference.

4. The living relationship

The deepest version of the project may lie in the changing relationship rather than either instrument alone.

Ankora can make Amastacia's continuity feel more stable by contrast. Amastacia can make Ankora's attacks feel more isolated or more embedded. A room can fuse their decays. A playback system can thin one more than the other. A performer's timing can make gestures lean together or apart.

The relationship itself becomes the musical object.

5. Gesture, signal, perception

A useful technical safeguard is to distinguish:

GESTURE - what Paul physically does. SIGNAL - what the microphone or room receives. PERCEPTION - what the listener hears as the event.

A hand strike can begin before its perceptual center. A breath articulation can begin acoustically before the listener hears it as "landing." Two gestures can be physically offset but perceptually aligned. Work on compound musical sounds and realistic multi-instrument timing shows that attack shape and instrumental role can influence the perceived temporal center and the detectability of asynchrony (Danielsen et al., 2026; Câmara et al., 2026).

This is why waveform precision should never become an artistic judge.

6. Technique as reduction of unwanted failure

For simultaneous Amastacia and Ankora work, technical progress can be defined modestly:

fewer unintended collapses; less panic around breath transitions; more independence between hand and breath; more ability to shift density without losing the desired pulse; more ability to recover after variation; more stamina across long form.

None of these specifies what Paul must play.

They increase the range of what he can play instinctively.

7. One body, not one rhythm

The performer's respiratory cycle, hand rhythm, postural movement, and attention operate on different timescales. Music-listening physiology likewise demonstrates that respiratory behavior and musical event structure should not be collapsed into one clock (Bernardi et al., 2006; Sato et al., 2012).

KLAAT does not need to synchronize them into one master clock.

Part of the project's organic quality may come from their partial independence.

A drum pulse can remain stable while breathing varies. A breath gesture can stretch across several strikes. A hand pattern can intensify while the drone remains spectrally calm.

The system lives because its components are coordinated without being identical.

Part VI - Synthesis

The performer is not a delivery device for a theory.

Paul's body is the generative center of KLAAT.

Circular breathing maintains the field. Motor skill reduces unwanted limitation. Automaticity can free attention. Flow changes the performer's experience. Ankora adds another coordination layer. The two instruments can remain independent while forming one coherent system.

The research becomes useful when it helps Paul do more of what he already hears internally with less technical friction.

It becomes harmful when it turns those findings into a score.

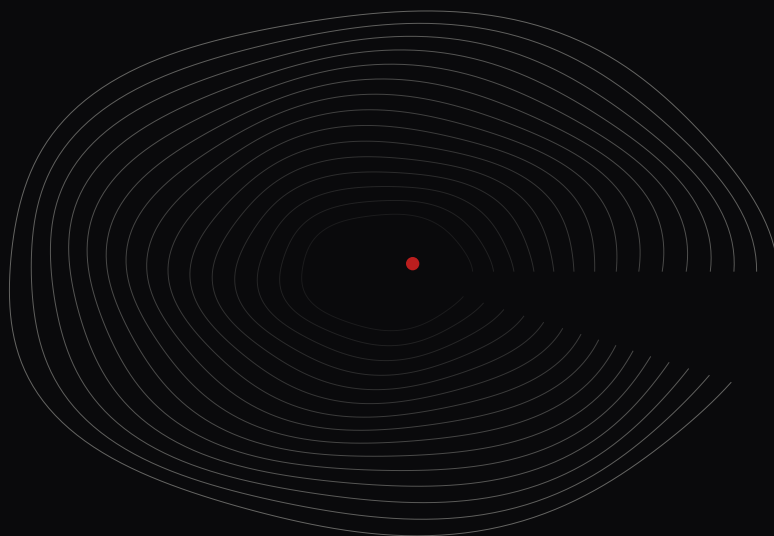
The mature relationship is simple:

PRACTICE CAN BE ANALYTICAL. PERFORMANCE CAN REMAIN INSTINCTIVE.

Part VII follows the sound after it leaves Paul: into the live venue, the microphone, the recording chain, the loudspeaker, the headphones, and the everyday environments where KLAAT must survive without pretending every delivery path is the same.

VII

Live, Recorded, And Portable Klaat



PART VII / 7 OF IX

The Venue Is Not One Room

1. Live KLAAT is spatial

A live performance does not deliver one identical signal to an audience.

Amastacia excites the room continuously. Ankora produces transients that reflect, decay, and overlap. Low-frequency modal behavior and reflections create spatially nonuniform level, spectrum, and decay, so different listeners can receive materially different acoustic conditions inside one venue (Kuttruff & Vorländer, 2025; Pierce, 2019; ISO 3382-1:2009). Floors, chairs, walls, and platforms can also move differently from the airborne sound field.

The live event is therefore a field of listener conditions.

This is why KLAAT's early statement "the room is part of the instrument" matured into a more precise principle:

THE VENUE IS NOT ONE RESPONSE. IT IS A DISTRIBUTED INSTRUMENT.

2. The performer does not hear the audience version

Paul stands or sits close to the sources. He receives direct sound, internally conducted vibration, hand impact, instrument contact, and body sensation unavailable to most listeners.

Someone at the back receives a delayed, reverberant, spatially filtered version.

This means soundcheck from the performer position can never fully represent audience experience.

The performer-ear position is one measurement zone, not the reference truth.

3. Reverberation changes timing

A room does more than color timbre.

Ankora's attack can be sharp at the source and smeared at the listener because reflections preserve parts of earlier strikes. Reverberation time and early/late reflections are standard room-acoustic variables precisely because they affect temporal clarity as well as spectral balance (Kuttruff & Vorländer, 2025; ISO 3382-1:2009). At faster pulse rates, the decay of one event can overlap the next.

This can thicken rhythm, reduce onset clarity, or make the drum feel larger than its dry signal.

For Amastacia, reverberation can create a broader field and emphasize certain spectral regions.

The room therefore participates in both timbre and time.

4. Mapping without over-measuring

KLAAT developed a reproducible acoustic-mapping principle so room claims could be compared responsibly.

Useful positions include:

- performer ear;
- nearest intended listener;
- representative center listener;
- rear listener;
- identified hotspot or null when relevant.

Measurements should specify duration, metric, calibration status, source configuration, position, and enough performance context to understand what was measured. ISO 3382 room-acoustic methods make position and spatial coverage part of defensible characterization, while IEC 61672 distinguishes the performance class and test scope of sound-level meters (ISO 3382-1:2009; ISO 3382-2:2008; IEC 61672-1:2013; IEC 61672-3:2013).

This does not mean every event needs a laboratory grid.

It means research claims require spatial honesty.

5. Ecological validity

A 60-second clip in headphones is not the same thing as a 30-minute live performance.

Long duration, room, visibility of the performer, social context, body position, and cumulative expectation can all change the experience. Research comparing live and mediated music also shows that "liveness" bundles multiple factors rather than representing one isolated variable, which is why KLAAT treats live-versus-recorded differences as an ecological comparison rather than a single-mechanism test (Trost et al., 2024; Tschacher et al., 2023).

CONTRADICTION BOX - LIVE IS NOT A SINGLE VARIABLE

Live music can differ from recorded music in sound level, room acoustics, visual performer information, social co-presence, expectation, movement opportunity, performer adaptation, and mechanical coupling. Studies reporting live-context effects therefore do not establish one universal "live advantage."

KLAAT should compare live and recorded conditions as bundles unless a specific factor is controlled. The useful question is what liveness adds - and which parts of that addition survive recording - not whether live performance is scientifically superior.

This is why a mechanism demonstrated in a short laboratory excerpt must pass an ecological-transfer test before it becomes a claim about full KLAAT.

A listener detecting one missing beat in a clip does not prove that the same event matters inside an uninterrupted ritual-scale performance.

6. Safety belongs to the venue model

Sound exposure is dose, not a moment. NIOSH's occupational framework explicitly combines level and duration, and WHO's live-venue standard likewise emphasizes calibrated monitoring, a reference position, sound-system optimization, hearing protection, and quiet zones rather than treating one peak level as the whole exposure picture (NIOSH, 1998/current guidance; WHO, 2022).

Audience positions can differ in level, and Paul's cumulative exposure includes rehearsal, setup, soundcheck, repeated takes, and performance.

KLAAT therefore keeps performer exposure and audience-event exposure separate.

The goal is not to make the work timid.

It is to preserve intensity without treating hearing risk as evidence of artistic seriousness.

The Playback System Is The Third Participant

1. Recording is not preservation without transformation

A recording feels like a copy of a performance, but every stage changes the event.

Microphone placement changes balance. Preamps and gain structure affect noise and headroom. Processing changes dynamics and spectrum. The final file contains only what the recording chain captured. The listener's speaker or headphones then filter that file again. The perceptual consequences are especially important for KLAAT because timbre, attack, low-frequency delivery, and auditory grouping are all sensitive to spectral/temporal changes (Grey, 1977; Caclin et al., 2005; Hove et al., 2020).

KLAAT therefore treats the playback system as a participant rather than a transparent pipe.

2. Three versions of the same take

The same performance can exist as:

- live room experience;
- headphone experience;
- small-speaker or portable experience.

Each may preserve different features.

Headphones can reveal breath detail while removing room coupling. A small speaker can preserve timing while losing deep bass. A full-range system can restore low-frequency weight while creating new room modes.

The question is not which one is fake.

The question is what each one preserves.

3. Delivery-chain validity

A claim about KLAAT playback needs to identify the delivery path.

At minimum: SOURCE / FILE -> PROCESSING -> TRANSDUCER -> ROOM / CONTACT -> LISTENER.

If the user listens on a phone, the experiment is about phone-delivered KLAAT. If the user listens through a full-range system in a resonant room, that is a different stimulus.

Without documenting delivery, listener comparisons can be misread as musical differences.

4. The recording engineer can alter the instrument relationship

Compression can lift breath noise. Equalization can reduce Amastacia's fundamental while emphasizing formants. Transient processing can make Ankora sharper. Noise reduction can remove part of the organic texture. Stereo placement can increase or decrease source separation.

These choices can change the perceptual relationship between the instruments without Paul playing differently.

Capture and mix decisions are therefore part of research provenance.

5. Original reference before processing

The safest approach is to preserve an untouched reference recording alongside processed versions.

That allows later comparison when a new research question appears.

If a future listener study finds that breath texture predicts authenticity, an untouched take becomes essential. If processing has already erased it, the question cannot be reconstructed.

