

A TECHNICAL MANUAL

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LOAD BEARING AND NERVES

UNDERSTANDING YOUR
COGNITIVE BREAKING POINT



F.E.RIOS

CARE & HEALTH



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DEDICATION

This work is dedicated to those who continue.

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PREFACE
UNDERSTANDING SYSTEMS

Systems necessitate a framework for understanding. If you are reading this book, it is likely because you are trying to understand something far beyond the pathology of your own body and mind. You are attempting to learn about your biology, your consciousness, and the millions of neurochemical reactions occurring within you that drive feelings that sometimes seem impossible to interpret. You are trying to define your system, not the emotions provoked by that system.

You are a system long before anyone teaches you to think of yourself that way. Every cell from conception carries its own metabolic program that shapes your development, your physiology, and eventually the architecture of your personality. Your body is a living structure made of cognitive circuits, emotional load paths, and spiritual feedback loops. The body becomes the hardware of consciousness. The mind becomes the processor. Yet this raises a harder question. What manages the spirit? This is where many who come to see me find themselves without answers. The spirit is the stabilizing subsystem, the organizing field that keeps everything coherent when the cognitive and emotional circuits begin to overload. It is the part of the system that interprets meaning, restores equilibrium, and holds you together when the rest of you is

attempting to make sense of itself. It is not mystical in the abstract. It is the integrative force that allows the whole system to function without collapsing under its own complexity.

To understand the spirit as a stabilizing subsystem is to recognize that meaning itself is a regulatory mechanism. Human Factors and Systems Engineering teach that every complex system requires a unifying control architecture, something that integrates signals, prevents overload, and maintains coherence when multiple subsystems compete for resources. In technical terms, the spirit functions as your internal systems engineer. It does not override biology or cognition. It harmonizes them. It allocates attention, softens threat responses, and restores equilibrium when emotional and cognitive load paths become saturated. Where physiology sets the parameters and the mind processes the inputs, the spirit interprets purpose and reorganizes the entire system around it. Without that integrative function, the human system behaves like a machine without calibration. With it, the system gains stability, resilience, and a capacity to adapt under strain.

Veterans and civilians who move from one life system to another often experience a kind of internal system overload that is far more mechanical than it is moral. When a person has adapted to a stable environment, whether that stability came from structure or from constant threat, the nervous system calibrates itself to that specific set of demands. Human Factors research shows that when a system is abruptly placed into a new operational environment with unfamiliar signals, unfamiliar expectations, and unfamiliar forms of safety, the internal circuits can misfire. The brain continues to run threat algorithms long after the danger has passed, or it freezes in the face of uncertainty because the new system has not yet been mapped. Veterans understand this transition with visceral clarity, but anyone who has lived through upheaval, loss, or major life change carries the same overload. Their cognitive circuits, emotional load paths, and spiritual stabilizers attempt to function simultaneously, often without a reliable reference point. The result is confusion, exhaustion, and the sense of being unmoored. This is not a failure you can always control.

Sometimes it requires guided training to recalibrate to bring you back to a new baseline. Bring you back home. Miscalibration to a new environment where symbols and signals have foreign meanings causes stress and is the predictable response of a human system trying to adjust to a new operational landscape without the stabilizing patterns it once relied on.

When engineers define a system, they begin by searching for the systems' boundaries. How do the limitations chart failure modes and what functions intervene to prevent system failures. When I selected the Human Factors and Behavioral Neurobiology Master of Science program at Embry-Riddle Aeronautical University, I did not yet understand what it would encompass or how it would reshape my already philosophical way of understanding the world. My quasi-Indigenous Mexican-ness had given me one lens. Embry-Riddle's rigorous aerospace training offered another. Together, they changed how I perceived human behavior in extreme environments.

