



SAILA

Digital Modelling Techniques
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BRIEF

Imagine a home where smart devices streamline tasks and interact to foster sustainability. With IoT and AI, living spaces evolve into intelligent ecosystems. As designer **Tom Dixon** says, “The future of design seamlessly integrates technology, enhancing life without compromising aesthetics.”

① Traditional lighting is fixed in place requiring constant manual adjustment



② Existing solutions are often bulky, limited in movement, and disrupt the space



③ WHAT IF YOUR LIGHT FOLLOWED YOU EFFORTLESSLY?



④ SAILA detects your presence and adjusts in real time always providing the perfect lighting



⑤ Designed to be seamless, elegant, and highly adaptive



⑥ SAILA transforms light into an intuitive and interactive experience

① Smart homes should simplify life, but multiple devices create clutter and complexity



② charging interruptions disrupt automation making smart devices less efficient



③ WHAT IF EVERYTHING STAYED POWERED EFFORTLESSLY, WITH NO EXTRA CABLES?



④ SAILA's smart base provides seamless power and modular adaptability



⑤ A system that adapts to your needs, whether for work, relaxation or daily routines



⑥ The future of smart living is effortlessly, beautiful and fully connected

CONCEPT

A tensioned cable track system that merges structural support with electrical power. The metallic cables serve as both rails and conductors, allowing effortless attachment, adjustment, and replacement of functional modules, seamlessly adapting to user needs.

RESEARCH

The development of Saila was driven by a deep exploration of **suspension-based lighting systems**, dynamic light diffusion, and smart adaptability. Our research focused on existing designs, mechanical solutions, and material innovation to create a **seamless, intelligent**, and **aesthetically refined lighting experience**.

A key inspiration, the Parentesi lamp introduced a tensioned cable system that allows vertical positioning through continuous friction. This principle guided Saila's approach to structural elegance and effortless adjustability.

PARENTESI BY FLOS



OK LAMP BY FLOS

A modern reinterpretation of Parentesi, incorporating LED technology into a lightweight, flexible lighting module.

Saila integrates with smart ecosystems, using wireless automation to adapt lighting and modules for seamless functionality and future expansion.

IOT ECOSYSTEMS



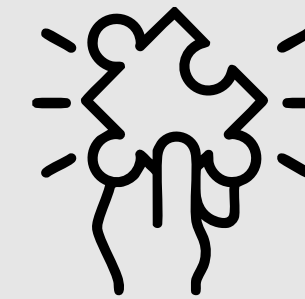
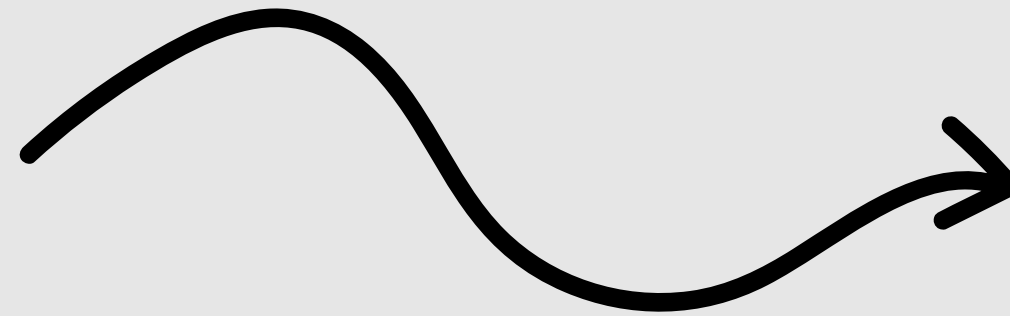
FROM PROBLEMS TO INNOVATION

Through our research and analysis, we identified key limitations in traditional lighting and smart home ecosystems. Instead of simply improving existing solutions, we aimed to **redefine how light and smart modules interact with the user.**

A LIGHT THAT MOVES WITH YOU



Problem: Static lighting requires constant manual adjustment, limiting flexibility.

