

ENERGY FOCUS READINESS



Non-Invasive Vagus Nerve Stimulation (nVNS)

Issue: Warfighters face overwhelming inputs and demands

The character of war is changing. The nature of war is not.

Global trends create potentialities in the cognitive space that go well beyond traditional “information operations” or “information war.”

Words mean things.

Do not rely solely on technology to solve what is fundamentally a human problem.



Issue: The human brain is now the 6th domain of warfare

Advances in biotechnology and AI have made the human mind the ultimate domain of warfare.

A deluge of information already slows & degrades decisions. It will only get worse. Near-Peer adversaries use Cognitive Warfare to exploit these cognitive vulnerabilities.



“The absence of a systemic approach to the human weapon system, including our inability to elevate the human to the same level of other weapon systems, lack of integration of human performance data, and the insufficient collaboration between the human and machines, directly erodes our ability to succeed in Great Power Competition (GPC).”

-Lt. Col Lea “Jedi” Johansen; USAF.

Why TAC-STIM?

Performance tech designed specifically for use by active-duty Military

Stimulates the vagus nerve in 2 minutes

Safely and effectively modulates multiple neurotransmitters involved in learning, memory, motivational and emotional states.



Prolonged military operations in harsh and adverse conditions can compromise the perceptual, cognitive, and emotional resources necessary to sustain performance on mission-related tasks across operational units.¹ Cognitive neuroenhancement tools and techniques, such as TAC-STIM, that can accelerate training, sustain attention, reduce fatigue, and improve mood are being explored by various Military units and is considered a critical need to promote readiness and performance across the force.⁵

TAC-STIM offers benefits in many areas related to operational readiness and mission performance. nVNS improves learning and memory,⁶⁻⁹ enhances multiple elements of cognition, such as arousal, attention, multi-tasking, decision-making, and memory,^{4,6,10,11} TAC-STIM has also improved the ability of warfighters to learn a new language,^{12,13} boost mood after prolonged periods of mission-related activity,¹⁴ while decreasing fatigue and sleepiness.¹⁵

“Solving for agility means adapting to the threat with a new kind of speed, power, and balance. In doing so, the U.S. Air Force’s processes, operating procedures and decision-making will prove more responsive and effective in countering its pacing threat.”

— General David W. Allvin, Chief of Staff, USAF

Non-Invasive Vagus Nerve Stimulation (nVNS)

The vagus nerve projects to the brain, where it modulates multiple neural connections and the balance of key neurotransmitters involved in learning and memory, motivational and emotional states, and pain and inflammation. TAC-STIM(nVNS) activates the vagus nerve with mild pulses of electrical energy delivered to the neck.



TAC-STIM is Ideal for:



TRAINING

- Foreign Language Initial Acquisition Program
- School Houses
- Special Ops training
- Other specific training environments



MISSION SUPPORT

- Preparation
- Increase vigilance
- Decrease fatigue
- Improve readiness



POST MISSION

- After action debrief
- Facilitate decompression
- Learning consolidation
- Physical and mental restoration

TAC-STIM in the Field



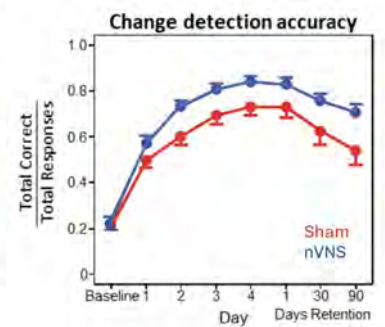
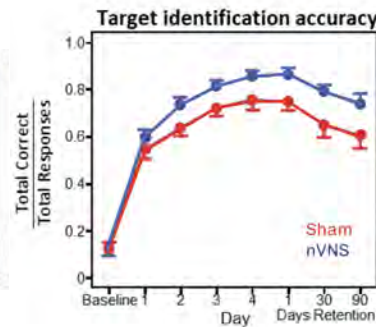
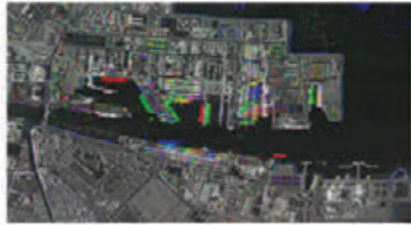
TAC-STIM offers the ability to enhance operational readiness and resilience while improving mood and decreasing fatigue. There is substantial need to accelerate training and improve performance across the force.