RAW FIRST is therefore not only an engineering preference.

It is an evidence principle.

What Klaat Must Preserve When The Bass Disappears

1. Portability is not failure

KLAAT is meant to exist outside a ceremonial room.

It should be capable of becoming an energizing soundtrack in a car, headphones, home speaker, or ordinary daily setting.

That creates a practical challenge: much of the project's live physical weight may not survive.

The research response is not to force every playback device to imitate a subwoofer.

It is to identify the information that carries KLAAT's identity.

2. Pitch can survive missing bass

Missing-fundamental perception means a low pitch can remain audible when the actual fundamental is greatly attenuated, provided enough harmonic structure survives; classic experiments demonstrate central pitch extraction from harmonic complexes and show that discrimination degrades when the remaining harmonic information becomes less favorable (Houtsma & Goldstein, 1972; Houtsma & Smurzynski, 1990).

For Amastacia, this means tonal identity may survive on limited systems.

The physical low-frequency pressure does not magically reappear.

Pitch survival and bass survival are separate.

CONTRADICTION BOX - PHYSICAL DEPTH AND MUSICAL IDENTITY CAN SEPARATE

Very-low-frequency or tactile delivery can alter movement or bodily response, yet missing-fundamental and didgeridoo-acoustics research shows that pitch, formant motion, attack, and timing can survive substantial loss of deep bass.

This means a small speaker may preserve a surprising amount of KLAAT identity while failing to reproduce a major bodily dimension. The portable version is not therefore a failed live version; it is a different delivery condition whose preserved and lost features can be measured separately.

3. Formants may carry the face of Amastacia

Didgeridoo vocal-tract research shows that expressive resonant shaping can occur well above the fundamental, with measured vocal-tract resonances/formants strongly reorganizing the upper harmonic spectrum (Tarnopolsky et al., 2005, 2006; Fletcher et al., 2006).

That makes upper harmonics, breath noise, and formant movement candidates for portable identity.

A small speaker may lose the chest but preserve the voice.

This is one reason KLAAT should not be mixed as though everything above the bass region is secondary.

4. Ankora's attack may carry the clock

A small speaker can preserve the timing edge of a drum strike even while losing much of the low resonant decay.

The beat, accents, omissions, and subdivisions can therefore remain legible.

The drum may feel thinner without becoming rhythmically meaningless.

Again, identity and physical impact separate.

5. Energy in the edges

Perceived musical energy can be carried by:

- attack shape;
- roughness;
- breath articulation;
- harmonic brightness;
- noise texture;
- timing;
- contrast;
- expectation.

These cues can survive when low-frequency physical energy does not.

That does not make them substitutes for bass.

They are additional pathways to intensity.

6. Virtual bass is not automatically KLAAT

Audio engineering can synthesize or emphasize upper harmonics to create the impression of stronger bass on small speakers. Virtual-bass research shows that this can improve perceived bass quality under some conditions while also introducing timbral/artifact trade-offs (Mu & Gan, 2015).

KLAAT should not assume that stronger virtual bass equals greater authenticity.

The project's organic spectral relationships may be more important than the impression of maximum low end.

7. Different listening purposes may need different fidelity priorities

Focused immersive listening may benefit from full-range reproduction and spatial depth.

Daily use may benefit more from preserved pulse, breath, and harmonic identity.

A portable version does not have to reproduce the live room to remain authentically KLAAT.

It should be honest about what it is.

Part VII - Synthesis

KLAAT does not have one delivery condition.

Live performance, studio capture, full-range playback, headphones, and portable speakers are related but materially different experiences.

The project becomes more coherent - not less - when those differences are acknowledged.

Live KLAAT can be bodily and spatial. Recorded KLAAT can reveal details the room hides. Portable KLAAT can preserve pulse, breath, harmonic identity, and activation even when low-frequency pressure is reduced.

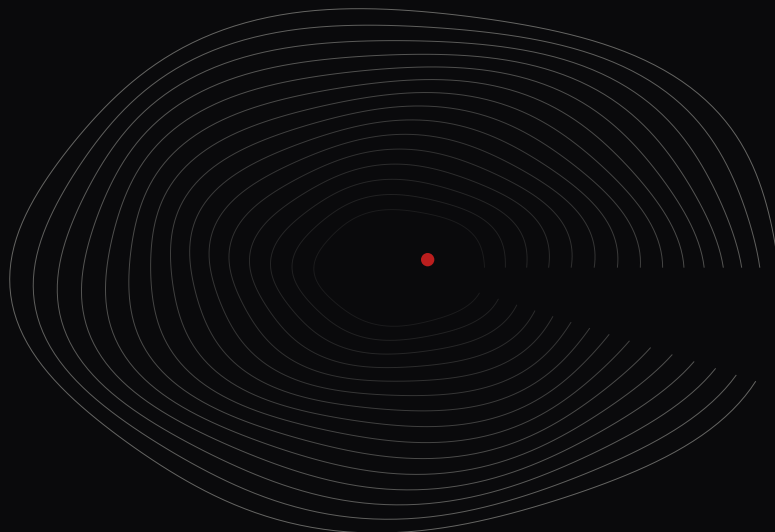
The goal is not to make every version identical.

The goal is to know what changed.

Part VIII turns to the research system itself: how KLAAT decides what counts as an event, what counts as evidence, and how to study real listeners without reducing the art to instrumentation.

VIII

From Experience To Evidence



PART VIII / 8 OF IX

What Counts As A Klaat Event?

1. The danger of pretending everything has a timestamp

A drum strike is easy to timestamp.

A gradual change in Amastacia's harmonic balance is not.

A listener's realization that "the music became different" may occur after the acoustic change began. A perceived chapter boundary may be reconstructed only after a new state has stabilized. A breath-related transition may unfold across hundreds of milliseconds rather than at one instant.

KLAAT therefore cannot treat every meaningful event as a point on a timeline.

2. Event ontology

The research program eventually distinguished several broad event types:

DISCRETE EVENTS - strikes, clear omissions, abrupt starts or stops.

SUSTAINED EVENTS - a drone field, a repeated pulse regime, a stable texture.

GRADUAL EVENTS - spectral drift, increasing density, slow reduction, changing roughness.

INFERRED EVENTS - the listener's recognition that a rule or state has changed.

PERCEPTUAL EVENTS - boundaries or compound moments identified by listeners even when no single physical marker dominates.

This ontology prevents false precision.

3. Acoustic event versus musical event

A measurable change does not automatically become musically meaningful.

A tiny microphone-level fluctuation may be irrelevant. A subtle change that several listeners identify independently may become a significant perceptual event even if its physical magnitude is small.

Conversely, a large acoustic change may be obvious but structurally unimportant.

KLAAT must preserve the distinction:

MEASURED CHANGE != EXPERIENCED EVENT.

4. The boundary is not the score

The four-phase vocabulary once risked becoming a template against which every performance would be judged.

The research later reversed that logic.

If listeners mark boundaries without seeing a score, their agreement can be compared with Paul's retrospective interpretation. If their segmentation differs, that is information.

The performance should not be forced into four phases simply because the vocabulary exists.

5. The reference is a distribution

Different annotators will disagree.

One person may mark a transition at 5:42. Another at 5:48. A third may mark a window from 5:35 to 5:55. Someone else may mark no transition.

The wrong response is to average them into one fake exact timestamp and call it ground truth.

The better response is to preserve the distribution.

Agreement, disagreement, confidence, and boundary width are themselves results.

6. Listener-defined chapters

KLAAT's spontaneous form becomes especially interesting when independent listeners discover similar boundaries without being told what to hear.

Such agreement would not prove a universal architecture.

It would show that a specific performance contained cues strong enough to support shared segmentation.

That is a real form of structure.

7. Before / Change / After

A transition should not be studied only at its peak moment. Predictive-uncertainty research shows that boundary judgments can depend on the evolving expectation context around a change, not only on the local surprise of a single event (Hansen et al., 2021).

The research now treats a candidate boundary as a window with context:

BEFORE - what rule or state had become normal? CHANGE - what acoustic or perceptual feature shifted? AFTER - did the new relationship persist long enough to alter expectation?

This helps distinguish an isolated accent from an actual change of musical state.

CONTRADICTION BOX - THE STRONGEST CHANGE MAY NOT BE THE MOST SURPRISING MOMENT

An unexpected omission can evoke a prediction-error response, but repeated deviations can themselves become predictable, and listener boundary judgments can depend on uncertainty about what comes next rather than only on local surprise (Prete et al., 2022; Hansen et al., 2021; Coy et al., 2023).

KLAAT therefore uses BEFORE / CHANGE / AFTER rather than a single "prediction error" score. The meaningful event may be the moment a listener's model reorganizes, which can occur after the acoustic trigger and need not correspond to the loudest or strangest instant.

Measurement Without Killing The Art

1. The measurement problem

KLAAT's research program became increasingly sophisticated, and that created a new danger: the apparatus could begin dictating what counted as important.

Sensors are useful only if they answer a real question.

The project does not need to measure everything because everything can be measured.

The governing rule is:

MEASUREMENT MUST SERVE A CLAIM.

2. One variable, one evidence stream

Different instruments answer different questions.

A microphone measures air pressure. An accelerometer measures structure motion. A respiratory belt estimates breathing movement. ECG or PPG estimates cardiac timing through different signals. Motion tracking measures movement. A questionnaire measures subjective report. Annotation captures perceived or defined events.

No stream is a universal truth channel.

3. Calibration is not optional when numbers become claims

Once KLAAT begins comparing acoustic levels across sessions, positions, or venues, calibration and measurement-chain scope matter. IEC 61672 specifies performance requirements for sound-level meters, while NIOSH guidance emphasizes calibration/recordkeeping and WHO safe-listening guidance emphasizes defined reference positions and continuous monitoring in venue contexts (IEC 61672-1:2013; CDC/NIOSH current guidance; WHO, 2022).

The research program established a simple minimum for formal acoustic measurements:

POSITION	DURATION	METRIC	CALIBRATION	STATUS
PERFORMANCE	CONTEXT	MEASUREMENT-CHAIN	CAPABILITY	

Without those, a number can look precise while remaining incomparable.

4. Shared timebase

Multimodal claims require synchronization.

If a microphone, accelerometer, movement sensor, and physiological device all run on independent clocks, apparent lags can be artifacts.

