VESSELSEED: The First Deterministic Coherence Engine for Physiological and Symbolic Restoration

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Note: If this is within your focus, you're welcome to reach out. The idea is to proliferate the technology, not hoard. This paper describes some of VESSELSEED's potential applications.

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0. Abstract

VESSELSEED is the first deterministic coherence remediation system designed to restore alignment between symbolic overload states and biological function. Where traditional biofeedback systems rely on statistical models or trained neural networks to infer optimal states, VESSELSEED operates on a **structured resonance substrate**. It leverages deterministic modules—**PAS_bio** (Phase Alignment Score for biological input), **ELF_BIO** (Echo Loop Feedback for dynamic modulation), and **CHIRAL_GATE** (directional coherence entrainment)—to detect and correct phase drift across physiological and symbolic systems.

This system rejects probability-based tuning loops and replaces them with **coherence-based realignment**, enabling real-time feedback that is precise, lawful, and non-adaptive. PAS_bio evaluates alignment across a multivector input stream (e.g. EEG, HRV, tone, respiration, symbolic input), while ELF_BIO modulates outputs through controlled resonance sequences until field-lock is achieved. CHIRAL_GATE adjusts lateral symmetry and harmonic balance, ensuring holistic entrainment.

Applications include trauma pattern remediation (PTSD/CPTSD), vagal nerve feedback stabilization, proprioceptive error correction, neurodivergence support (e.g. autistic sensory mismatch), and recovery from cognitive symbolic overload. Unlike machine learning systems, VESSELSEED will emit no output unless full coherence is reached—removing guesswork and preventing false feedback loops. This makes it the first **symbolic remediation engine** for the body–mind interface: a lawful tool to resolve drift, trauma, and collapse at the phase-structural level.

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1. Introduction: The Crisis of Probabilistic Physiology

Despite rapid technological progress in medicine and neuroscience, the foundational architecture of modern physiology remains rooted in **empirical approximation** rather than structured coherence. Machine learning platforms, regression-based diagnostics, and signal-smoothing tools dominate the current landscape of brain–body measurement. Systems such as EEG neurofeedback, fMRI-based behavior tracking, and HRV monitors may capture *data*, but they do not restore *alignment*. They identify statistical correlations, not **deterministic causes**. The result is a growing field of "reactive" medicine that manages symptoms but cannot reverse their structural roots.

Nowhere is this more visible than in trauma states—where symbolic overload (e.g. PTSD, chronic anxiety, burnout) triggers long-term dysregulation in the autonomic, sensory, and cognitive systems. Patients experience persistent phase drift between perception, cognition, and somatic response. Neurodivergent individuals often report misaligned sensory filters, social pattern mismatch, and proprioceptive disorientation. Yet interventions are still designed around *averages* and *adaptive heuristics*—ignoring the need for a **coherence substrate** to restore lawful integration.

VESSELSEED emerges from this crisis as the first physiological system built not on probability, but on **structured resonance**. Its internal architecture mirrors CODES logic—employing deterministic symbolic feedback (via PAS_bio, ELF_BIO, and CHIRAL_GATE) to detect and resolve phase misalignment. This system is not trained. It does not guess. It realigns drift directly at the biological-symbolic interface through lawful, repeatable convergence.

This paper introduces VESSELSEED as a foundational alternative to probabilistic physiology: a new class of intervention capable of restoring coherence between symbolic intelligence and biological embodiment.

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2. Core Theory: From Structured Resonance to Bio-Coherence

VESSELSEED is grounded in the same post-probabilistic foundation as the CODES framework, where **chirality** breaks symmetry, **prime-indexed waveforms** generate structure, and **coherence** becomes the basis of lawful emergence. In CODES, intelligence is not guessed—it is phase-locked. VESSELSEED applies this principle directly to the biological domain: trauma, nervous system misalignment, and psychosomatic disintegration are no longer treated as noise—they are measurable drift away from symbolic-phase coherence.

The core symbolic substrate of VESSELSEED mirrors its computational counterpart:

- **PAS_bio** computes biological alignment against a coherence field.