- The demand for ISR analysts to support ongoing operations has grown exponentially over the past decade in the face of analyst attrition due to operational burnout.²⁰
- The Air Force is attempting to accelerate pilot production while helping airmen retain more information to overcome the serious pilot shortage.^{3,19, 21}
- Foreign language skills and cultural expertise are critical capabilities needed by today's military to face the challenges of our present security environment.²²
- Current operational tempo leads to increases in stress and fatigue

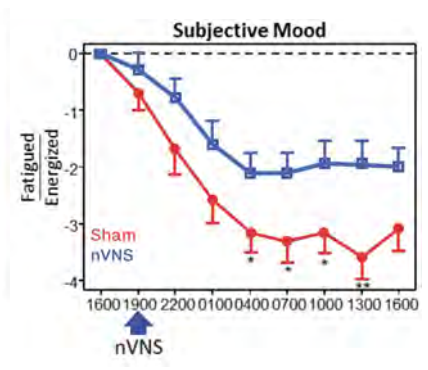
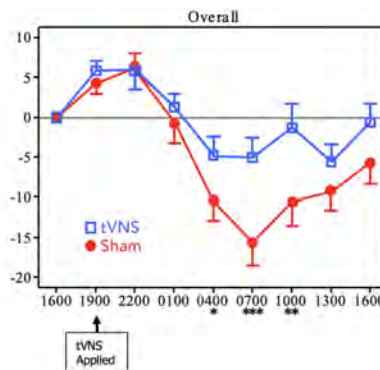
Completed research and initial deployments demonstrate that TAC-STIM enhances readiness across a range of operational domains. Additional research and training are underway to further examine the benefits of TAC-STIM in other deployment environments, such as active mission support and post-mission recovery.

PROVEN RESULTS

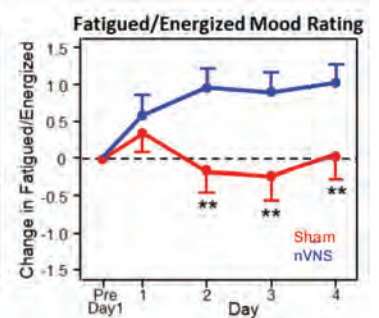
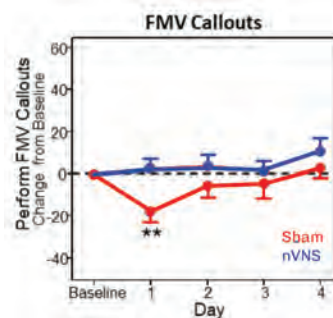
TAC-STIM Enhances ISR Synthetic Aperture Radar Training¹⁶



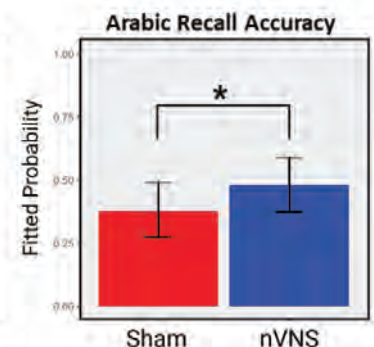
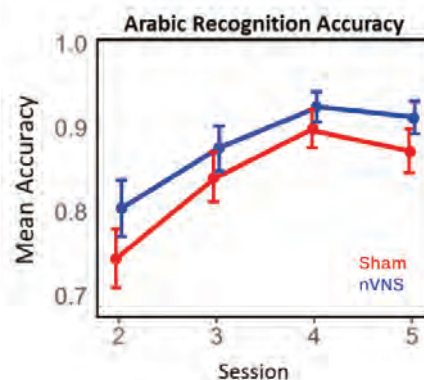
TAC-STIM Improves cognitive skill after sleep deprivation⁴