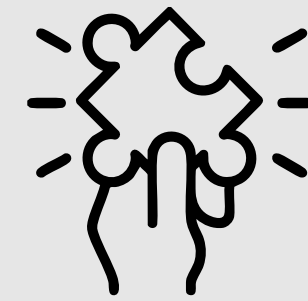
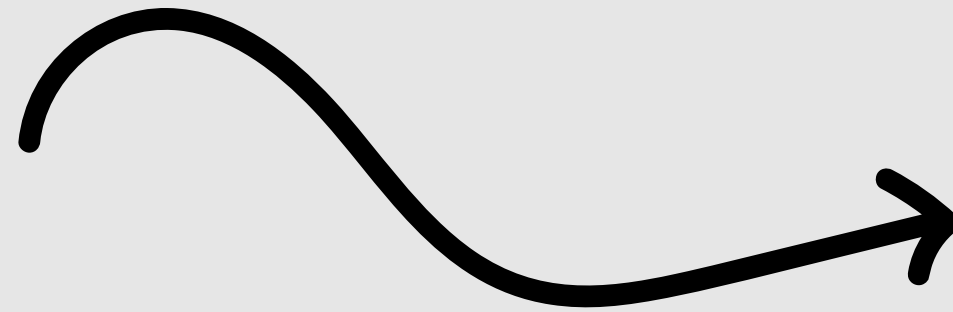


Solution: Saila features a motorized, tensioned cable system, allowing it to seamlessly reposition and adjust brightness based on user movement. This creates an effortless, adaptive lighting experience that responds intuitively to daily activities.

A LIGHT THAT MOVES WITH YOU



Problem: Conventional smart lights are bulky, intrusive, and aesthetically rigid.

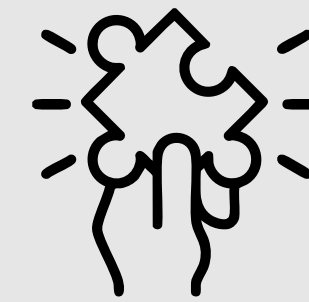
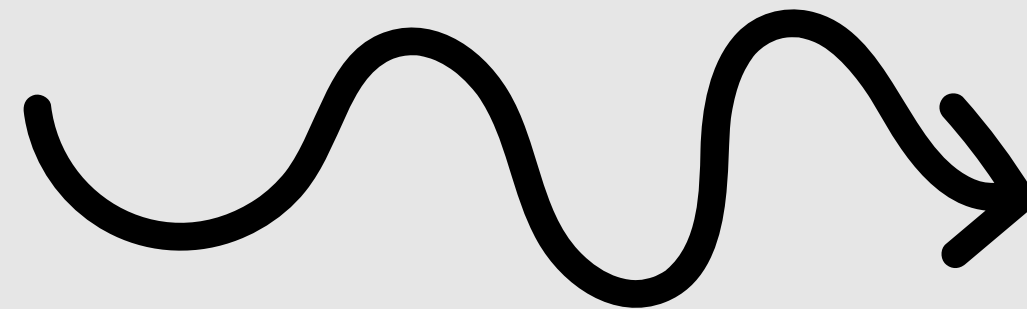


Solution: Saila integrates elegant, floating PET sails that diffuse light naturally, combining high-tech functionality with minimalism. The system blends into any environment without visible arms or excessive hardware.

AN ECOSYSTEM THAT WORKS EFFORTLESSLY



Problem: Smart home devices are often fragmented, requiring separate hubs, chargers, and management systems.

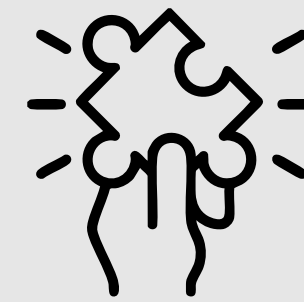


Solution: Saila's charging base and modular system streamline smart functions into a single, adaptable ecosystem. With magnetic docking and wireless power, the system eliminates cable clutter while keeping all modules seamlessly connected.

AN ECOSYSTEM THAT WORKS EFFORTLESSLY



Problem: Charging interruptions reduce the efficiency of smart devices.