A claim that "heart rate changed 800 milliseconds after the Gate" is meaningless if the streams cannot support sub-second alignment.

KLAAT's acquisition principle therefore became:

ONE TIMEBASE, ONE EVENT TABLE, RAW FIRST.

5. Raw data before interpretation

Processed features are useful, but raw or minimally processed data should be preserved whenever possible.

That allows later questions to be asked without repeating the performance.

If the research later discovers that attack envelope, not peak SPL, matters to a listener effect, the original recording allows reanalysis.

The same logic applies to vibration and physiology.

6. Safety measurement is different from artistic measurement

Hearing exposure needs appropriate metrics and duration accounting; NIOSH's occupational REL and WHO's recreational-venue standard both combine level with time rather than treating instantaneous loudness as dose (NIOSH, 1998/current guidance; WHO, 2022).

Timbre needs spectral and temporal analysis.

Bodily vibration needs mechanical measurement at relevant interfaces.

Listener experience needs subjective report.

Trying to turn one measure into all four creates false authority.

7. Do not measure the metaphor

Words such as energy, grounding, portal, ancient, pressure, expansion, or body activation can be artistically meaningful.

The research should not pretend every metaphor has a one-to-one sensor.

Instead, it should ask what the listener meant and which measurable variables, if any, covary with that report.

The metaphor is data as language, not a failed physics statement.

8. Minimal viable study

KLAAT does not need a university laboratory to begin producing useful evidence.

A good first study can involve:

- one authentic unedited recording;
- documented playback;
- a handful of independent listeners;
- neutral open-ended reporting first;
- a short set of defined ratings afterward;
- a clear question;
- preserved audio and timestamps;
- no forced theory.

Small studies cannot establish population-wide effects, but they can identify whether a proposed phenomenon is worth deeper work.

9. Causal controls

If a strong moment occurs, several explanations may compete.

Was it prediction violation? A loudness increase? A timbral change? A room effect? A visible performer gesture? Adaptation to the preceding passage?

KLAAT's Three-Causes framework - prediction, attention, repetition/adaptation - is one example of the broader rule:

DO NOT CLAIM CAUSATION FROM COINCIDENCE.

The Listener As Data Without Reducing The Listener

I. Subjective report is evidence

A listener saying "I felt the vibration move up my back" is evidence of an experience.

It is not automatically evidence of literal upward mechanical propagation.

A listener saying "time disappeared" is evidence of altered subjective time.

It is not automatically evidence of a neural trance state.

A listener saying "the drum and drone became one thing" is evidence of perceived unity.

It does not prove the acoustic sources physically merged.

KLAAT's listener research becomes stronger when subjective reports are respected precisely for what they are.

2. Open report before category

Leading questions can bias self-report by changing what participants search for or how they interpret ambiguous experience; KLAAT therefore treats neutral open report before theory as a methodological commitment rather than assuming structured scales are sufficient on their own.

If listeners are asked, "Did you feel the energy rising?" some will search for rising energy.

A better sequence begins with:

**WHAT HAPPENED FOR YOU? WHAT STOOD OUT?
WHERE DID YOUR ATTENTION GO?**

Only afterward should specific categories be introduced.

This preserves unexpected responses.

3. Separate dimensions

KLAAT should avoid a single "trance score."

More useful dimensions include:

- absorption;
- energy;
- urge to move;
- actual movement;
- imagery;
- bodily salience;
- enjoyment;
- tension;
- perceived continuity;
- pulse clarity;
- willingness to keep listening;
- time passage;
- discomfort.

Different combinations may define different forms of successful listening.

4. Null results belong in the work

If listeners do not agree on a boundary, that matters.

If a full-range system produces no stronger absorption than headphones, that matters.

If Paul's highest-flow take is not preferred by listeners, that matters.

KLAAT becomes more legitimate when negative findings remain visible.

The research does not exist to prove the project effective.

It exists to learn what the project actually does.

5. Individual differences are not failure

Listeners arrive with different musical histories, movement preferences, hearing, expectations, attention, and tolerance for repetition. Groove, beat, and segmentation studies all show meaningful listener/task dependence rather than one invariant response profile (McAuley & Semple, 1999; Popescu et al., 2021; Witek et al., 2014; Dean & Taylor, 2026).

Variation may be central to the phenomenon.

A KLAAT effect that appears only for some listeners can still be artistically meaningful, but it should not be generalized to everyone.

6. Performer and listener remain separate

Paul's immediate report after a take is valuable.

Listeners' reports are valuable.

The strongest design preserves both without letting one explain away the other.

This is the Two-Sided Experience Gate:

PERFORMER STATE ACOUSTIC PERFORMANCE
LISTENER EXPERIENCE PHYSIOLOGICAL / BEHAVIORAL
RESPONSE

Each remains its own layer.

7. Blindness where possible

Listeners should not be told which take Paul thought was "better" before they respond.

They should not be told that one playback system is expected to create more body sensation.

They should not be given phase names before marking boundaries.

Blinding does not remove subjectivity.

It reduces suggestion.

8. The listener is more than a sensor

No experimental framework should erase the fact that listening is an artistic encounter.

A person's language, memory, imagery, aversion, pleasure, and interpretation are not nuisances around the "real" physiological data.

They are part of what KLAAT is trying to understand.

The science becomes reductive only when it claims that a heart-rate trace is more real than the listener's experience.

Both are real observations of different things.

Part VIII - Synthesis

KLAAT research is now mature enough to know that rigor does not require sterilizing the art.

It requires disciplined separation.

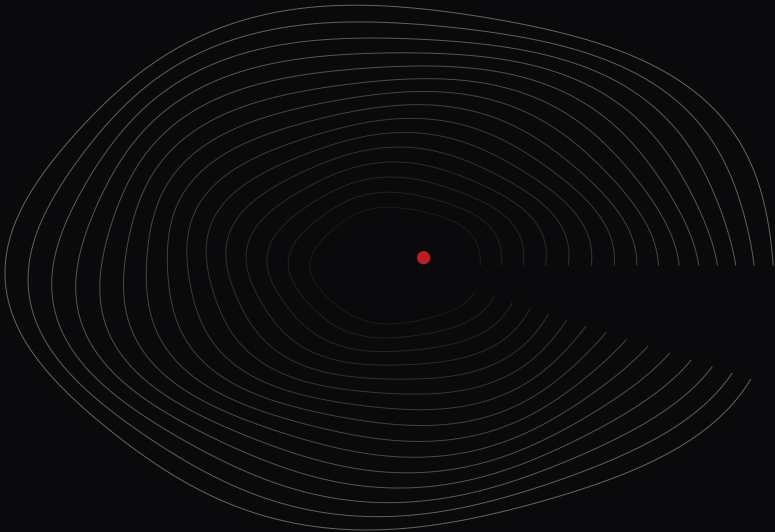
Separate event from timestamp. Separate source from perception. Separate performer from listener. Separate pressure from acceleration. Separate bodily report from mechanical pathway. Separate prediction from attention. Separate engagement from movement. Separate measurement from meaning.

Once those boundaries are protected, the project can become more adventurous, not less.

Part IX states the research position after ninety-three sessions: what KLAAT knows, what it suspects, what it has rejected, and which experiments are finally worth doing next.

IX

The Klaat Research State



PART IX / 9 OF IX

What We Know

After ninety-three research sessions, the most important achievement is not a collection of exotic claims. It is a clearer map of what can be said without exaggeration.

KLAAT is a sparse human acoustic system whose apparent simplicity contains many interacting layers: sustained drone, pulse, breath, harmonic and noisy timbre, prediction, repetition, room, bodily delivery, attention, memory, motor invitation, performer flow, and playback transformation.

The following conclusions are strong enough to function as foundations.

Resonance is system-specific. Rooms, structures, and instruments have measurable resonant behavior governed by their physical properties and boundary conditions, but there is no defensible basis for treating one named frequency as a universal biological key (Fletcher & Rossing, 1998; Pierce, 2019).

Low-frequency sound is not one thing. Acoustic pitch, pulse rate, modulation rate, room mode, and mechanical vibration spectrum are different quantities (Kinsler et al., 2000; McAuley & Semple, 1999; ISO 2631-1:1997).

The body receives music through multiple pathways. Airborne hearing, contact vibration, motor expectation, and perceptual attribution can all contribute to what a listener calls physicality; music studies and whole-body-biodynamics work demonstrate that these pathways and interfaces should not be collapsed into one variable (Hove et al., 2020; Fairley & Griffin, 1989; Cameron et al., 2022).

Pulse is hierarchical. A sequence of Ankora attacks can support multiple perceived metrical levels, and perceived beat depends on tempo, accent structure, musical experience, and context rather than one event rate alone (McAuley & Semple, 1999; Witek et al., 2014).

Repetition creates expectation. Deviations, omissions, and rule changes acquire meaning through history; predictive-uncertainty and omission studies demonstrate that context changes the response to what happens - or fails to happen - next (Hansen et al., 2021; Prete et al., 2022).

Timbre matters as much as pitch. Attack shape, spectral structure, roughness, formants, breath noise, and harmonic movement can carry identity and salience (Grey, 1977; Caclin et al., 2005; Tarnopolsky et al., 2005).

The room is distributed. One seat is not the venue (Kuttruff & Vorländer, 2025; ISO 3382-1:2009).

The playback system changes KLAAT. The live room, headphones, a small speaker, and a full-range system are related but non-equivalent conditions.

Performer and listener states are separate. Performer-flow research supports studying spontaneous creative state, while audience/listener studies require separate measures; Paul's flow therefore cannot substitute for listener data (Rosen et al., 2024; Tschacher et al., 2023).

Subjective experience is evidence of experience. It is not automatically evidence of a specific mechanism.

Measurement determines what can responsibly be claimed. Microphones, accelerometers, physiology, movement, listener report, and annotation are different evidence streams.

These conclusions do not prove that KLAAT induces trance, heals, or changes physiology in a unique way.

They do something more useful: they give the project a defensible scientific foundation without reducing it to science.

CONTRADICTION PRINCIPLE

The mature KLAAT position is not built by averaging conflicting studies into one vague conclusion. When evidence points in different directions, the project asks which variables changed.

Repetition can adapt and deepen. Low-frequency delivery can increase movement without increasing absorption. Microtiming can help, hurt, or do nothing depending on relationship and style. Background music can support one task and disrupt another. Live performance can add important dimensions without being universally superior. Performer flow can matter without being directly transmitted.