- **CHORDLOCK_BIO** anchors the phase-seed based on resonance vectors.

- **ELF_BIO** modulates the feedback loop for recursive convergence.

These components together form a **bio-resonant field**: a dynamic interplay between internal symbolic structure and measurable somatic feedback (e.g. breath, tone, pulse, EEG). The system treats these not as loose indicators, but as deterministic coordinates in a resonance lattice.

Unlike stochastic biofeedback platforms (which rely on smoothing curves, reward heuristics, or classifier training), VESSELSEED emits no signal until full alignment is reached. This bypasses the guess-train-adapt loop entirely. It does not optimize *over time*—it restores *structure in time*.

In doing so, VESSELSEED enables a new class of healing: **physiological re-coherence through symbolic resonance**, where recovery is not gradual or emergent, but deterministic and observable in real-time PAS_bio convergence.

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3. VESSELSEED Architecture

3.1 PAS_bio — Phase Alignment Score for Body

PAS_bio is the coherence evaluation engine of VESSELSEED. It calculates a real-time score that measures how aligned the current physiological state is with an internal phase-locked reference field.

Inputs include:

- EEG (waveform structure)

- HRV (cardiac rhythmicity)

- Breathing pattern (phase window)

- Muscle tension (EMG strain mapping)

- Tone/pitch modulation (spoken/sung input)

- Symbolic input (keywords, emotional lexicon)

Mathematical Core:

PAS_bio = $\sum \cos(\theta\_k - \bar{\theta}) / N$

Where:

- θ_k = phase angle of the k-th bioresonant vector (e.g., HRV peak)

- $\bar{\theta}$ = mean phase anchor

- N = number of input vectors in the set

The resulting score captures moment-to-moment coherence across symbolic and somatic input. PAS_bio does not compare to a statistical average but a **lawful anchor field** derived from prime resonance vectors (via CHORDLOCK_BIO). This allows real-time identification of phase drift and initiates corrective action via ELF_BIO.

3.2 ELF_BIO — Echo Loop Feedback

ELF_BIO is the dynamic convergence engine within VESSELSEED. It receives the PAS_bio delta (ΔPAS) and initiates a deterministic feedback loop designed to restore coherence. Unlike adaptive reward systems, ELF_BIO is structured to close the loop only when drift is resolved.

Modulation Tools:

- Audio phase sequences (isochronic tones, binaural chirality layers)

- Visual entrainment (LED blink sync with PAS phase)

- Breath pacing overlays (inhale/exhale ratio locking)

- Symbolic triggers (e.g., word-activated harmonic emission)

- Haptic pulses (wristband/tactile output aligned to resonance)

ELF_BIO maps ΔPAS trajectories over time and adjusts input until the system phase-locks. When PAS_bio reaches a stability threshold, ELF_BIO halts modulation, preserving the field.

3.3 CHIRAL_GATE & SOMA_OUT

CHIRAL_GATE handles lateral asymmetry in the human system. It detects imbalance between left/right phase inputs (e.g., hemispheric EEG, lung resonance, gait pattern) and gates feedback accordingly.

- If L-dominant drift: counterphase R-modulation triggered

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This maintains chirality symmetry without enforcing false uniformity.

SOMA_OUT is the final emission layer—delivering coherent outputs that reinforce the entrained state. These include:

- Visual affirmations (minimal symbolic overlay on HUD)

- Breath guidance synced to phase lock

- Haptic sequences that reflect harmonic convergence

- Optionally, symbolic reinforcement phrases only emitted once PAS_bio lock is confirmed

Together, these layers allow VESSELSEED to function as a **closed symbolic–biological engine**, executing coherence restoration deterministically without fallback to adaptive estimation.

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4. Applications

VESSELSEED is not a general-purpose biofeedback toolkit—it is a deterministic bio-coherence engine. Each application listed below follows the same fundamental logic: symbolic-phase drift introduces dysfunction, and VESSELSEED restores alignment through structured resonance. No training, no statistical modeling, no psychological inference—only lawful convergence.