The field itself remains loosely defined within the aerospace industry. I remember sitting across a conference table from prominent biochemical engineers as I attempted to explain what Human Factors is. A researcher from Texas A&M looked at me with confusion and said, "I do not understand how Human Factors contributes to designing a cockpit." I answered him in the only language I knew he would understand. "You want me to explain it as a chemist. Let me try. I do not design cockpits, sir. I design people who want to use cockpits and do not question why they are pushing a button or pulling a lever when the safety of their environment changes. I study how humans behave, react, and perform in complex environments. You activate chemical reactions. I activate behavior. You monitor rate limits and stability ranges. I do the same, only with cognition and perception. Same logic. Different domain." The room went silent. All the green eyes stared at me for a long moment, slow smile across one man in particular who spoke my name slowly like a prayer,

“ Flllooor.”

“Yes,” I said, “Like Flower.” There was a moment of contemplation between all the green eyes and me. The conversation then shifted to another topic.

This is how I learned to build bridges across disciplines. I could look at a biochemical system, an aircraft cockpit, or a behavioral pattern in a veteran, and recognize the same architecture underneath. Circuits, feedback loops, stability ranges, and failure points. Where others saw separate domains, I saw the same system wearing different masks. And the truth is, this was never about intelligence. It was the cognitive adaptation of someone who had lived inside extended long-term danger.

Complex Post Traumatic Stress Disorder sharpens pattern recognition in ways most people never notice. When a person spends years in environments where safety is unpredictable, the mind learns to detect micro-signals, anticipate instability, and map entire systems faster than most people can interpret a single moment. This pattern is well documented in primary research on survivors of prolonged interpersonal threat (Lanius et al., 2010). It is also mirrored in the neurobiology of veterans returning from combat, whose brains have recalibrated themselves to constant alertness, rapid threat appraisal, and hypervigilant attention (van der Kolk et al., 1996).

Veterans often describe it as a type of “combat math” that never shuts off. They read a room by scanning exits, evaluating posture, assessing tone, and identifying potential threats before their conscious mind even forms a thought. Their nervous systems become tuned, like an instrument held too tightly for too long. Cloitre’s work shows that this tuning is not voluntary. It is a survival logic generated by repeated overwhelming experiences that reorganize emotional regulation, identity processing, and social engagement systems (Cloitre et al., 2013).

For me, this same survival logic allowed me to see cross-disciplinary patterns. For them, it kept them alive in combat. For both of us, it came from the same origin: systems that

adapted in conditions where failure meant harm. CPTSD and combat stress produce similar cognitive architectures. The brain becomes an engineer of its own survival. It captures what others miss. It connects what others ignore. But once the threat is gone, the system continues to run its old algorithms. Veterans call this “coming home but not arriving.” Survivors of interpersonal harm describe it as always watching and never resting. It is the lingering signature of a system that performed exactly as it was designed to under extreme conditions.

Scholars at the National Center for PTSD explain that the adaptive cognitive patterns involve exposure to overwhelming events that accumulate and reshape emotional, cognitive, and relational functioning (American Psychiatric Association, 1980; National Center for PTSD, 2024). Rather than focusing on single incidents, the concept describes a climate of persistent fear, instability, and emotional injury that persists for months or years. The person struggles to feel real, grounded, or consistent across time. The body is always alert, emotions harder to regulate, and relationships feel risky even when no threat is present. Researchers have found that people with these histories learn to continuously scan for danger, to prepare for unpredictability, and to suppress feelings in order to survive. Van der Kolk describes this pattern as the body remembering what the conscious mind wants to forget. This tension is what many veterans struggle with the spiritual strain of holding on to cohesion between a mind that never rests and a body that won’t listen. Van der Kolk describes how muscle tensions, sleep disturbances, and emotional reactivity are not signs of moral weakness. They are signs of a system that adapted to chronic threats and has not yet been fully supported in rewiring itself.

But people can heal themselves.

This book outlines how I healed and may or may not help you, but it might help someone. So let me introduce you to systems engineering through applied Human Factors and Behavioral Neurobiology. Were I try to understand how the brain

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manages attention shifts under strain, how perception collapses when noise rises, and how memory fragments when workload exceeds capacities because the brain is always regulating thresholds. Everything inside of you is data. A process and a cognitive load but to understand how to find the path to healing let's first find you, all of you, as a system.