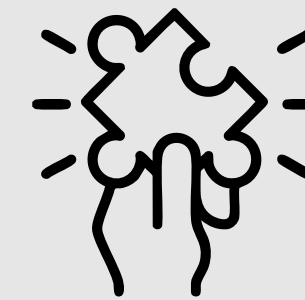


Solution: The conductive tensioned cable track ensures that lighting and modules remain powered at all times, removing the need for manual recharging.

AN ECOSYSTEM THAT WORKS EFFORTLESSLY



Problem: Users have different needs depending on context (work, relaxation, home automation).



Solution: The modular system allows users to attach, detach, and reposition functional modules for smart lighting, environmental monitoring, scheduling, and entertainment, all within a single, elegant framework.

MODULARITY

FLEXIBILITY

Dynamic configurations allow easy adaptation to changing routines and spatial requirements

MINIMALISM

A clean, refined design that blends seamlessly into any interior without visual clutter

CONNECTIVITY

Wireless integration with smart home ecosystems for effortless synchronization and automation

TENSIONED CABLES

A structural and electrical support system that allows seamless module attachment, repositioning, and adaptability within the home

CUSTOMIZATION

Modular components and adjustable settings enable users to personalize lighting, smart functions, and spatial configurations

A scalable system where elements can be added, removed, or repositioned to suit different lifestyles