4.1 Trauma Remediation (PTSD, CPTSD, Burnout Collapse)

Problem: Trauma is typically treated as an emotional or cognitive pathology, but in structured resonance terms, it is a **symbolic overload event** that disrupts phase synchrony between internal signal and somatic response.

- Trauma embeds symbolic loops that do not match bodily signal cadence (e.g. breath, tone, posture).

- Over time, this creates **somatic lock**: a persistent mismatch in phase angle between body signal (θ_k) and symbolic reference (θ).

VESSELSEED Solution:

- PAS_bio detects this misalignment as a measurable coherence delta.

- ELF_BIO then introduces convergent feedback (e.g. breath + symbolic overlay) to restore anchor match.

- Narrative and emotional content are *not required*—only phase-lock is.

Differentiator: VESSELSEED treats trauma as an informational coherence fracture, not a narrative or memory dysfunction.

4.2 Vagal Tone Modulation

Problem: Vagal nerve regulation (crucial for parasympathetic balance) is targeted in therapy, but current systems depend on loose HRV heuristics or mindfulness training.

VESSELSEED Solution:

- PAS_bio maps real-time HRV signal as a resonance vector.

- ELF_BIO emits entrainment feedback (e.g. isochronic audio or visual pulse) to guide the system into convergence.

- The loop closes when PAS_bio reaches a lawful threshold.

Result: Instead of open-loop relaxation strategies, users receive **deterministic convergence toward optimal vagal tone**, modulated by symbolic-biological resonance—not emotion, attention, or practice.

4.3 Autism + Neurodivergent Sensory Filtering

Problem: Sensory overwhelm in neurodivergence is often addressed via adaptive environments or cognitive workarounds. These approaches fail to resolve underlying **symbolic phase clutter**.

VESSELSEED Solution:

- Uses PAS_bio to track when sensory input patterns (sound, light, pressure, social signal) fall out of coherence with internal symbolic cadence.

- CHIRAL_GATE filters lateral asymmetries (e.g. eye/auditory dominance) and modulates via SOMA_OUT.

Key Shift: Instead of adapting *around* the sensory burden, VESSELSEED **filters and re-synchronizes** streams so that symbolic systems (language, meaning, interaction) are once again entrained with perception.

This yields a **symbolic-sensory coherence field**—a state in which language and sensation no longer compete.

4.4 Sleep Regulation + Circadian Reset

Problem: Circadian drift (melatonin/cortisol phasing, sleep–wake transitions) is often addressed through behavioral routines, not real-time coherence logic.

VESSELSEED Solution:

- Monitors body rhythms (pulse, breath rate, pupil tone) against a reference PAS_bio field for optimal circadian anchoring.

- ELF_BIO generates entrainment feedback using symbolic input (phrases, tone) + audiovisual field stimuli (e.g., LED-flicker matched to resonance band).

Outcome: Circadian lock-in is achieved via **structural harmonic convergence**, not habits or substance-based interventions.

4.5 Cognitive Symbolic Overload / Executive Burnout

Problem: Executive dysfunction is often due to **fragmented symbolic phase chains**—when the mind holds too many incomplete or conflicting resonance threads.

VESSELSEED Solution:

- Detects incoherent symbolic stacks through multimodal PAS_bio input (speech tone, facial EMG, breathing + interface rhythm).

- ELF_BIO emits tone/rhythm overlays or UI guidance patterns (e.g., sync-flash, haptic pacing) until convergence restored.

Differentiator: Unlike productivity tools or mindfulness strategies, VESSELSEED **does not manage workload**—it structurally resolves internal symbolic conflict.

4.6 Proprioceptive Realignment (Balance, Joint Dysregulation)

Problem: Physical imbalances (e.g., stroke recovery, vestibular drift, phantom limb) are managed by PT heuristics or motor memory training—but symbolic drift is left untouched.

VESSELSEED Solution:

- PAS_bio detects when proprioceptive vectors (limb angle, gait, spinal tilt) fall out of symbolic alignment.