PART I

Introduction

You as a System

Sometimes when I tell my story, people wonder how I did it. They hear pieces of my childhood, the places I survived, the volatility that shaped me, and they search for a heroic narrative. But my life did not unfold through heroics. It unfolded because the only option was to persist or stop existing and that was never an option. Actually, I didn't know it was an option until I was a teenager. I rose out of soul crushing grief by adapting to wildly unpredictable incomprehensible situations of urban warfare.

I remember the first time I saw a body fall after being hit. I did not understand what was happening, but the entire moment stretched into a strange slow-motion silent movie montage. My mind could not process the sight, so all I can remember now is what my body did. The way the smile faded from my young face. The way the ratta tat tat shifted the air into something sharp and unfamiliar. The sudden scatter of everyone around me. I was ready to run like the others, but an arm reached out, held me still, and told me never to run. Sit. Cover. Listen.

Years later, when I recall this moment, my jaw still tightens. My molars tingle with that old anxiety. My throat contracts in the way it does right before tears should come and the smell of metal is so prevalent that I can taste it, like copper or rusty iron. The memory no longer plays like a scene. It exists as sensation. A small body learning danger before it had language for survival. These memories live inside me as physical impressions rather than sound or story, imprinted forever in the place where the nervous system keeps its oldest lessons.

Before you can understand your limits, your resilience, or the way you break under load, you must understand yourself as a system. Not as a collection of feelings. Not as isolated memories. A system. You were born with neural wiring, metabolic cycles, emotional load paths, and a stabilizing spiritual field that work together as a single organism. The system existed long before anyone taught you how to describe it. From your first cell division to your first breath, your biology was engineering itself into coherence.

Your cognitive subsystem forms the processor of your internal world. It interprets signals, allocates attention, filters noise, and makes meaning out of chaos. It is the part of you that calculates risk, predicts patterns, and decides whether something is safe or unstable. It works fast, often faster than you consciously realize. For many who have lived under prolonged danger, this cognitive subsystem becomes hyper-calibrated, constantly scanning, constantly computing. Veterans know this sensation the way a mechanic knows the hum of an engine. It never turns off.

Your emotional subsystem is your load-bearing structure. Emotions are not moral or weakness. They are measurements of internal pressure, indicators of how much strain the system can tolerate before it destabilizes. When someone grows up in overwhelming environments, the emotional subsystem often develops its own stress architecture. It becomes either overly reactive or tightly compressed, because both strategies allow the person to survive.

Your spiritual subsystem is the stabilizer that keeps everything coherent. It is the part of you that creates purpose, identity, and meaning. Without it, the cognitive and emotional subsystems run like machinery without calibration. With it, the entire system gains direction and internal unity. In Human Factors terms, this is your integrative control field. In human terms, it is what keeps you from collapsing under the weight of your own complexity.

The body is the first architecture you ever inherited, shaped by your genetics, your environments, and every signal your nervous system learned to interpret long before you knew

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words for fear, stability, or safety. Every adaptation you carry, from the tightness in your jaw to the speed of your reflexes, was encoded through real events that trained your physiology to respond in specific ways. This hardware holds your metabolic rhythms, your muscle tension patterns, your sensory thresholds, and the accumulated memory of every environment you survived. To understand yourself as a system, you must begin by understanding the machine you live inside. This next worksheet helps you do exactly that.

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WORKSHEET

Physical Systems: Hardware of the Body

Describe the current state of your physical system. Consider sleep, appetite, endurance, tension patterns, energy levels, somatic signals, and physical habits that were shaped by past environments.

My physical system currently behaves like:

Under strain, my body tends to:

My baseline signals of overload are:

PART I

Material Properties

Finding your baseline

“The world is brutal; the world is violent. And nobody cares. The only person that is going to save you is yourself. Time and time again have proven that ultimately it all comes down to you. And it might seem crazy; it might seem like fear mongering but to talk about this type of stuff -to learn this type of information but the craziest thing about combat survival is that often it occurs after evasion.”