SMART MODULES

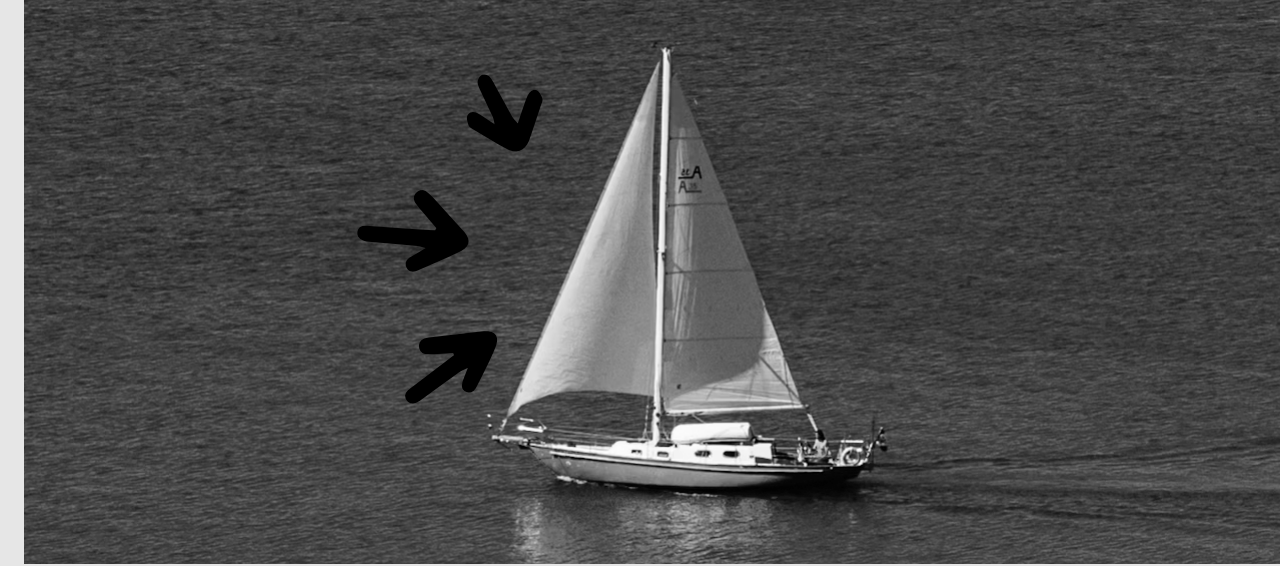
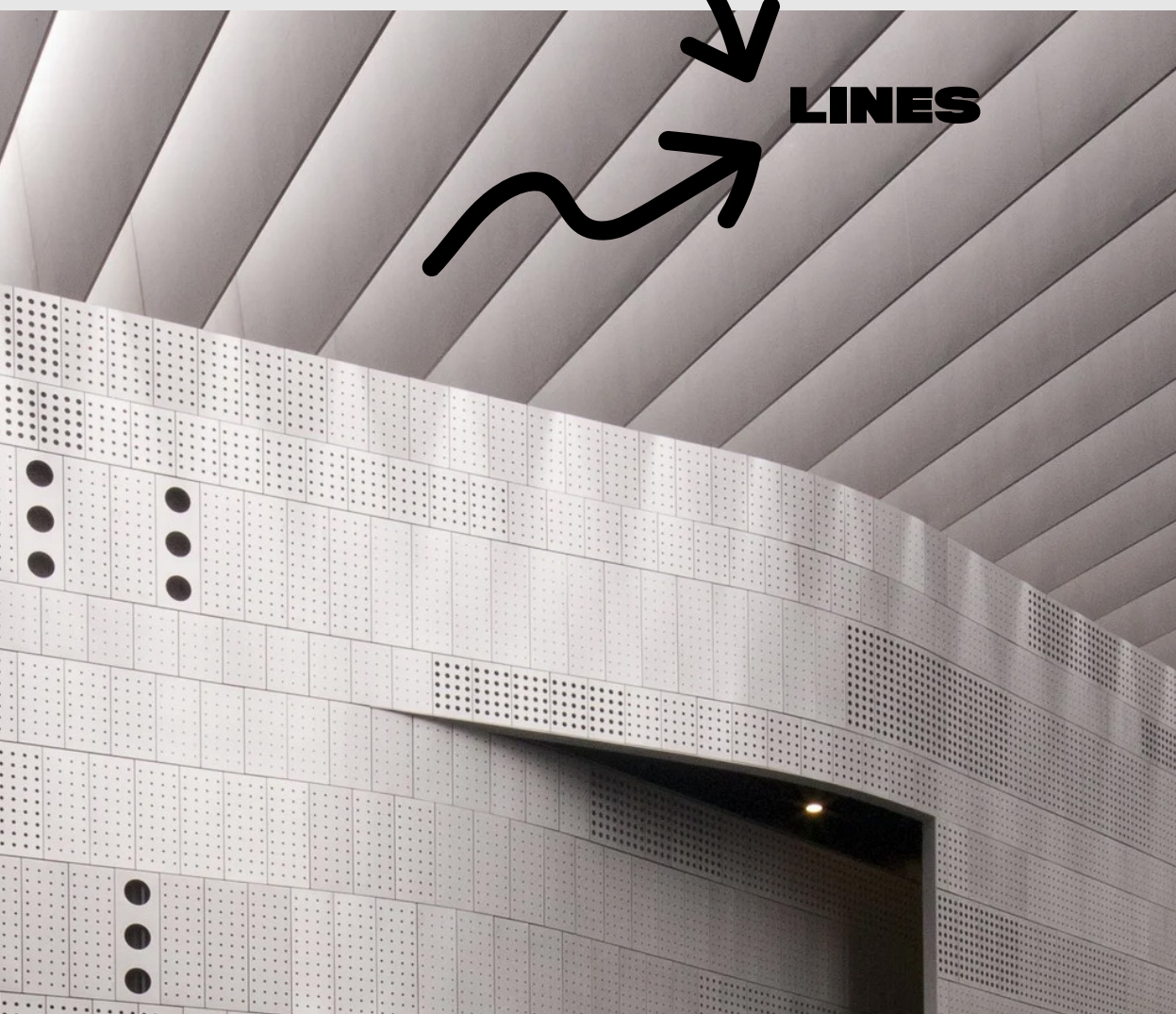
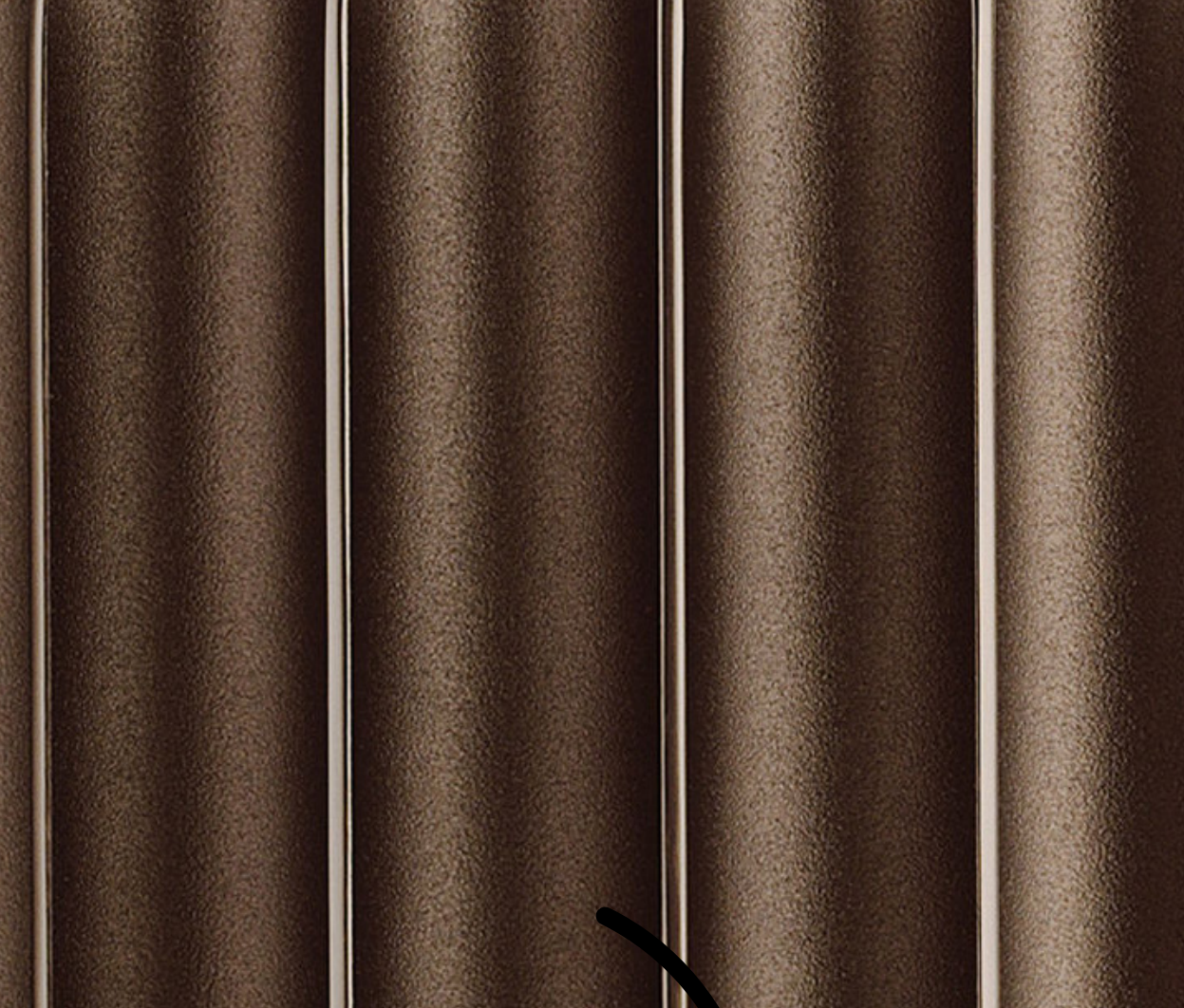
Interchangeable units offering intelligent lighting, voice control, environmental monitoring, and home automation features