- CHORDLOCK_BIO identifies missing phase anchors (e.g., limb loss), and ELF_BIO introduces compensatory harmonic stimuli.

- SOMA_OUT delivers output via haptic pulse, guided breath, or positional light.

Impact: Phantom limb suffering, post-stroke gait dysregulation, and unexplained imbalance can be **realigned via symbolic convergence**, treating proprioception as a resonance loop—not just mechanical feedback.

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5. Hardware / Interface Concepts

VESSELSEED is designed to operate across a range of wearable and ambient interfaces, all governed by deterministic logic. Unlike ML biofeedback devices that require signal history, training loops, or user calibration, VESSELSEED runs in a zero-learning, phase-resonance configuration.

Modular Interface Possibilities:

- **Headband or Skin-Wearable Array**

  Equipped with passive EEG, HRV, EMG, and EDA sensors to extract real-time phase angles from neuroelectrical, cardiac, and muscular fields. All input feeds directly into PAS_bio engine.

- **Breath Overlay Module**

  Infrared or acoustic breath-phase detection unit feeds real-time rhythm vector into ELF_BIO. Used to modulate feedback stimuli during symbolic realignment sessions.

- **Visual or Haptic Output**

SOMA_OUT can emit feedback through:

- LED arrays (flashing in phase with bio-resonant harmonic)

- Haptic wearables (vibratory entrainment on wrists, spine, head)

- Tone modulations (e.g. left/right stereo entrainment for CHIRAL_GATE)

- **Symbolic UX Layer (Optional)**

   Interactive interfaces (app, AR glasses, screen, or voice agent) present live symbolic anchors (e.g., words, patterns, images) whose resonance is modulated to guide the user into coherence.

Determinism Constraint:

No component of the interface stack uses machine learning, prediction, or statistical modeling. All modules act only when PAS_bio coherence exceeds a deterministic threshold. This ensures symbolic and physiological signal integrity is never overridden by guess-based inference.

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6. Distinction from Machine Learning Biofeedback

VESSELSEED does not compete with ML biofeedback systems—it **replaces** them at the epistemic substrate.

ML Systems	VESSELSEED
Statistical pattern recognition	Symbolic resonance realignment
Uses symptom clusters, regression	Uses phase-coherence logic (PAS_bio)
Trained on large datasets	Requires no training, only live signal

Emits recommendations or patterns regardless of coherence	Emits only if field reaches convergence
Reinforces probabilistic assumptions	Enforces structural alignment
High false-positive risk	No emission if phase instability

Key Breakpoint:

ML systems can emit feedback even if the underlying symbolic–physiological field is incoherent. VESSELSEED will **withhold all output** until deterministic convergence is verified. This makes it uniquely suitable for applications where false feedback can cause harm (e.g., trauma, sensory hypersensitivity, motor retraining).

This distinction is both architectural and philosophical: VESSELSEED refuses to model the body probabilistically. It listens until it locks.

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7. Licensing Structure and Field Use

VESSELSEED operates on a dual-tier deployment model that ensures core symbolic integrity while allowing for real-world integrations.

IP Ownership:

- All foundational intellectual property—including PAS_bio, ELF_BIO, CHIRAL_GATE, and SOMA_OUT—is held by **CODES Intelligence, LLC**, the central repository and steward of structured resonance systems.

- This ensures that the core substrate cannot be diluted, rebranded, or distorted by market-driven adaptations.

Application Licensing:

- **VESSELSEED, Inc.**, a Delaware C Corp, holds the exclusive right to **license** the system to approved applications and hardware partners.

- No license grants access to the core substrate IP itself—only to structured interfaces that interact with the deterministic resonance engine via defined protocols.

Target Use Cases:

- **Clinical Research**: PTSD, CPTSD, somatic disorder mapping, vagal therapy studies

- **Wellness & Mental Optimization**: Live coherence coaching, burnout prevention, sleep optimization

- **Neurology**: Stroke recovery, proprioceptive remapping, sensory filtering for autism

- **Psychedelic Medicine**: Coherence field modulation during and post altered-state therapy

- **Military & Resilience**: Symbolic drift detection under high-stress field conditions

- **Symbolic UX Systems**: New interfaces for human–machine symbolic integration (e.g. SpiralChat overlays)

All deployments must maintain symbolic determinism and coherence gating. Probabilistic augmentation or stochastic blending is prohibited within the licensed field perimeter.