Survival Systems, Human Factors (HFS), and the Work of Relearning Safety

The statement that the world is brutal and violent and that no one will save you but yourself is a worldview shaped inside long-term danger and repeated often by veterans and survivors alike. It is a belief system built from lived experiences, from data not anecdotal happenstance. Human systems adapt to the conditions around them, and when a person has spent years in environments filled with unpredictability, interpersonal harm, or combat, the nervous system learns that the self-reliance is a survival requirement. This perspective appears harsh, but when viewed through the lens of HFS and biological systems engineering, it is a logical outcome of repeated exposure to high-threat environments.

I am blessed to have been born into a Mexican household. While we were incredibly poor and my family

struggled with language, finances, chemical dependencies, and other challenging family dynamics we also had a great deal of love and community that insulated us from the constant feeling of high-threat tensions of our environment. We played late into the twilight, and our nights were full of loud music and louder laughter. Family was not only blood but the people we chose and the people who chose us. We lit bonfires on concrete. We danced to salsa and cumbias. We ate food so colorful and fragrant that even now nothing in the world compares to it. This was the baseline of my happiness. It was never labels or cars or objects. It was people. It was food. It was laughter. It was love made visible through community.

But in survival contexts, the nervous system learns to conserve energy by pulling inward. Trust becomes a liability. Relying on others increases cognitive load because unpredictability in social environments demands constant monitoring. The longer you must think about someone's intentions, the more risks your mind identifies. Yet my baseline—my original operating system—was built on relying on others, because that was how we survived in Los Angeles. When one family worked late, another family watched the kids. When a family couldn't afford meals, someone else cooked. It was a shared load.

I carried that operating logic with me to Berkeley, to NASA, and to Embry-Riddle. I walked into those institutions assuming community would form the way it had in my childhood. But those environments did not function on collective survival. My neurobiological adaptations, the ones that once kept me safe, began placing me in dangerous situations. My instinct to trust, to lean on others, to build community quickly, collided with environments where unpredictability was not communal, but personal. The system that once protected me now began to misfire the mismatch between my old operating system and my new environments just didn't work anymore.

Veterans often describe the same feelings when transitioning from service to civilian life. As if all the signs, tokens, and symbols they had trained with no longer applied.

The same iconography from military life existed in civilian worlds but the meanings, those had changed. Leaving some veterans I met feeling lost. Ford and colleagues demonstrate that long term interpersonal threats alter medial prefrontal and limbic functioning, the front part of the brain, which helps people decide if something or someone is a threat. That process engages many micro emotions as the individual works through the decision-making process (Ford et al., 2013). Your body and mind, the system, becomes tuned for danger rather than connection and is constantly cycling through data analysis.

The worldview post service that one must save oneself is not entirely wrong. It is an accurate reflection of the work that is entirely up to the individual. No one can do the work for you, but your community can celebrate with you when you get to the finish line and there will be many finish lines. This is where the beginning of the Veteran Multi Assistance Center (VMAC) becomes significant. Our flagship location in Central Florida's famous Space Coast was rich with the symbols of resiliency. In the horizon were the launchpads of space rockets, the labs or scientific discoveries and institutions of learning that were foundations of military personnel. Florida also boasted of the largest veteran communities in the nation with some of the highest rates of homelessness, suicide, and chemical dependencies. It was twice as likely that a veteran would experience death through suicide in Florida than in California. The acquisition of at least 1 acre of land for the Space Coast Veteran Multi Assistance Center became our mission's priority.

The Space Coast VMAC operates as an applied Human Factors environment. The environment micro farming. This is where the external load is intentionally reduced and internal regulation is supported. It becomes a controlled operational space where individuals can slowly test whether safety is real. There are no consistent routines, just consistent and predictable people. Low stakes tasks act as regulatory scaffolding. These reduce cognitive loads when assessing others and create conditions necessary for the

nervous system to stand down. Thome and colleagues demonstrate in their research that supportive relational and environmental inputs can restore functional connectivity in trauma-affected neural networks (Thome et al., 2019).