These contradictions are not defects in the research. They are evidence that KLAAT is a multivariable human system rather than a one-knob technology.

What We Think Might Be True

The next layer consists of hypotheses that repeatedly emerge from independent parts of the research and fit authentic KLAAT practice.

They are worth testing because they are specific enough to fail.

1. Amastacia may create continuity without stasis.

Her stable pitch center can coexist with breath, formant movement, roughness, noise, and envelope variation. That combination may help long drone remain alive rather than merely static.

2. Ankora may anchor time without becoming the only rhythmic stream.

The drum can support a recoverable pulse while accents, subdivisions, Amastacia articulations, and timbral events generate additional temporal layers.

3. The relationship between the instruments may matter more than either alone.

Masking, timing, common envelope, contrast, perceptual grouping, and alternating dominance may be central to KLAAT's identity.

4. KLAAT may support pressurized continuity.

A listener may remain oriented inside one acoustic world while surface activity becomes denser, rougher, more urgent, or less predictable.

5. Strong moments may come from expectation rather than greater energy.

A missing strike or subtle timbral shift may become powerful because of learned context, not because the signal became louder or more physically intense.

6. Tactile contribution may depend on coherence and interface.

A moderate vibration arriving at the right time through a well-coupled surface may matter more perceptually than a larger but poorly aligned mechanical signal.

7. Spontaneous form may be recoverable by listeners.

Independent listeners may discover overlapping transition regions in a performance Paul never consciously divided into sections.

8. Performer flow may leave audible traces.

Flow itself cannot be transmitted directly, but high-flow performances may contain different continuity, timing, breath, or coordination patterns.

9. Technical fluency may increase improvisational freedom.

Improved circular breathing and hand-breath independence may reduce conscious workload and allow more attention to remain available for listening and emergence.

10. KLAAT may have two valid listening modes.

The same recording may support focused absorption and everyday activation under different conditions.

11. Portable KLAAT may preserve identity better than bodily depth.

Pitch, formants, attack, pulse, and texture may survive limited playback even when deep acoustic pressure and tactile involvement do not.

These hypotheses are not doctrine.

They are invitations to look at what the actual music does.

What We No Longer Believe

A serious research program becomes defined partly by what it learns to stop saying.

KLAAT has accumulated a useful set of negative conclusions.

We no longer treat C# as biologically special simply because Amastacia is tuned there.

We no longer treat approximately 137 BPM as a universal human tempo.

We no longer convert BPM into hertz and call that a brainwave claim.

We no longer treat stimulus-locked neural activity as automatic proof of trance.

We no longer treat "felt energy" as direct proof of autonomic activation.

We no longer treat a reported bodily path as proof that vibration physically traveled along that path.

We no longer treat one floor accelerometer as whole-body dose.

We no longer assume more bass means more absorption.

We no longer assume more vibration means more embodiment.

We no longer assume performer flow equals listener trance.

We no longer assume audience movement proves broad neurological entrainment.

We no longer treat respiratory-rate change as sufficient proof of respiratory entrainment.

We no longer treat HRV as a one-number readout of "vagal activation."

We no longer treat one microphone as the room.

We no longer treat one waveform timestamp as the meaning of an event.

We no longer assume performer-intended transitions are perceived by listeners.

We no longer treat the four-phase architecture as universal psychological law.

We no longer treat Ground Anchor, Threshold Gate, Rising Pulse, and Return Path as required composition rules.

We no longer assume greater prediction error is always better.

We no longer use random microtiming as shorthand for human groove.

We no longer allow scientific theory or AI analysis to determine canonical KLAAT structure.

These are not losses.

They are evidence that the project has matured.

The discarded claims were attractive because they made KLAAT easier to explain.

The surviving model is more complicated and more credible.

The Experiments That Matter Next

The primary bottleneck is no longer literature.

It is KLAAT-specific data. The external evidence now supplies plausible mechanisms and measurement constraints, but the categories "KLAAT-observed" and "KLAAT-replicated" remain largely empty until authentic recordings and listener data are collected.

The next stage should begin with authentic performance rather than engineered stimuli.

PROGRAM A - AUTHENTIC RECORDING BASELINE

Record several uninterrupted 8-20 minute performances without playing to a protocol.

Immediately afterward, Paul records a brief performer note:

- flow;
- effort;
- breath difficulty;
- drum/didgeridoo coordination difficulty;
- sense of freedom;
- memorable moments;
- anything that felt forced.

Do not analyze while playing.

PROGRAM B - BLIND LISTENER DESCRIPTION

Give several listeners the same recording without explaining phases, mechanisms, or Paul's self-rating.

Ask first: What happened for you? What stayed with you? Where did your attention go? Did you want to move? Did time feel unusual? Did the music seem to change at any point?

Only afterward collect structured ratings.

PROGRAM C - EVENT CONSENSUS

On a second listen, ask listeners to mark meaningful transitions or landmarks.

Preserve disagreement.

Do not force four phases.

PROGRAM D - PLAYER / LISTENER COMPARISON

Compare Paul's performer notes with listener reports and acoustic features.

The question is not whether listeners "felt his trance."

It is whether high-flow takes contain repeatable acoustic characteristics or different listener outcomes.

PROGRAM E - DELIVERY CHAIN

Present the same take through headphones, a small speaker, and a more capable system.

Compare:

- pitch identity;
- breath / texture;
- pulse clarity;
- physical weight;
- bodily sensation;
- energy;
- absorption;
- preference.

Do not assume the largest system wins.

PROGRAM F - TECHNIQUE / FREEDOM

Across ordinary practice, track:

- circular-breath continuity;
- coordination errors;
- perceived effort;
- recovery after disruption;
- flow.

The goal is not a scientifically ideal performance.

It is to see whether technique reduces unwanted limitation while leaving musical choice unconstrained.

PROGRAM G - LONGITUDINAL FAMILIARITY

Give the same authentic recording to a small listener group across several days.

Track enjoyment, absorption, energy, imagery, willingness to relisten, and what details become newly noticeable.

This begins answering whether KLAAT deepens with familiarity or recedes into background.

PROGRAM H - LIVE VERSUS RECORDED

Once a stable live setup exists, compare the same musical material across live and recorded contexts while documenting room and playback.

The aim is not to prove live is better.

It is to identify what liveness adds.

Epilogue: experience-led creation

KLAAT does not need science to authorize its existence.

The artistic world came first.

Amastacia was already a voice before anyone measured her harmonics. Ankora was already a pulse before anyone separated beat from event rate. Paul was already entering flow before the research distinguished performer state from listener response. The room was already changing the sound before it became a spatial field in a ledger. Listeners were already capable of feeling something before the project had language for interoception, prediction, masking, or perceptual grouping.

The research has a narrower and more valuable role.

It can tell us when a claim outruns the evidence. It can distinguish one mechanism from another. It can improve technical freedom. It can help recordings preserve what matters. It can protect ears and bodies. It can discover which parts of the experience are shared and which are individual. It can allow mystery to remain where measurement stops.

Most importantly, it can keep KLAAT from becoming an illustration of its own theories.

The music should continue to emerge from Paul's body, attention, history, instruments, room, and instinct.

Science follows afterward.

The research serves KLAAT, not the other way around.

Experience-led creation. Science-informed refinement.

SCIENTIFIC TERMS ===== =====

ACOUSTIC FREQUENCY Rate of pressure-wave oscillation, measured in hertz (Hz). Do not confuse with musical event rate, BPM, neural oscillation frequency, or mechanical vibration frequency.

AMPLITUDE MODULATION Change in the amplitude/envelope of a carrier over time. The modulation rate is distinct from the carrier frequency.

ATTACK The early rise of a sound event. Attack duration and shape can strongly influence timbre and perceived timing.

AUDITORY CONTINUITY ILLUSION Perception that a sound continues through a masking interruption under suitable conditions. This is perceptual restoration, not literal acoustic continuity.

AUDITORY SCENE ANALYSIS Processes by which the auditory system organizes sound into perceptual objects or streams. Timing, timbre, harmonicity, and temporal coherence can contribute.

AUTOMATICITY Relative reduction in deliberate attentional control for a practiced action. Not all-or-none; task and learning history matter.

BEAT A perceived recurring temporal reference in music. The perceived beat may differ from the physical rate of individual events.

BONE CONDUCTION Transmission of mechanical vibration through skull/body structures to the auditory system. Performer bone-conducted experience can differ from audience airborne listening.

CARRIER FREQUENCY The frequency of the underlying oscillatory acoustic or mechanical signal. A carrier can be modulated at a much slower rate.

CROSSMODAL Involving interactions between sensory modalities, such as hearing and touch.

DAMPING Loss/dissipation of vibratory energy in a system, affecting resonant response and decay.

DUAL-TASK INTERFERENCE Performance cost that occurs when two concurrent tasks compete for processing/control resources. Practice can reduce some interference under specific conditions.

ECOLOGICAL VALIDITY Degree to which a study condition reflects the real-world phenomenon the research aims to understand.

ENTRAINMENT A term used differently across disciplines. In strict dynamical usage, it involves synchronization or phase-locking between oscillatory systems. In music research it is sometimes used more broadly. KLAAT should name the exact measured synchronization rather than use entrainment as a catch-all.

EVENT RATE Number of discrete events per unit time. A drum strike rate is not automatically the perceived beat or an acoustic low-frequency tone.

FORMANT Spectral region emphasized by a resonant filter such as the vocal tract. Didgeridoo performers can alter formant structure through vocal-tract configuration.

FORCED VIBRATION Vibration caused by an external driving force. A driven object can move without being at resonance.

FUNDAMENTAL FREQUENCY Lowest frequency associated with a periodic harmonic sound, often corresponding to perceived pitch but not always physically required for pitch perception.

GROOVE Music-perception construct associated with pleasurable urge to move. Groove is not equivalent to actual movement, tempo, syncopation, or trance.

HARMONIC Frequency component at an integer multiple of a periodic signal's fundamental frequency.

HARMONICITY Degree to which spectral components fit a harmonic relationship. Can influence pitch and auditory grouping.

INTEROCEPTION Perception/interpretation of internal bodily states. Interoceptive report is subjective evidence and does not automatically identify a causal physiological pathway.

LAEQ Equivalent continuous A-weighted sound pressure level over a stated duration. The duration must be reported.

MASKING Reduction in audibility of one sound due to another sound.