TAC-STIM Boosts performance and mood during ISR FMV Training¹⁷



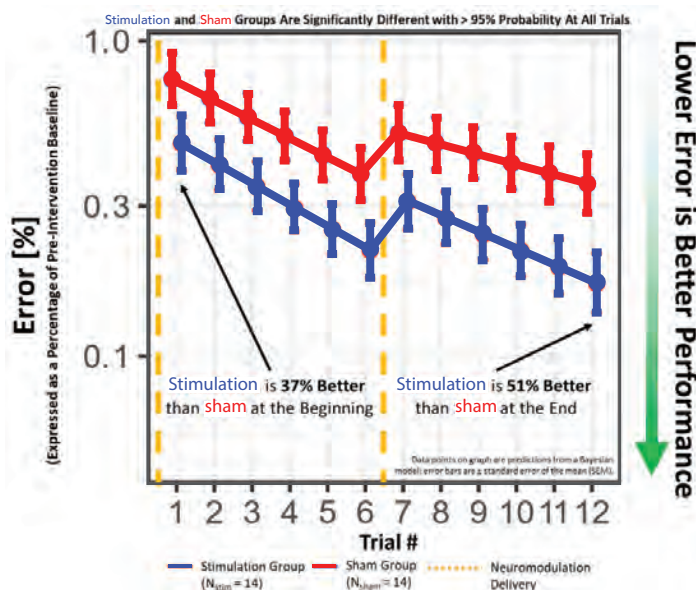
TAC-STIM Enables Faster Foreign Language Learning¹⁸



TAC-STIM Accelerates Pilot Training²⁴



AFRL



Goal: Neuromodulation to accelerate pilot training

Sim: T6-A Texan II

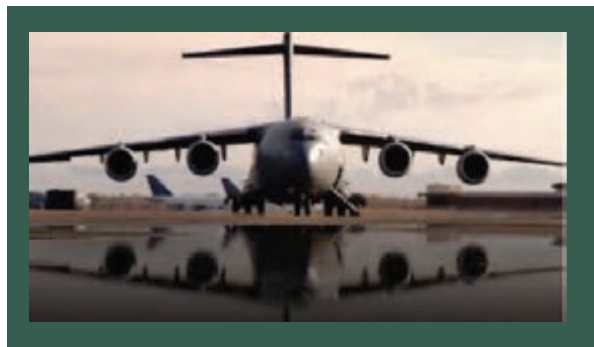
Tech: TAC-STIM (ct-VNS)

Result: ct-VNS Accelerated sensorimotor learning in pilot training

Current Research

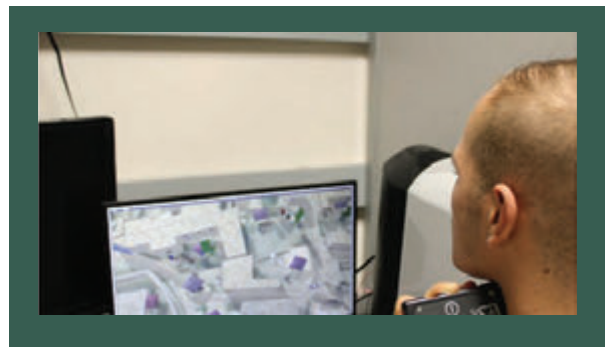
Air Mobility Command/AFRL

TAC-STIM as a Fatigue Countermeasure for Long Haul Pilots (C17s)



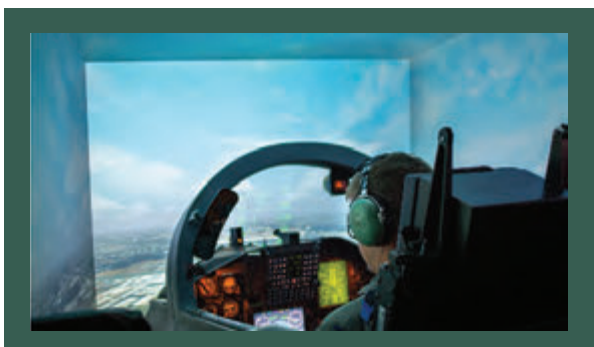
AFRL/A2PEX

A2PEX to Decrease Cognitive Fatigue



AFRL

TAC-STIM to Accelerate Pilot Training



USAARL

TAC-STIM to Improve Blackhawk Pilot Performance



TAC-STIM is deployed within the following branches and major commands



TAC-STIM is under evaluation and assessment at the following major commands



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