This model was developed because of a Marine.

He came to the Space Coast VMAC as a Marine who had mastered survival but had never been taught how to live in safety. He carried himself with the steady posture of someone trained to endure. His voice was quiet when he spoke, but he rarely ever spoke. His eyes were always alert, his movements stiff and controlled. I remember the first time I touched his hands. His hands turned to fists and his arm rigid and tense. I raised my eyes to look at him and with no words I gently rocked his arm into relaxation and placed his hand onto a fishing net with a smile. We never spoke of why; we just noticed one another's hang ups. Everything about him suggested readiness, but underneath that readiness lived exhaustion. I could tell he didn't understand me. Why I treated him with kindness even when he answered with rudeness. I imagine years of deployment, evasion, and long nights of uncertainty had trained his nervous system to stay awake even when there was no danger.

In hindsight, what brought us together was not a single breaking point but a slow collapse of multiple systems. It was the same for me. I found myself far from home, alone, and exploring a new identity far from that of a mother, a wife, a caregiver. I was learning about myself through my education. What do I want to become? Who was I before? How will it change me? And this was the bridge. I, a civilian, was asking the exact same questions as a veteran.

We said very little at first. Not because we were hiding, but because we had learned that words did not protect us in the past. "Are you ok with silence?", I recall asking one day. He only nodded in response and that's how we worked in silence. Human Factors researchers would describe us as operating with a narrowed attentional field and

an elevated baseline of vigilance. I lacked it and he personified it. Lanius and colleagues in, *Social Cognitive and Affective Neuroscience*, have shown that people with long-term threat histories often display disrupted self-referential processing, and he embodied that disruption. He did not speak of himself as a person. He spoke of himself as an introspection. He, like me, did not sleep, he did not trust. He did not settle. Cloitre's (2020), work on complex post traumatic stress, explains that to break the patterns of hypervigilance as an adaptation, new conditions are necessary to unwind, recalibrate, and relearn new baselines. Thus, we developed our program around the landscape as it was always changing and provided that. It offered routine, predictability, and community that allows people's nervous systems to test whether safety was real. In time, he shifted. His shoulders softened and our breath synced. He spoke of memories and I of mine. Neither of us lost our strength. We reclaimed it. Neither of us at war with our environment.

Complex post-traumatic stress disorder describes people whose inner systems learned to operate in constant threat. They adapt through vigilance, withdrawal, and emotional compression. These patterns made sense during danger but are exhausting later in life. The work of the Space cost VMAC is to help individuals transition from survival logic to recovery logic. It provides emotional platonic relationships, stable emotional validation, and a predictable environment. Farming mirrors that cyclical environmental shift. Crop growth follows the same rhythm as bringing land back to cultivation after years of harsh conditions. Soil that has been overworked or damaged cannot be forced into productivity. It needs steadiness, predictable watering, and protection from further strain before it can hold life again. Slow restoration. The land heals through gentle, repeated care. People recover in those environments too.

The world view that someone must save oneself is not entirely wrong. However, the science is clear that human systems heal through co-regulation, relational stability, community frameworks, and environments where the

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nervous system does not have to constantly defend itself. Healing is not the rejection of self-reliance. It is the expansion of it. Community allows us to grow beyond all of it. But with women, that whole system needed much more work than I initially imagined. But that's a different chapter. Let's work on identifying your cognitive processing unit.

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WORKSHEET

Cognitive Subsystem: Processing Unit

This is your attention, memory, reasoning, adaptability, pattern recognition, and decision cycles.

My thinking patterns under normal conditions look like:

When the environment becomes unpredictable, my cognitive (brain) system tends to:

When things get hard, what do you tend to do automatically that makes the situation worse or drains your system:

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