

Glossary of Terms and Acronyms

AAPB BOS13 - Optimizing Cognitive Performance Under Extreme Stress Using Respiratory Biofeedback

Use this handout as a reference for key terms used during the session. Definitions are intentionally practical and context-specific.

Scope note: The terms below are used for educational discussion of applied psychophysiology, respiratory biofeedback, high-fidelity training, and individualized performance analysis. They should not be used as diagnostic labels, clinical thresholds, treatment claims, fitness-for-duty criteria, or operational selection standards.

Term / acronym	Working meaning in this session
1-MAO	One-minute all-out effort. In this session, a short high-intensity load used to provoke acute ventilatory, cardiovascular, and perceptual strain before reassessing cognition and task performance.
Allostasis	Adaptive regulation through change. The body maintains stability by adjusting physiology to meet internal and external demands.
Allostatic load	The cumulative cost of repeated or prolonged adaptation to stressors, especially when recovery is incomplete.
Arousal regulation	The ability to adjust physiological activation so it supports the task rather than overwhelms attention, perception, or decision-making.
Behavioural hypocapnia	Low arterial carbon dioxide associated with breathing behaviour, often involving excessive ventilation relative to metabolic demand. It is context-sensitive and should not be treated as a diagnosis from a single observation.
Breathing behaviour	The observable pattern of breathing, including rate, depth, rhythm, route, pauses, sighing, and recovery after load.
Breathing mechanics	The physical movement pattern of breathing, including rib-cage, abdominal, shoulder, and upper-chest contributions.
Capnogram	The waveform display of exhaled carbon dioxide across the breathing cycle.
Capnography	Measurement and display of carbon dioxide in exhaled breath. In this session, capnography is discussed as an educational biofeedback tool rather than a diagnostic assessment.
Performance Capnography	An educational capnography approach used to help learners observe stress-related breathing behaviour, interpret it cautiously, and practise respiratory self-regulation during training.
Cerebral blood flow	Blood flow through the brain. Changes in carbon dioxide can influence cerebral vessel tone and therefore may affect the physiological conditions supporting cognitive control.
Chemoreflex	A reflexive control process in which receptors respond to chemical changes, especially carbon dioxide, oxygen, and pH, to influence breathing drive.
Cognitive control	Executive processes that support attention, inhibition, working memory, cognitive flexibility, and goal-directed behaviour under demand.
CQB	Close-quarters battle. In this session, CQB refers to high-demand threat-decision training tasks used to examine cognition and performance under load.
Critical error	A task-relevant error with operational significance, such as a wrong target decision, unsafe action, missed cue, or delayed response under time pressure.
Decision stability	The ability to maintain accurate, context-appropriate decisions despite stress, fatigue, perceptual load, or physiological disturbance.
Dyspnoea	The subjective experience of breathing discomfort or air hunger. It can influence perceived effort, attention, and performance behaviour.
Educational biofeedback	Feedback used to support learning, awareness, and self-regulation. It is not diagnosis, treatment, screening, or selection.
End-tidal carbon dioxide (ETCO₂)	The carbon dioxide level measured near the end of exhalation. It is often used as a non-invasive estimate of ventilatory status and breathing efficiency, interpreted in context.
EOD	Explosive ordnance disposal. In this session, EOD examples are used to illustrate high-consequence training environments.
Eucapnia	Carbon dioxide within an expected functional range for the individual and context.
High-fidelity training	Training designed to reproduce key physical, perceptual, cognitive, emotional, and social demands of the target performance environment.
HPO	Human performance optimization. A broad approach to improving performance, resilience, recovery, and decision quality through evidence-informed training and monitoring.
HRV	Heart rate variability. Beat-to-beat variation in heart timing, often used as one indicator of autonomic regulation, recovery, and stress response. It should be interpreted alongside context and other measures.
Hyperventilation	Ventilation that exceeds metabolic demand, which can lower carbon dioxide. It may occur through high rate, excessive depth, or both.
Hypocapnia	Lower-than-expected arterial carbon dioxide. It can occur when ventilation exceeds metabolic demand and may influence cerebral blood flow, symptoms, and performance state.
IEDD	Improvised explosive device disposal. Assault IEDD-style training refers to high-fidelity explosive-threat decision environments.
Individualized performance analysis	A data-informed approach to understanding how one person responds under specific task demands, then using that profile to guide training hypotheses and personalized interventions.
Interference control	The ability to suppress irrelevant or distracting information so task-relevant decisions can be made accurately.
Multi-sensor analytics	Combined analysis of several data streams, such as breathing, cardiovascular response, muscle oxygenation, cognitive task performance, and operational outcomes.
Operational selection	Using data to make access, role, readiness, or pass/fail decisions. This requires separate validation, governance, consent, and oversight beyond educational use.
PaCO₂	Partial pressure of carbon dioxide in arterial blood. It is not identical to ETCO ₂ , although ETCO ₂ may provide useful non-invasive information about ventilation in context.
Performance profile	An individualized summary of physiological, cognitive, recovery, and task-outcome patterns observed under defined conditions.
Personalized intervention	A training plan selected for the individual's observed pattern, such as breathing optimization, recovery practice, cognitive-load progression, or high-fidelity transfer work.

Educational handout only - not for diagnosis, treatment, screening, or operational selection.

Psychophysiological monitoring	Measurement of physiological signals to help understand psychological, cognitive, emotional, and performance states in context.
Respiratory biofeedback	Use of breathing-related feedback to help a learner observe, adjust, and reassess breathing behaviour and regulation.
Respiratory rate	Number of breaths per minute. It is informative but insufficient alone; rhythm, depth, ETCO ₂ trend, task demand, and recovery also matter.
SET	Stress Exposure Training. Progressive training that prepares learners to perform under increasing stress through education, skills acquisition, application, and scenario transfer.
Simon task	A cognitive task often used to assess response inhibition and interference control by comparing congruent and incongruent stimulus-response conditions.
SplendoTactical	A multi-sensor platform discussed in this session as one implementation example for performance intelligence. Mention is for educational transparency, not endorsement or product promotion.
Ventilatory drive	The physiological and perceptual drive to breathe, influenced by carbon dioxide, oxygen, pH, exertion, threat, emotion, and task demand.
Ventilatory load	The burden placed on the breathing system by exertion, stress, equipment, posture, environment, or task demand.
Ventilatory strain	A state in which breathing demand, breathing behaviour, and recovery demands begin to compete with cognitive and task performance.
VO₂ max	Maximal oxygen uptake. A measure of aerobic capacity, useful for understanding physiological capacity but not sufficient to predict complex performance alone.
Waveform regularity	The stability and shape of the capnogram over time. Irregularity may prompt educational inquiry, but it should not be overinterpreted without context.
Working memory	The ability to hold and manipulate task-relevant information over short periods, especially under distraction or pressure.

Interpretation cautions

- Interpret physiological data as individualized trends within task context, not as universal thresholds.
- Use live biofeedback for awareness and regulation, not as diagnosis, treatment, screening, or selection.
- Use performance analysis to generate training hypotheses and personalized interventions, then reassess over time.
- Protect consent, privacy, data access, and non-punitive learning culture whenever monitoring occurs in high-fidelity settings.