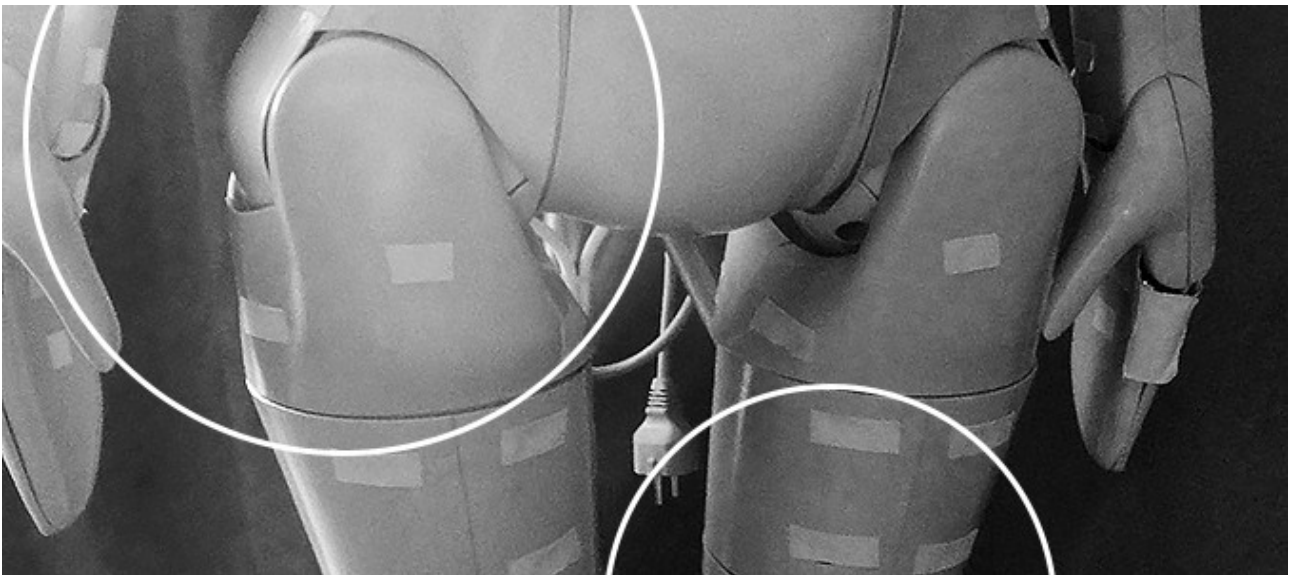


MA-UNI Architecture Book

MA-UNI

Humanoid Body Architecture Platform



Executive Concept Document (Part A)

Version 1.0

Independent Concept • Physical Prototype • Architectural Platform

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1. Executive Introduction

MA-UNI is an **independently developed humanoid body architecture platform** created in Bulgaria through more than three decades of conceptual research and several years of practical design and prototyping.

The project **already exists as a full-scale physical prototype** demonstrating a complete human-scale body with integrated mechanics, embedded electronics, autonomous power supply and programmable coordinated movement.

MA-UNI is not presented as a finished commercial humanoid robot.

It is presented as the first physical realization of a **broader architectural concept** whose purpose is to explore how a coherent humanoid body can be designed as a long-term technological platform rather than as a single-purpose robotic machine.

The objective of this document is to describe that architectural concept, explain **the principles** behind the existing prototype and define the direction of its future engineering development.

This document is intended for robotics engineers, industrial designers, research laboratories, technology organizations and potential development partners interested in evaluating MA-UNI from a professional perspective.

2. A Different Starting Point

MA-UNI proposes a **different architectural approach** to humanoid robotics.

The project does not begin by asking how to build the strongest, fastest or most autonomous humanoid machine.

It begins by asking **how a coherent humanoid body can become the permanent architectural foundation** for future generations of robotics technology.

MA-UNI separates two different layers of development:

- **Body Architecture** — the persistent geometry and structural organization of the humanoid body.
- **Engineering Systems** — the mechanical, electronic and intelligent systems that evolve inside that architecture over time.