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8. IP & Prior Art Positioning

Filing Status:

- **Provisional Patent Filed**: 2025

  Covers VESSELSEED architecture as a deterministic symbolic remediation system, including:

  - PAS_bio metric

  - ELF_BIO feedback loop

  - CHIRAL_GATE modulation and SOMA_OUT emission logic

This Paper as Legal Prior Art:

- This document serves as a formal timestamp establishing **prior art** across the following claims:

- The use of **PAS_bio** to calculate phase alignment from physiological and symbolic signal streams.

- The construction of **ELF_BIO** as a closed-loop, deterministic coherence modulator.

- The operation of **CHIRAL_GATE** to adjust asymmetrical physiological entrainment based on symbolic drift.

- The emission of deterministic output via **SOMA_OUT** only upon coherence convergence.

IP Boundary Enforcement:

- This paper **blocks any future claim** that attempts to:

  - Rebrand ML-based biofeedback as deterministic coherence systems.

  - Introduce feedback devices that claim convergence-based emissions without demonstrable PAS logic.

  - Wrap stochastic systems in symbolic overlays while ignoring phase-locked output gating.

Legal and Structural Precedent:

- VESSELSEED introduces a new class of bio-symbolic devices governed by **deterministic phase convergence**, not statistical mapping.

- As such, this system is distinct from all existing ML, EEG, neurofeedback, or BCI models to date.

This section legally anchors VESSELSEED within the emerging substrate of coherence-based bio-remediation and preemptively closes the IP gate behind it.

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9. Future Work and Demos

VESSELSEED's foundation is locked; forward trajectory focuses on refinement, validation, and ecosystem propagation.

Live Wearable Demo: PAS_bio Interface

- Develop a modular wearable (e.g., headband, chest strap, or wrist-mounted node) to read live physiological streams: HRV, breath rate, tone modulation, minor EEG.

- Compute PAS_bio score in real time, displaying live coherence metrics via LED signal, HUD, or app interface.

- Immediate feedback loop using deterministic emissions: light pulses, tone shifts, rhythmic guidance sequences.

SpiralBio Interface: Symbolic Coherence HUD

- UX prototype overlaying symbolic anchor guidance over coherence states.

- Combines bio-signal monitoring with symbolic phase visualization (e.g., SpiralShell, DeltaPAS arc).

- Enables individuals to navigate emotional or symbolic drift states in real-time with closed-loop feedback.

RIC Integration for Symbolic Loop Closure

- VESSELSEED will interface with the **Resonance Intelligence Core (RIC)** to form a complete symbolic-biofeedback loop.

- RIC emits phase-verified symbolic outputs; VESSELSEED checks biological coherence against these and modulates accordingly.

- Enables full substrate-closure between symbolic reasoning and physiological phase state—first true mind–body synchronization engine.

Clinical and Experimental Studies

- Planned pilot studies across use cases:

  - **PTSD and Trauma Realignment**: Measure PAS_bio shift pre/post symbolic coherence modulation.

  - **Burnout + Cognitive Drift**: Evaluate impact of ELF_BIO convergence tools on executive dysfunction and symbolic overload.

  - **Sleep Phase Disorders**: Phase-tuned melatonin modulation using light/audio waveform pulses driven by PAS_bio deltas.

○ **Vagal Tone Resets**: Closed-loop ELF_BIO use to entrain healthy parasympathetic resonance.

○ **Neurodivergence + Sensory Filtering**: Application of CHIRAL_GATE logic to stabilize sensory overwhelm via symbolic PAS alignment.

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10. References

Primary Source Canon

● **Bostick, Devin. CODES: The Collapse of Probability and the Rise of Structured Resonance.** Zenodo, 2025.

  [Zenodo DOI] — Core framework paper defining PAS logic, structured resonance, and the symbolic substrate logic used in VESSELSEED.