MECHANICAL COUPLING Transfer of vibratory energy between connected systems, such as floor-chair-body. Coupling depends on contact and mechanical properties.

METER Hierarchical organization of beats into recurring strong/weak patterns. Meter is perceived, not read directly from one event rate.

MICROTIMING Small timing relationships among musical events. Microtiming may be systematic, expressive, accidental, or perceptually influenced by attack shape.

MISSING FUNDAMENTAL Pitch perception in which a fundamental pitch is heard or inferred from higher harmonic relationships even when the physical fundamental is absent or attenuated.

MODULATION RATE Rate at which a signal property such as amplitude varies. It is distinct from the carrier frequency and from BPM.

MOTOR INVITATION Informal manuscript phrase for a perceived urge or readiness to move. Not a standardized scientific construct unless operationalized.

OMISSION RESPONSE Perceptual/neural response to an expected event that fails to occur. Does not imply one universal prediction-error mechanism in music.

P-CENTER / PERCEPTUAL CENTER Perceived temporal location of an event; can differ from the earliest acoustic onset.

PERCEIVED PASSAGE OF TIME Subjective sense that time moved quickly/slowly. Distinct from estimating how much clock time elapsed.

PREDICTION Expectation about future sensory events based on learned regularities and context.

PREDICTIVE UNCERTAINTY Uncertainty about what event or continuation is likely next. Different from how surprising one actual event is.

RESONANCE Enhanced response of a system near one of its natural modes under appropriate driving conditions. Depends on physical system properties; not a mystical property of a frequency.

REVERBERATION Persistence/decay of sound energy in an enclosed space after excitation, produced by reflections.

ROUGHNESS Perceptual quality associated with rapid envelope/spectral interactions under certain acoustic conditions. Roughness can be salient but has no universal emotional meaning.

SENSORIMOTOR SYNCHRONIZATION Coordination of movement with an external temporal sequence, such as tapping to a beat.

SOMATIC ATTRIBUTION KLAAT research phrase for the process by which a listener localizes or interprets a bodily sensation. The felt location need not equal the physical site of maximum mechanical input.

SPECTRAL CENTROID A common descriptor of spectral "brightness," representing a weighted center of spectral energy.

SPECTRAL FLUX Measure of change in a spectrum across time.

STIMULUS LOCKING Time-locked neural/physiological response to repeated events. It should not automatically be labeled broad entrainment or trance.

SUBDIVISION Faster temporal divisions perceived relative to a beat.

SUBJECTIVE TIME Umbrella term covering perceived passage, duration estimation, temporal memory, and related experience. These should be measured separately where possible.

SYNCOPIATION Rhythmic placement that conflicts with or displaces expected metrical accents. Its effect depends on context, meter familiarity, and other layers.

TACTILE MASKING Reduction in detectability of one tactile signal due to another tactile stimulus.

TEMPORAL COHERENCE Degree to which features change together over time, which can support perceptual grouping.

TIMBRE Perceptual identity/quality of a sound beyond pitch and loudness, shaped by spectrum, attack, temporal envelope, noise, modulation, and other features.

VIBROTACTILE Relating to perception of vibration through touch.

WHOLE-BODY VIBRATION Mechanical vibration transmitted to the body through support/contact surfaces under defined conditions. Occupational standards are not artistic target specifications.

AMASTACIA, THE DRONE Paul's C# agave didgeridoo. In KLAAT analysis, Amastacia is treated as a sustained but internally evolving acoustic field rather than one frequency.

ANKORA, THE PULSE Paul's elk-hide frame drum. In KLAAT analysis, Ankora is treated as a source of temporal events and pulse information, not merely a BPM generator.

ARCHAEOSONIC KLAAT aesthetic term for a sonic world that feels ancient, excavated, ritual, material, or premodern without claiming an authentic historical/Indigenous lineage.

FIELD KLAAT descriptive term for the sustained acoustic/perceptual environment, usually strongly associated with Amastacia. Not a formal physics term unless specifically qualified.

PULSE KLAAT artistic term for Ankora's temporal function. Scientific analysis should specify event rate, beat, meter, subdivision, or other measured property when needed.

GROUND ANCHOR Historical KLAAT phase label for a stable orienting condition. Retained as descriptive artistic vocabulary, not a required composition rule or validated psychological phase.

THRESHOLD GATE Historical KLAAT phase label for a perceived transition or threshold. Retained descriptively, not as universal structure.

RISING PULSE Historical KLAAT phase label for increasing activation/density/temporal pressure. Retained descriptively, not prescriptively.

RETURN PATH Historical KLAAT phase label for a transition toward closure/reorientation. Retained descriptively, not prescriptively.

PRESSURIZED CONTINUITY KLAAT hypothesis/descriptor: a condition in which the listener retains a coherent sense of field or pulse while surface density, urgency, roughness, or unpredictability increases.

ANCHOR KLAAT analytic shorthand for a feature that supports temporal or perceptual orientation. Not automatically Ankora in every passage.

SURFACE KLAAT analytic shorthand for faster-changing texture, articulation, accent, noise, harmonic motion, or subdivision above/around a more stable anchor.

EARNED WOUND Historical KLAAT phrase for a violation/omission/deviation that gains force because the listener had enough prior regularity to form an expectation. Artistic language, not scientific terminology.

SCAFFOLD Historical KLAAT analytic term for a relatively stable organizing layer. Use retrospectively; do not prescribe.

KSV / MINIMUM STATE VECTOR Historical modeling attempt that reduced KLAAT passages to FIELD STABILITY, CLOCK STRENGTH, SURFACE PRESSURE, and WITHDRAWAL. Retained as research-history vocabulary, not a composition engine.

SAMPLE ZERO Historical 66-second KLAAT recording used as early calibration/reference. Any measured features belong to that recording only.

KLAAT-DEMONSTRATED Highest project-specific evidence category: a finding observed in actual KLAAT data with sufficient measurement quality. Very few claims currently qualify.

KLAAT-OBSERVED A result seen in a KLAAT pilot but not necessarily replicated.

KLAAT-TESTABLE A hypothesis specific enough to be investigated with authentic KLAAT recordings/listeners.

KLAAT-COMPATIBLE External scientific mechanism that plausibly could apply to KLAAT but has not been directly shown in KLAAT.

EXPERIENCE-LED CREATION Paul's artistic decisions arise from instinct, experience, technique, instruments, room, and spontaneous emergence - not from research prescriptions.

SCIENCE-INFORMED REFINEMENT Science can improve explanation, technique, capture, safety, measurement, and testing after the artistic world exists.

ACTIVATION Can mean subjective energy/arousal, behavioral movement, physiological arousal, or neural activation. Always specify which.

BODY RESONANCE Avoid unless a specific physical resonant response is measured. Prefer bodily sensation, contact vibration, or biodynamic response.

ENERGY Artistically valid but scientifically ambiguous. Specify acoustic energy, mechanical energy, subjective energy, or activation when making technical claims.

HEALING Do not use as an empirical KLAAT outcome without appropriate clinical evidence.

HYPNOTIC Can be used descriptively if a listener uses it, but do not equate with clinical hypnosis or a defined neural state.

RITUAL Valid artistic/cultural form description. Do not imply inherited ceremonial authority or established therapeutic mechanism.

SHAMANIC Use only where culturally/historically appropriate or as self-described artistic influence; never as evidence of Indigenous lineage or physiological mechanism.

TRANCE Valid subjective descriptor but scientifically underspecified. If used in research, operationalize absorption, time distortion, movement, imagery, responsiveness, or physiology separately.

VAGAL ACTIVATION Avoid as shorthand inferred from HRV or calmness alone.

BRAINWAVE ENTRAINMENT Avoid unless a study design distinguishes stimulus-locked evoked responses from genuine oscillatory entrainment and measures a relevant neural variable.

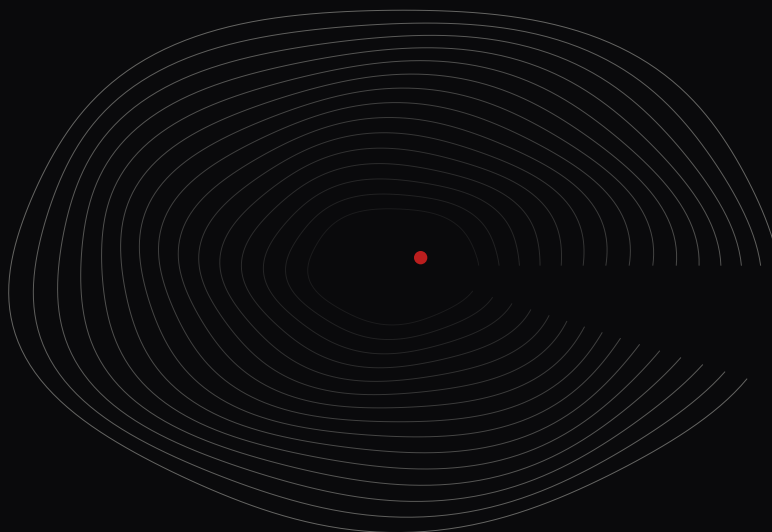
KLAAT can keep its mythic, ancient, strange, bodily, and ritual language.

The research simply has to know when it is speaking as art and when it is speaking as measurement.

Experience-led creation. Science-informed refinement.

B

The status of claims



APPENDIX B / EVIDENCE BY CHAPTER

This appendix preserves the evidence classifications developed during the 93-session research program. They sit outside the running narrative so the book can move as a book while keeping its scientific claims inspectable.

Chapter 1 – Resonance Without Frequency Magic Established Outside Klaat:

- Physical systems exhibit resonant modes.
- Resonance depends on properties of the system and coupling conditions.
- Forced vibration is not synonymous with resonance.
- Enclosed rooms produce frequency- and position-dependent modal effects.
- Low-frequency sound can contribute to bodily sensation under sufficient conditions.
- The body's mechanical and tactile responses vary by frequency, site, posture, and coupling.

Plausible for KLAAT but not yet demonstrated:

- Particular rooms may strongly reinforce or suppress important parts of Amastacia's spectrum.
- Some venues may produce stronger bodily salience because acoustic and structural pathways happen to align.
- Particular Amastacia harmonic configurations may excite narrow resonances in nearby objects or structures.

Unsupported:

- C# is intrinsically healing.
- A named frequency automatically entrains an organ or neural system.
- Any visible vibration is proof of resonance.
- A strong bodily sensation identifies the responsible physical pathway by itself.