This difference defines the entire project.

The architecture remains the identity of the platform.

The engineering evolves through future generations.

3. What Is MA-UNI?

The question can be answered at **two different levels**.

Practical Answer

MA-UNI is a human-scale humanoid robotics platform designed as the foundation for a future **personal humanoid product** intended to exist naturally in everyday human environments.

Its long-term ambition is to become a personal technological presence rather than a machine designed only for isolated technical tasks.

Professional Answer

MA-UNI combines four interconnected concepts within one platform:

- **Humanoid Body Architecture** — a complete architectural model of a humanoid body.
- **Modular Robotics Platform** — a body capable of accepting future generations of mechanical and electronic systems.
- **Design System** — a consistent visual and functional language that preserves body identity through future upgrades.
- **Long-Term Technology Platform** — a foundation intended to evolve with advances in robotics, sensing and artificial intelligence.

The current physical robot is the first realization of this platform within the possibilities of today's technology.



4. The Body Is Part of the Technology

In many robotic systems, the external appearance is added after the engineering architecture has already been defined.

MA-UNI follows the opposite direction.

Instead of designing mechanics first and shaping the body afterward, MA-UNI begins with the architecture of the body and develops mechanical systems within that architecture.

The central principle of MA-UNI is simple:

The body is not merely a container for technology.

The body is part of the technology.

Body proportions, spatial relationships and external geometry define the architectural space available for:

- joints,
- mechanical transmission,
- electronics,
- batteries,
- sensors,
- future upgrades, etc.

In MA-UNI, body architecture is treated as an engineering constraint rather than a cosmetic consequence of engineering.

This changes the development process. The objective is not to imitate a human body. The objective is to build a technologically **coherent humanoid body** whose form and mechanics evolve together.

5. The Five Architectural Principles of MA-UNI

1. Human-Oriented Body Architecture

The architecture begins with the geometry and proportions of the body rather than with exposed mechanical assemblies.

2. Integrated Mechanical Space

Mechanical systems are developed inside the architectural body rather than defining its external form.

3. Persistent Platform Identity

The body architecture is intended to remain stable while engineering systems evolve across future generations.

4. Modular Evolution

Body components and internal technologies are designed to be replaceable without redefining the architectural platform.

5. Architectural Coherence

Every design decision attempts to **balance functionality, manufacturability, safety, modularity and human presence within one coherent system.**

6. Design-Led Robotics

MA-UNI is developed under a set of architectural constraints that remain consistent throughout the project.

Several architectural principles define the platform.

Human-Oriented Proportions

The overall proportions intentionally remain close to human scale in order to support natural interaction with people and future domestic environments.

Pelvis Architecture

The pelvis is treated as a spatial engineering problem rather than simply a mechanical joint assembly.

Its geometry attempts to preserve human body proportions while providing internal space for complex lower-body articulation.

Waist Architecture

The waist is intentionally compact in order to maximize degrees of freedom without visually separating the torso into independent mechanical blocks.

Neck Architecture

The neck intentionally preserves visible mechanical elements as part of the identity of the prototype.

The objective is not complete human imitation but a visible coexistence between machine and human-oriented form.

7. What MA-UNI Optimizes

MA-UNI does not attempt to maximize one capability.

Instead, it seeks a **balanced combination** of capabilities that together create a coherent humanoid platform.

The platform is simultaneously optimized for:

- human-scale proportions;
- modular construction;
- lightweight architecture;
- manufacturability through digital fabrication;
- safety for interaction with people;
- personalization;
- future technological upgrades.

The project does not pursue maximum performance in one category.

It pursues maximum coherence between many categories.

This principle guides every architectural decision.

8. Why MA-UNI Is Modular

The architecture separates body identity from technological implementation.

This means that future versions may preserve the same body architecture while introducing completely different engineering systems.

Potential modular upgrades include:

- alternative actuator technologies;
- different power systems;
- interchangeable hands;
- interchangeable faces;
- upgraded torso modules;
- upgraded sensory systems;
- future artificial muscle technologies.