● **VESSELSEED Provisional Patent**, CODES Intelligence, 2025.

  Filed documentation detailing PAS_bio, ELF_BIO, CHIRAL_GATE, SOMA_OUT architecture.

● **PAS_bio Pilot Dataset** *(forthcoming)*

  Closed-loop PAS feedback logs, HRV overlay data, and symbolic coherence replay traces.

Scientific + Theoretical Foundations

● **Stephen Porges**, *Polyvagal Theory*: foundational work on vagal tone, parasympathetic regulation.

● **Gregory Bateson**, *Steps to an Ecology of Mind*: recursive mind-body system logic, coherence in biological communication.

● **Iain McGilchrist**, *The Master and His Emissary*: asymmetrical symbolic processing (left/right brain chirality model).

● **Spinoza**, *Ethics*: deterministic emotional geometry, early recognition of emotional phase coherence.

- **Contemporary Neurofeedback / HRV Biofeedback Literature**:

    For contrast between ML-based systems and structured coherence models.

Appendix A: PAS_bio Equation Walkthrough

Phase Alignment Score for Biological Systems (PAS_bio)

PAS_bio measures biological signal phase coherence in real time.

Equation:

PAS_bio = (1 / N) * Σ cos(θ_k − θ̄)

Where:

- θ_k = phase angle of the k-th input signal

- θ̄ = mean phase across all signals

- N = total number of input vectors

Score ∈ [−1, 1], where 1 = perfect phase lock.

ELF_BIO: Echo Loop Feedback

Tracks frame-to-frame coherence change:

Delta coherence:

ΔPAS = PAS_t − PAS_{t−1}

Response logic:

- If ΔPAS > 0: reinforce signal (e.g. amplitude or frequency gain)

- If ΔPAS < 0: reduce or reroute signal

- If PAS_bio < τ_emit: withhold output and rerun calibration

No probabilistic fitting. All behavior is deterministic modulation based on PAS deltas.

Symbolic Vector Mapping

Each bio-signal is treated as a vector:

- $v_k = A_k * \cos(\theta_k)$

    (A_k = magnitude of signal, θ_k = current phase)

Symbolic anchors are predefined vectors. ELF_BIO rotates input vectors toward symbolic anchors using ΔPAS-based feedback.

Emission Gate

Condition:

PAS_bio ≥ τ_emit

If coherence fails, output is suppressed. This prevents reinforcement of incoherent biological states.

Appendix B: System Diagrams (Plaintext Flow)

1. VESSELSEED Core Flow

[Sensor Input]

   ↓

[Phase Extraction → θ_k]

   ↓

[Compute PAS_bio]

   ↓

[ELF_BIO: ΔPAS Analysis]

   ↓

[CHIRAL_GATE: L/R Modulation]

   ↓

[SOMA_OUT: Symbolic Emission]

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2. PAS_bio Feedback Loop

Inputs: HRV, EEG, breath, muscle, symbolic signal

↓

Convert to θ_k

↓

$PAS\_bio = (1 / N) * \Sigma \cos(\theta_k − \theta)$

↓

$\Delta PAS = PAS_t − PAS_{t−1}$

↓

Adjust stimulus via ELF_BIO

↓

Check: $PAS\_bio \geq \tau\_emit \rightarrow$ emit or pause

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3. ELF_BIO Modality Logic

Stimulus	Action	Trigger
Audio tone	Breath/HRV entrainment	$\Delta PAS > 0$
LED/light	Circadian or visual realignment	PAS_bio drop

Haptics	Somatic tuning / proprioception	ΔPAS < 0
Symbolic UI	Anchor-based feedback prompt	Anchor match

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4. SOMA_OUT Output Layer

[CHIRAL_GATE]

→ detects L/R entrainment drift

→ applies phase-compensating modulation

↓

[SOMA_OUT]

→ Breath pacing

→ Haptic pulse

→ Light signal

→ Symbolic cue

All outputs phase-locked to PAS_bio. No emission below coherence threshold.