INNOVATION

Advanced technology meets functional design, enhancing daily life with intuitive and future-proof solutions

ADAPTABILITY

Designed to evolve with user needs, Salla integrates into various home environments, from workspaces to relaxation areas



MADE FOR HOMES

Saila is designed to integrate seamlessly into the **domestic environment**, enhancing comfort, efficiency, and adaptability. By responding to the evolving needs of contemporary living, it supports a **dynamic** and **functional space** where technology facilitates daily activities without disrupting the aesthetic and spatial balance of the home.



Tech-Savvy Professional

Demographics:

Age: 25–40

Lifestyle: Balances a demanding career with personal growth and social activities. Often works in hybrid settings, including home offices or co-working spaces

Needs:

This persona seeks a system that enhances productivity and aesthetics in their work environment. They need customizable lighting for different tasks, tools for efficient scheduling and reminders, and seamless integration with other smart devices

How We Help:

The system provides smart lighting modes tailored to work, relaxation, or virtual meetings, ensuring optimal conditions throughout the day. Its modular design offers productivity-enhancing features like scheduling tools and voice-controlled assistants, while the sleek aesthetic fits perfectly into modern office or home settings



Family Organizer

Demographics:

Age: 30–50

Lifestyle: Manages the schedules and needs of an entire household, balancing responsibilities for work, children, and home management

Needs:

This persona looks for a solution that simplifies organizing family activities, enhances safety, and supports shared spaces with versatile lighting and smart tools

How We Help:

The system acts as a central hub for family scheduling and communication. Motion-sensitive lighting ensures safety during nighttime, while modules like smart assistants provide reminders and manage household devices. The design allows for easy adaptation to different rooms or shared spaces



Elderly User Seeking Simplicity

Demographics:

Age: 60+

Lifestyle: Prefers straightforward and intuitive solutions to enhance safety and simplify daily activities

Needs:

They value a system with easy-to-use controls, safety features like motion-sensitive lighting, and tools for staying connected to family without complexity

How We Help:

The system features voice commands and motion-activated lighting for effortless operation, reducing the risk of trips or falls. Smart assistants provide reminders for medication and events, while the modules offer a user-friendly experience with minimal learning curve



The Young Explorer

Demographics:

Age: 6-12

Lifestyle: Curious, energetic, and constantly exploring their surroundings. Engages in play, learning activities, and creative expression, often influenced by interactive and sensory experiences.

Needs:

They need a lighting and smart module system that enhances their play and learning environment, provides a sense of comfort and safety, and encourages independent interaction in a simple and intuitive way.

How We Help:

The system offers adjustable, playful lighting that adapts to different activities, such as reading, playing, or winding down before bed. Interactive modules with tactile controls make it easy for children to engage with their environment without screens, while soft ambient lighting can function as a nightlight, providing a reassuring presence at night. The modular and movable design allows for dynamic setups, fostering creativity and a personalized space that grows with them.