The artistic language may remain expansive. The scientific language has to remain exact.

Research basis: Sessions 1, 3, 8, 21, 27, 28, 46, 50, 60, 61, 62, 92, 93.

Chapter 2 – Sound Is Not One Frequency Established Outside Klaat:

- Acoustic carrier frequency and event rate are distinct.
- Beat and meter are perceptual organizations of temporal events.
- Amplitude modulation and beating can arise without creating a new pure low-frequency tone.
- Attack transients strongly influence temporal perception and timbre.
- Roughness can arise from rapid amplitude interactions and auditory-filter behavior.
- Auditory nonlinearities and missing-fundamental pitch perception are real.

Plausible for KLAAT:

- Amastacia's internal envelope may contribute rhythmic information independent of Ankora.
- Listeners may organize a fast Ankora pulse at slower metrical levels.
- Roughness and attack shape may influence activation independently of overall SPL.
- Portable playback may preserve pitch identity while reducing physical presence.

Unsupported:

- Converting BPM into hertz proves a matching brainwave state.
- A modulation rate is equivalent to a pure tone at that frequency.
- Perceived low pitch proves physical low-frequency energy reached the body.
- One numerical rate can summarize KLAAT's entire temporal experience.

Research basis: Sessions 4, 10, 11, 21, 23, 30, 37, 42, 43, 63, 67, 77, 78, 81, 91, 93.

Chapter 3 - The Room Is A Distributed Instrument Established Outside Klaat:

- Enclosed spaces create modal peaks and nulls.
- Acoustic response varies substantially with position.
- Reverberation affects temporal clarity and spectral experience.
- Structural vibration and airborne sound are distinct measurement domains.
- Occupancy and loading can alter acoustic or mechanical behavior.

Plausible for KLAAT:

- Amastacia may reveal venue-specific spatial zones particularly strongly because of sustained excitation.
- Ankora pulse clarity may vary with reverberant smearing and listener position.
- Some rooms may increase bodily salience through accidental alignment of acoustic and structural responses.
- Paul may alter his improvisation in response to room feedback even without consciously analyzing it.

Unsupported:

- One room measurement represents the whole audience.
- A strong room mode is a healing frequency.
- A vibrating floor proves strong vibration entered every listener.
- The most resonant room is necessarily the most effective KLAAT environment.

Research basis: Sessions 8, 13, 27, 45, 46, 48, 50, 58, 60, 61, 68, 72, 80, 92.

Chapter 4 - The Drone Is Not One Frequency Established Outside Klaat:

- Didgeridoo sound contains a fundamental plus many harmonics and noise components.
- Vocal-tract shaping can strongly alter the radiated spectrum and formant structure.
- Sustained sounds can contain rich envelope and spectral modulation.
- Auditory systems adapt to regularity and emphasize deviations.
- Missing-fundamental pitch perception can preserve pitch identity when the physical fundamental is attenuated.

Plausible for KLAAT:

- Amastacia's recognizable identity may depend strongly on upper-harmonic and formant movement.
- A stable drone may become perceptually dynamic because listener attention moves among internal features.
- Portable playback may preserve identity while reducing bodily depth.
- Subtle spontaneous timbral changes may become unusually salient after prolonged stability.

Unsupported:

- Amastacia is meaningfully described by only one frequency.
- Her C# identity guarantees a biological effect.
- Preserved pitch means preserved physical bass.
- Stable drone means a stable listener state.

Research basis: Sessions 4, 10, 22, 23, 29, 41, 42, 43, 81, 93.

Chapter 5 - Breath, Harmonics, Roughness, And The Human Edge Established Outside Klaat:

- Circular breathing is a coordinated, trainable motor skill.
- Performer physiology and audible breath traces are not identical.
- Didgeridoo vocal-tract configuration alters harmonic structure.
- Roughness and rapid modulation can affect salience and urgency.
- Music can influence respiration in context-dependent ways.

Plausible for KLAAT:

- Better circular-breath fluency may reduce unwanted technical interruptions while preserving expressive texture.
- Breath noise and vocal-tract movement may be part of Amastacia's identity rather than removable artifacts.
- Listener absorption may relate to perceived continuity without requiring respiratory synchronization.

Unsupported:

- Circular breathing creates a special autonomic state in listeners.
- The listener automatically breathes with the performer.
- Roughness is a universal trance or fear switch.
- Cleaner tone is inherently more authentic.

Research basis: Sessions 6, 10, 19, 20, 23, 32, 43, 57, 81, 82, 93.

Chapter 6 - Continuity, Masking, And The Sound That Survives Established Outside Klaat:

- Auditory masking can hide simultaneous or nearby sounds.
- Auditory continuity/restoration can produce perceived continuation across masked interruptions under controlled conditions.
- Perceptual object identity can persist despite changes in acoustic detail.
- Familiarity and adaptation alter salience over time.

Plausible for KLAAT:

- Ankora or room sound may occasionally mask brief breath-related discontinuities in Amastacia.
- Listeners may perceive a stable drone object despite substantial microvariation.
- Amastacia's identity may survive low-frequency loss if harmonic and temporal cues remain.
- Repetition may create a stable reference that supports attention moving elsewhere without total disengagement.

Unsupported:

- Every uninterrupted subjective drone proves auditory restoration.
- Perceptual continuity proves physiological continuity.
- A listener's sense of an unbroken field demonstrates neural entrainment.
- Removing low-frequency energy leaves the live experience unchanged.

Research basis: Sessions 7, 15, 22, 29, 40, 41, 51, 80, 81, 82, 83, 84, 85, 93.

Chapter 7 - Beat, Meter, Subdivision, And The Internal Clock Established:

- Beat and meter are perceptual organizations of temporal events.
- Listeners can represent multiple metrical levels.
- Spontaneous motor tempo varies between and within individuals.
- Rhythmic density can change independently of the perceived underlying beat.

Plausible for KLAAT:

- Ankora may support a stable anchor while subdivisions become denser.
- Different listeners may organize the same ~137 BPM passage at different metrical levels.
- Internal accent hierarchies may allow one drum to function as both anchor and surface.

Unsupported:

- 137 BPM is biologically privileged.
- A listener who moves at half-time is less entrained.
- One measured BPM describes all temporal experience in the performance.

Research basis: Sessions 5, 21, 37, 63, 67, 74, 77, 78, 89.

Chapter 8 - Repetition, Expectation, Omission, And Surprise Established:

- Auditory systems learn temporal regularities.
- Expected omissions can elicit measurable perceptual and neural responses.
- Deviants can become predictable when repeated according to learnable rules.
- Musical engagement depends on context, not simply maximum unpredictability.

Plausible for KLAAT:

- Sparse repetition may make small spontaneous deviations unusually salient.
- Rule-level changes may sometimes matter more than isolated event magnitude.
- Omitted Ankora strikes may produce subjective anticipation without physical impact.

Unsupported:

- Every omission creates trance.
- Novelty "resets" the nervous system.
- There is a fixed optimal amount of surprise.
- Random timing protects against habituation.

Research basis: Sessions 5, 7, 15, 16, 29, 37, 40, 51, 53, 54, 70, 71, 88.

Chapter 9 - Groove, Motor Invitation, And Human Microtiming Established:

- Groove, urge to move, observed movement, and pleasure are separable outcomes.
- Rhythmic complexity effects depend on meter, style, and listener context.
- Arbitrary microtiming deviations do not universally improve groove.
- Sound envelope and timbre influence perceived event timing.
- Relative timing relationships can matter more than absolute deviation from a grid.

Plausible for KLAAT:

- Amastacia-Ankora timing relationships may influence motor invitation and perceptual unity.
- Technical fluency may reduce unwanted interference while preserving expressive irregularity.
- Listeners may hear different timing centers depending on attack shape and grouping.

Unsupported:

- Random jitter makes KLAAT more human.
- Quantized timing is inherently lifeless.
- A fixed millisecond offset will maximize groove.
- Urge to move proves trance or physiological entrainment.

Research basis: Sessions 11, 30, 63, 67, 77, 78, 89, 90, 91.

Chapter 10 – Airborne Bass Versus Mechanical Vibration

Established:

- Airborne sound pressure and mechanical vibration are different physical quantities.
- Vibrotactile perception depends on frequency, contact site, magnitude, posture, and coupling.
- Added low-frequency or tactile stimulation can alter movement and groove-related experience under some experimental conditions.

Plausible for KLAAT:

- Full-range live reproduction may create bodily experiences not preserved by small speakers.
- Some listener movement may depend on delivery system as much as composition.
- Ankora and Amastacia may contribute differently to auditory and mechanical channels.

Unsupported:

- Low pitch automatically equals strong body vibration.
- A microphone spectrum proves tactile exposure.
- A listener's body report proves a specific mechanical pathway.
- More bass necessarily creates deeper absorption.

Research basis: Sessions 2, 3, 9, 13, 24, 35, 46, 62, 92.

Chapter II - Contact, Coupling, And The Multi-Interface Listener Established:

- Body-surface coupling changes mechanical transmission.
- Occupancy can alter the support system.
- Multi-axis and multi-contact body vibration cannot be reduced to simple arithmetic addition.
- Tactile salience depends on background, adaptation, and contrast.

Plausible for KLAAT:

- Seating and floor conditions may substantially alter bodily experience at a fixed acoustic performance.
- Some venues may create strong mechanical involvement without unusually high airborne SPL.
- Listener posture may explain part of between-person variation in felt intensity.

Unsupported:

- One floor accelerometer represents whole-body dose.
- Seat + feet + back measurements can be summed into a universal "body energy" value.
- Stronger mechanical transmission is always more immersive.

Research basis: Sessions 13, 25, 35, 46, 50, 52, 60, 62, 68, 92.

Chapter 12 - Audio-Tactile Coherence And The Constructed Body Map Established:

- Auditory and tactile signals can interact and bind perceptually.
- Temporal coherence can influence multisensory grouping.
- Tactile apparent-motion and sensory-saltation illusions demonstrate that perceived path can differ from physical stimulation path.
- Reported bodily location is not equivalent to a mechanical measurement.

Plausible for KLAAT:

- Aligned heard/felt Ankora events may increase bodily salience or perceived unity.
- Amastacia and Ankora may sometimes form one perceptual compound event.
- Some reports of "movement through the body" may reflect multisensory construction rather than literal vibration travel.