Major body segments are designed as **fully integrated, replaceable modules** rather than as permanent parts of a monolithic structure. Each module can incorporate its own mechanical systems, electronics, interfaces, structural elements, and exterior components.

This modular architecture allows entire body segments — such as an arm, leg, head, pelvis, or torso — to be replaced or upgraded as complete functional units. Future generations of MA-UNI can therefore preserve the system's core architectural identity while evolving its mechanical, electronic, and physical configuration. **The platform is intended to evolve without requiring a complete redesign of the body.**

9. Platform Instead of Prototype

MA-UNI is designed as a **persistent platform** rather than a single robot configuration.

The architecture is intended to remain stable while internal systems evolve.

Future generations may replace:

- actuators,
- electronics,
- batteries,
- sensors,
- processors,
- communication hardware,
- artificial intelligence systems.

The body architecture remains the continuous identity of the platform.

10. The Existing Prototype

The current prototype represents **the first physical validation** of the architecture.

Current characteristics include:

- human-scale height (approximately 155–160 cm);

- lightweight body (approximately 15 kg);
- approximately 30 programmable servo-driven joints;
- integrated power supply;
- programmable coordinated movement;
- modular digitally manufactured structure.

The prototype demonstrates architectural feasibility rather than engineering completeness.

Its purpose is validation.

11. What The Prototype Demonstrates

The existing prototype demonstrates several principles of the MA-UNI architecture.

It demonstrates that:

- a complete humanoid body can be realized **within the proposed proportions**;
- modular body components can be **physically manufactured**;
- coordinated movement can be integrated into the architecture;
- future engineering development can build upon an. **already existing physical platform**.

The prototype intentionally leaves significant engineering work for the next development stage.

12. Current Engineering Stage

MA-UNI has completed its first architectural stage.

The next stage focuses on professional engineering development.

Primary objectives include:

- structural refinement;
- durable mechanical architecture;
- dynamic balance;
- unsupported standing;
- controlled locomotion;
- sensing;
- recovery after falls;
- progressively autonomous movement.

This engineering stage develops the existing platform rather than replacing it.

13. Development Opportunity

MA-UNI is currently seeking professional dialogue rather than immediate commercialization.

The purpose of the first conversation is not to evaluate a finished product. It is to evaluate whether the architectural approach behind MA-UNI represents a meaningful direction for further engineering development. The project is looking for professionals capable of discussing the platform as a complete architectural system and exploring possible paths toward its next engineering stage.

14. Executive Summary

MA-UNI is an independently developed humanoid body architecture platform that already exists as a functioning physical prototype.

Its primary innovation is not presented as a single mechanical component or isolated technology.

It is presented as an architectural approach that attempts to integrate mechanics, body geometry, modularity, manufacturability and human presence into one coherent humanoid platform.

The current prototype validates the architectural concept.

The next stage is professional engineering development built upon this existing foundation.

15. Terminology

Body Architecture

The persistent geometric and structural organization of the humanoid body that defines the available space for mechanics, electronics and future technological systems.

Platform

A body architecture designed to support multiple generations of engineering systems without changing its core identity.

Modularity

The ability to replace or upgrade functional body components while preserving the architectural integrity of the platform.

Human Presence

The overall physical impression created by proportions, posture, movement and visual identity during interaction with people.

Artificial Presence

A technological presence created through the integration of body architecture, movement and interaction rather than through human imitation.

16. Full Documentation

This document provides a concise introduction to the MA-UNI concept and its underlying system architecture.

The complete documentation set — including:

- system architecture;
- mechanical and visual design;
- demos, images, and PDFs;
- project history and evolution;
- the unified MA-UNI ecosystem, platform, and brand;
- future directions;
- development opportunities;
- advertising, marketing, and market strategy;
- potential related activities;
- FAQ and other supporting materials

— is available at:

ma-uni.com

The website serves as the central knowledge and documentation hub for MA-UNI, providing access to the project's complete and continuously evolving body of knowledge.

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