Shareable Architecture Overview
PEMMA-Class Modular Field-Mediated Propulsion & Energy Systems (Conceptual)

Abstract

The PEMMA (Plasma-Excited, Microwave-Mediated, Magnetically-Accelerated) architecture defines a class of propulsion and energy systems in which plasma excitation, confinement, acceleration, and energy interaction are organized around a shared electromagnetic field infrastructure rather than isolated subsystem stacks. Unlike conventional plasma or electric propulsion architectures that treat plasma generation, acceleration, and exhaust as sequential and loosely coupled stages, PEMMA-class systems emphasize field-mediated interaction zones, intentional boundary design, and modularity defined by excitation and mediation interfaces rather than hardware separation.

At the architectural level, PEMMA systems decouple excitation, magnetic shaping, and exhaust mediation while allowing them to coexist within a unified field environment. Plasma excitation may be achieved through interaction with solid media (a defining focus of the PEMMA architecture) as well as gaseous or composite media in alternate configurations, without altering the underlying system logic. This abstraction enables multiple drive variants—ranging from high-thrust to sustained-operation and compact auxiliary configurations—to share a common foundation.

The architecture is intentionally energy-agnostic, allowing integration with conventional electrical, nuclear, or advanced power sources without requiring redesign of the propulsion or control framework. This document presents a conceptual and architectural framing only and does not disclose implementation details, performance characteristics, control laws, materials, or proprietary geometries. Core intellectual property related to PEMMA-class systems is patent pending.

Scope & Intent

This document provides a high-level architectural overview of the PEMMA-class propulsion and energy system family. It is intended for conceptual and architectural discussion only and does not disclose implementation details. Core intellectual property related to PEMMA-class systems is patent pending.

System Problem Space

Advanced plasma-based propulsion systems are often developed as tightly coupled, bespoke solutions with duplicated infrastructure. The PEMMA architecture addresses these issues by treating energetic fields and plasma environments as shared system infrastructure.

Architectural Philosophy

PEMMA-class systems are guided by a field-first architecture, excitation–acceleration separation, modularity by interaction zone, and progressive capability integration.

Core System Structure

At an architectural level, PEMMA systems operate through controlled energetic excitation, magnetic shaping, magnetically mediated acceleration, and shared-field functional coupling.

Iterative PEMMA Variants

The architecture supports multiple configurations including high-thrust, sustained-operation, and compact auxiliary variants, all built on the same foundational system logic.

Architectural Comparison

Unlike conventional propulsion architectures that rely on sequential stages and mechanically defined acceleration, PEMMA-class systems treat excitation, acceleration, and exhaust as field-mediated interaction zones.

Energy Path & Recovery Integration

PEMMA-class systems are architecturally energy-agnostic and allow energy interaction and recovery mechanisms to operate within the same field environment used for propulsion.

Field Boundary & Stability Management

Gradients and transitions between excitation, confinement, and exhaust regions are treated as designed control surfaces rather than emergent challenges.

Validation & Risk Reduction

Development emphasizes architectural validation before performance optimization, focusing on controllability, stability, and repeatability.

Closing Notes

This overview supports architecture-level discussion and does not constitute a performance claim or disclosure of protected details.