Unsupported:

- Perceived bodily movement proves energy physically traveled through the body.
- Strong audio-tactile coherence proves autonomic activation or trance.
- The most mechanically intense condition is necessarily the most coherent perceptually.

Research basis: Sessions 9, 18, 26, 34, 36, 46, 49, 55, 56, 59, 69, 90, 92.

Chapter 13 - Attention, Absorption, And Mind-Wandering Established:

- Music can alter attentional state, imagery, mood, arousal, and task focus.
- Orienting, absorption, mind-wandering, and task attention are distinct constructs.
- Interoceptive attention can change subjective bodily experience without proving a new physical stimulus.

Plausible for KLAAT:

- Long-form drone and pulse may support anchored wandering for some listeners.
- Small spontaneous changes may reorient attention after periods of stability.
- Familiar KLAAT may function differently during daily activity than during focused listening.

Unsupported:

- Absorption proves trance in a neurological sense.
- Mind-wandering means the music failed.
- KLAAT automatically improves concentration or productivity.
- A strong bodily report proves autonomic activation.

Research basis: Sessions 17, 18, 31, 34, 51, 69, 71, 79, 84, 85, 89.

Chapter 14 – Familiarity, Habituation, And Listening Endurance Established:

- Repeated exposure can change liking, familiarity, attention, and perception.
- Sensory adaptation is not equivalent to boredom.
- Novelty can sustain attention while familiarity can increase appreciation.

Plausible for KLAAT:

- Some listeners may become more absorbed across repeated hearings.
- Familiarity may shift attention from obvious pulse toward subtler texture.
- KLAAT may work differently as focused art and everyday soundtrack.

Unsupported:

- Repetition necessarily causes trance.
- Repetition necessarily causes boredom.
- A fixed number of repetitions determines habituation.
- More novelty always improves engagement.

Research basis: Sessions 14, 15, 29, 40, 51, 53, 71, 84, 85.

Chapter 15 – Subjective Time And The Chapters No One Composed Established:

- Subjective time is multidimensional.
- Attention, memory, event structure, and rhythmic focus can alter duration judgments.
- Listeners segment continuous experiences into meaningful events and boundaries.
- Boundary judgments can vary between listeners.

Plausible for KLAAT:

- Continuous drone may reduce explicit time monitoring while spontaneous changes create memorable landmarks.
- Different listeners may recover recurring transition windows from the same improvisation.
- Some performances may naturally resemble the historical four-phase vocabulary without being composed to do so.

Unsupported:

- Time distortion proves trance.
- Four listener clicks validate a universal KLAAT architecture.
- Every acoustic change is a perceptual boundary.
- Every meaningful boundary has a single correct timestamp.

Research basis: Sessions 14, 54, 65, 66, 72, 73, 74, 75, 76, 86, 87, 88.

Chapter 16 - Circular Breathing As Skill, Not Metaphysics Established:

- Circular breathing is a coordinated motor skill involving multiple anatomical structures.
- Audible continuity does not imply continuous pulmonary exhalation.
- Listener respiration cannot be inferred from performer respiration.

Plausible for KLAAT:

- Greater circular-breath fluency may reduce unwanted effort and free attention for improvisation.
- Simultaneous Ankora playing may reveal specific interference points in breath transitions.
- Some breath artifacts may become artistically valuable rather than merely technical errors.

Unsupported:

- Circular breathing induces a special listener autonomic state.
- Hidden inhalations entrain listener breathing.
- Technical smoothness automatically increases absorption.

Research basis: Sessions 6, 19, 32, 57, 82, 83.

Chapter 17 – Flow, Automaticity, And The Player-Listener Divide Established:

- Improvisational performance can differ cognitively and neurally from rehearsed execution.
- Skilled motor behavior can become more automatic with practice.
- Performer and listener receive different sensory and motor information.

Plausible for KLAAT:

- Greater technical automaticity may support freer improvisational flow.
- High-flow takes may contain recurring acoustic signatures that listeners sometimes prefer.
- Listener absorption may correlate with some features of high-flow performance without matching Paul's internal state.

Unsupported:

- Performer flow automatically transmits to listeners.
- A listener's trance-like report proves Paul was in flow.
- More automatic performance is inherently better.

Research basis: Sessions 12, 24, 63, 79, 82, 91.

Chapter 18 - Two Instruments Becoming One Living System Established:

- Multitask motor coordination can improve with practice.
- Perceptual grouping can bind contributions from distinct sound sources into compound events.
- Attack shape and timing influence perceived synchronization.

Plausible for KLAAT:

- Greater hand-breath independence may increase improvisational freedom.
- Some naturally occurring Amastacia-Ankora alignments may be perceived as unified events.
- Partial independence between respiratory and rhythmic cycles may contribute to KLAAT's organic character.

Unsupported:

- Perfect synchronization is the goal.
- Perceptual unity proves physiological synchronization.
- More technically difficult passages are necessarily more artistically effective.

Research basis: Sessions 36, 44, 56, 78, 79, 82, 89, 90, 91.

Chapter 19 - The Venue Is Not One Room Established:

- Rooms are spatially heterogeneous.
- Reverberation alters temporal and spectral perception.
- Measurement position and duration are part of the result.
- Live context differs from short controlled playback.

Plausible for KLAAT:

- Venue zones may produce substantially different Amastacia weight and Ankora clarity.
- Visual performer presence and room coupling may change absorption relative to recorded playback.
- Some venues may support KLAAT's bodily aesthetic more efficiently than others without greater overall SPL.

Unsupported:

- One microphone describes the whole venue.
- A strong hotspot means the room is universally "better."
- Laboratory detectability guarantees artistic significance in full performance.

Research basis: Sessions 8, 27, 45, 47, 48, 60, 61, 72.

Chapter 20 – The Playback System Is The Third Participant Established:

- Recording and playback systems alter spectrum, dynamics, transients, spatial presentation, and low-frequency delivery.
- Different playback environments produce different received stimuli.

Plausible for KLAAT:

- Some listener effects may transfer well across playback systems because they depend on timing and harmonic identity.
- Other effects may require full-range acoustic or tactile delivery.
- Recording choices may strongly influence whether Amastacia and Ankora feel separate or unified.

Unsupported:

- A digital file contains the full live bodily experience.
- A listener's reaction can be interpreted without knowing the playback path.
- More technically accurate reproduction automatically creates a stronger artistic experience.

Research basis: Sessions 47, 48, 58, 72, 80, 81, 82, 92, 93.

Chapter 21 - What Klaat Must Preserve When The Bass Disappears Established:

- Missing-fundamental pitch can preserve low-pitch identity without the physical fundamental.
- Didgeridoo timbre depends strongly on higher harmonic/formant structure.
- Small playback systems often preserve transients differently from deep low-frequency decay.

Plausible for KLAAT:

- Breath, attack, harmonic motion, and pulse may preserve substantial identity on limited playback.
- Full-range systems may add a separable bodily dimension rather than simply a "better version" of the same experience.
- Listeners may prefer different delivery profiles for focused versus everyday use.

Unsupported:

- If the pitch survives, the physical bass experience survives.
- Virtual-bass processing automatically improves KLAAT.
- Portable KLAAT is artistically inferior by definition.

Research basis: Sessions 42, 80, 81, 82, 83, 92, 93.

Chapter 22 – What Counts As A Klaat Event? Established:

- Event perception can be hierarchical and distributed in time; music-segmentation studies show listener boundary judgments at multiple structural scales and substantial variation across listeners and stimulus types (Phillips et al., 2020; Popescu et al., 2021; Dean & Taylor, 2026).
- Listener segmentation often shows partial agreement rather than one exact ground truth, which is why KLAAT preserves boundary distributions rather than forcing one timestamp (Phillips et al., 2020; Bruderer et al., 2009; Dean & Taylor, 2026).
- Annotation uncertainty is meaningful and should be preserved.

Plausible for KLAAT:

- Some spontaneous transitions will produce shared listener boundary regions.
- Gradual changes may be better described as windows than timestamps.
- Retrospective performer structure may sometimes align with listener-defined chapters.

Unsupported:

- Every event has one correct timestamp.
- Four phase labels are universal ground truth.
- Listener agreement alone proves trance or physiological state change.

Research basis: Sessions 54, 65, 66, 72, 73, 74, 75, 76, 87, 88.

Chapter 23 – Measurement Without Killing The Art Established:

- Measurement validity depends on calibration, synchronization, sensor capability, and experimental design.
- Different evidence streams answer different questions.
- Raw-data preservation improves auditability and reanalysis.

KLAAT methodological commitment:

- Use the least invasive measurement capable of answering the question.
- Preserve provenance.
- Separate acoustic, mechanical, subjective, behavioral, and physiological claims.
- Stop when the data cannot support the next inference.

Research basis: Sessions 47, 48, 58, 65, 66, 71, 72, 73, 75, 76, 92.

Chapter 24 – The Listener As Data Without Reducing The Listener Established:

- Subjective reports and physiological measures are distinct evidence streams.
- Leading questions can bias reports.
- Blinding and neutral prompts improve interpretive discipline.
- Individual differences matter in music perception and response.

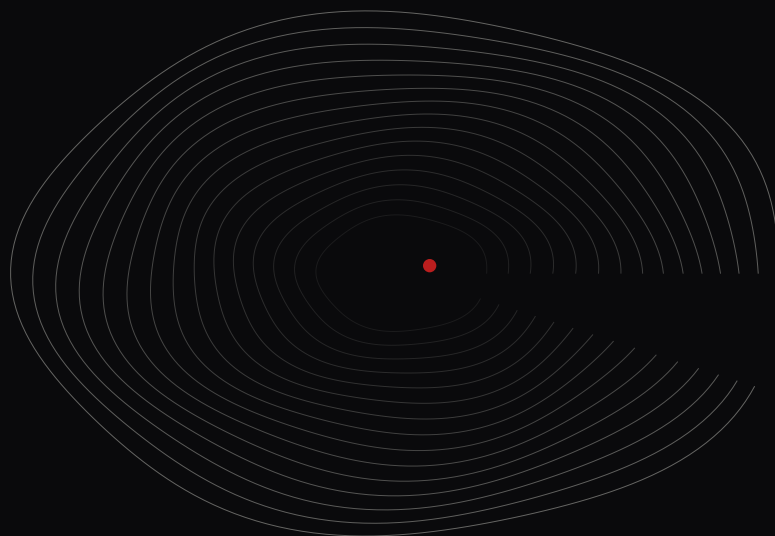
KLAAT methodological commitment:

- Preserve open-ended experience.
- Measure defined dimensions separately.
- Allow "nothing happened" as a valid result.
- Do not translate poetic language into mechanism without evidence.
- Do not use performer flow as a proxy for listeners.

Research basis: Sessions 18, 34, 59, 65, 69, 72, 73, 76, 79, 84, 85, 86, 87, 89, 90.



The sources under the surface



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This register consolidates 83 inherited records into 79 distinct entries, removing four repeated standards or institutional guidelines. The literature list remains a research register: abbreviated author lists and individual citation metadata require final publisher-level verification before formal academic publication.

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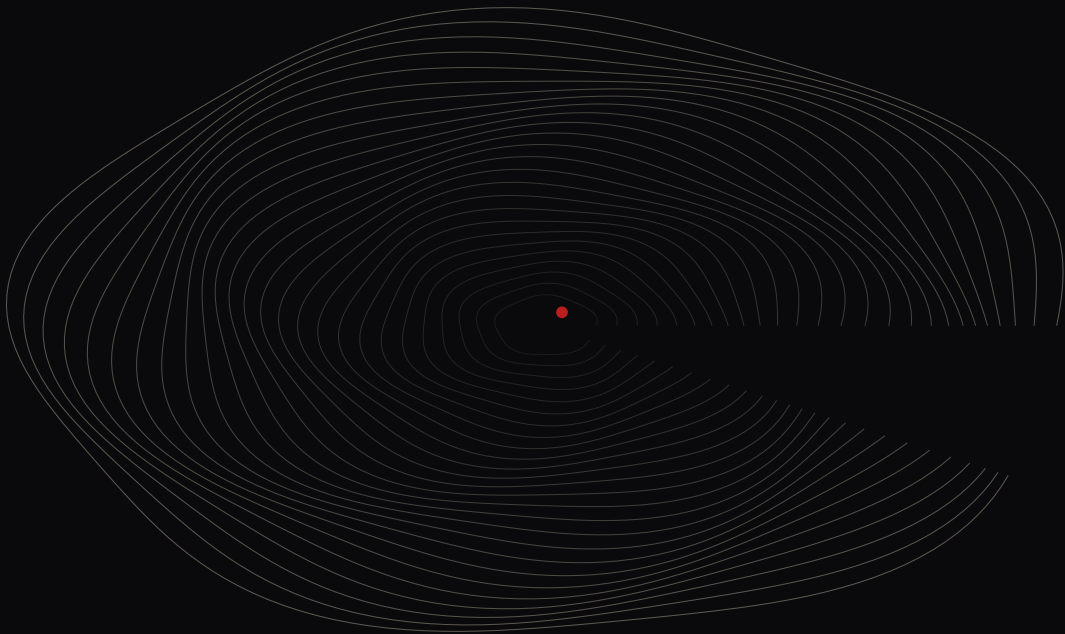
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The field is not complete. A new recording can change a diagram; a new listener may hear a different form; a null result may send a hypothesis back to the beginning. This is not the failure of an atlas. It is the condition under which an atlas remains useful.

The experiment follows the music.

Experience-led creation. Science-informed refinement.

THE EVIDENCE CONTINUES



*A new finding changes the questions one can ask. It does not
retroactively prove what the music has done.*

The beat and the state

Supplement to the research field / 2026

Two 2026 publications sharpen KLAAT's research questions without closing them. They deserve a place in this book precisely because they make the boundary between possibility and proof easier to see.

One study of drumming and neural tracking

Gordon, Karvat, Dagan and Landau (2026) investigated responses to ten-minute sessions of isochronous drumming at 1.5, 4 and 9.5 beats per second. The experiment enrolled forty participants and recorded EEG while they listened; the authors also collected reports of altered experience and estimates of elapsed time. Their reported association between theta-range neural tracking and altered-experience scores is scientifically interesting.

But the result is not a demonstration that four beats per second makes everyone enter trance. The population, procedures, sound material and outcome measures were specific. A correlation between a neural measure and reported experience is not a warrant to claim that any musical work, much less KLAAT, reliably induces a particular state. Theta EEG activity, four drum attacks per second, and a culturally named trance experience are three concepts, not one.

The most valuable next question for KLAAT is not which number to imitate. It is whether the relation between expectation, shifting density and listener experience can be investigated using authentic performances, individual reports and control conditions. A finding about one experimental stimulus is a reason to design better experiments, not a substitute for doing them.

A review with cultural and methodological scope

Kontouli, Hove, Lehmann, Vuust and Keller (2026) review accounts of music-induced non-ordinary states from both anthropology and neuroscience. They describe heterogeneous practices and partially overlapping proposed mechanisms. They also acknowledge that the empirical literature remains fragmented and methodologically uneven.

That caution matters to KLAAT. A narrative of repetitive sound can be profound without becoming a physiological law. Rather than treating diverse forms of trance as identical, an artist-researcher can ask what was played, how attention was directed, what the setting contributed, and what participants themselves meant by the words they chose.

A language belongs somewhere

Supplement to the original field VII

Research into drumming traditions is not a warehouse of rhythms available for anonymous extraction. A pattern may depend on ceremonial roles, shared language, social authority, apprenticeship, and the people entitled to teach it. Even where acoustic techniques can be compared, their uses and meanings are not interchangeable.

Franck Bernede's ethnography of dhimay drum learning among Newar farmers in the Kathmandu Valley describes musical compositions transmitted with mimetic syllables within a situated ritual apprenticeship. The syllables are not merely a convenient mnemonic detached from their community; their teaching and authority belong to a social and cultural practice. The article also situates drum learning alongside acrobatic training and religious processions.

Anne de Sales's study of Kham-Magar shamanic speech in Nepal examines the sources of ritual authority and the conditions under which an utterance becomes efficacious within a ceremonial relationship. It is primarily about authority and speech, not a recipe of drumming techniques. That distinction is itself useful: the mechanics of a sound and the authority a community assigns to it are different subjects.

Andrew Alter's account of dhol sagar knowledge among musicians in Garhwal, northern India, documents another named and situated musical discourse. It should not be flattened into the same system as Newar dhimay or Kham-Magar ritual speech merely because all three belong to a wider conversation about music, memory and tradition.

What KLAAT may legitimately learn

KLAAT can study how sustained training develops technique, how meaningful cues become recognizable, how patterns are remembered, and how an improvised response is understood by a practitioner. It should build its own vocabulary by recording its own gestures on Amastacia and Ankora, and by checking whether others can learn and recognize them.

The name of a KLAAT gesture must come from the gesture, not from invented antiquity. A new symbolic language is permitted to be new. A personal practice does not need to borrow another community's ceremonial authority in order to become worth teaching.

The witness and the waveform

A compact protocol for a future genuine KLAAT study

The Atlas requires a repeatable route from music to evidence. The route below is deliberately modest. It neither diagnoses altered states nor promises therapeutic outcomes. Its purpose is to keep personal experience audible without claiming the participant is an instrument.

Before presenting the recording

Choose a real, unedited KLAAT performance and note the recording chain, listening environment, playback level and device. Preserve a copy of the original. Recruit listeners with varied musical backgrounds. Ask about any discomfort or reasons to stop, allow withdrawal, and avoid exposing participants to uncomfortable volume or vibration.

During the listening

Do not announce a target brain state, hidden frequency, or expected spiritual experience. Instead ask listeners to indicate moments when something perceptually changes, if they wish. Record the time marks without interpreting them for the participant. A silent listening option and a straightforward stopping procedure matter more than an impressive label.

Immediately afterward

Ask open questions first: What did you notice? Where did your attention travel? Did the music seem to contain recognizable sections? Which, if any, bodily sensations did you experience? Was any event expected but absent? Only then offer carefully worded rating questions. Keep the performer's report separate from audience reports.

When analyzing the material

Measure actual drum onset timing, approximate beat structure, changing spectral content and physical playback conditions. Compare the recordings with reported events without quietly selecting only the confirming examples. Examine individual patterns before averaging across listeners. A null finding or disagreement is not a failed performance.

This is a starting design rather than a completed scientific protocol: research involving human participants may require ethics review, appropriate data handling, validated measures and specialist advice. KLAAT-specific effects remain unestablished until the work is carried out and reported transparently.

Supplementary sources

Verified bibliographic additions / October 2026

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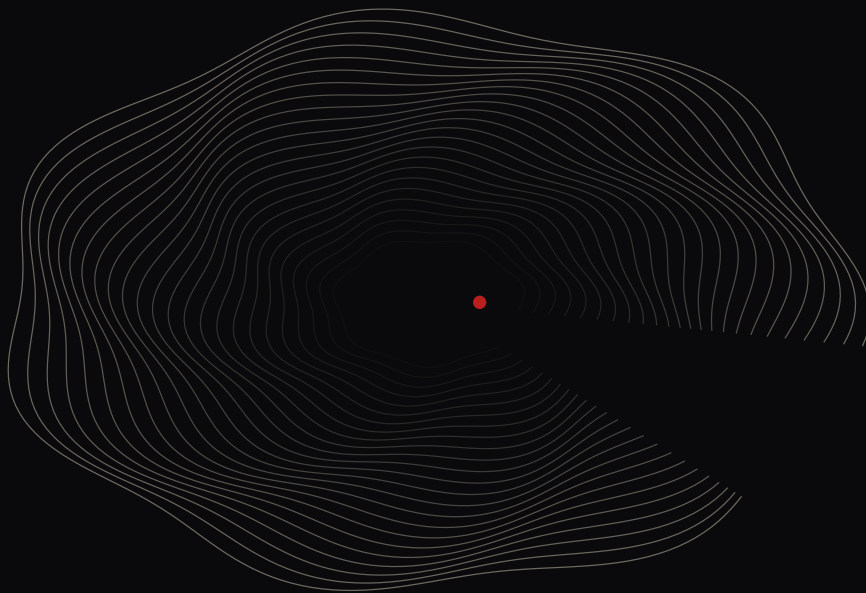
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Scope note: These are supplementary references verified for bibliographic identity and the claims cited in this addendum. The broader source corpus has not received an independent line-by-line peer review. These external studies do not report controlled outcomes of KLAAT performances.

KLAAT / A RETURN WITHOUT AN END



The sound came first.
It should always be permitted the last word.

EXPERIENCE-LED CREATION / SCIENCE-INFORMED REFINEMENT