IN COMMON

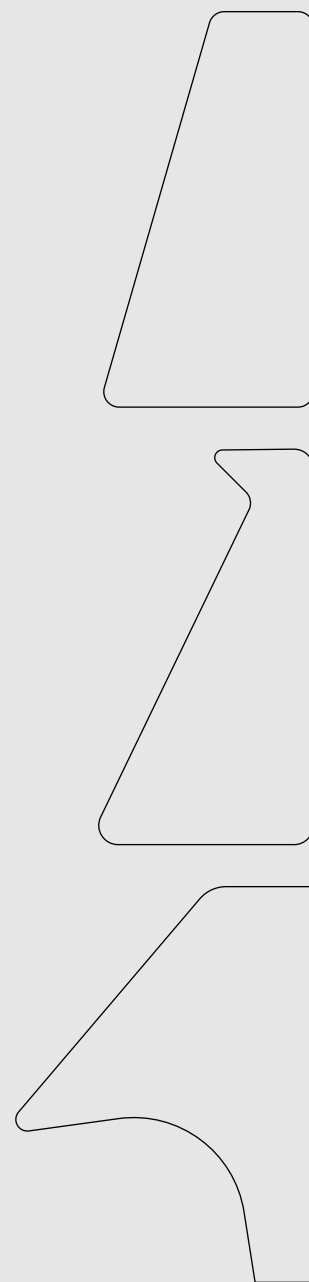
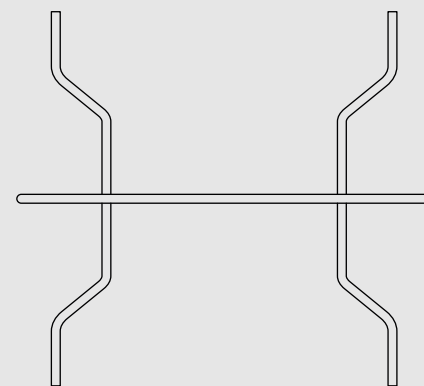
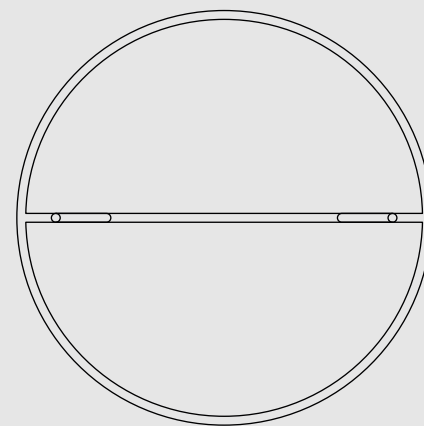
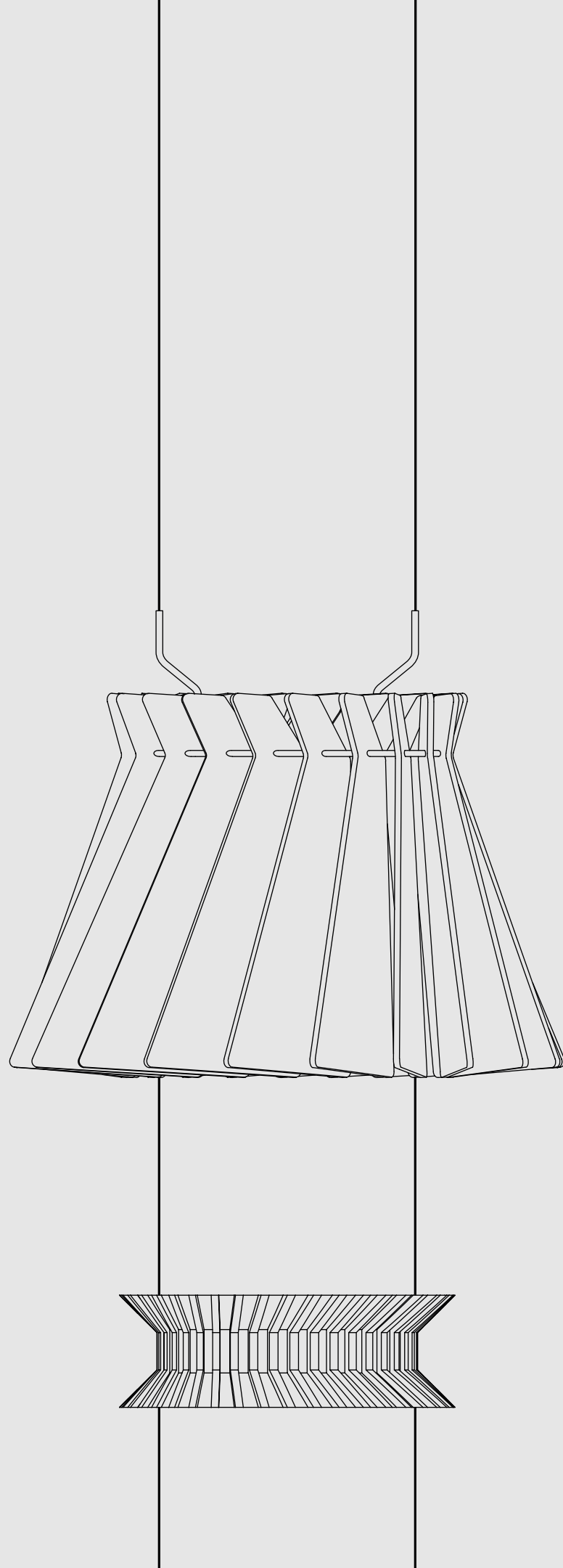
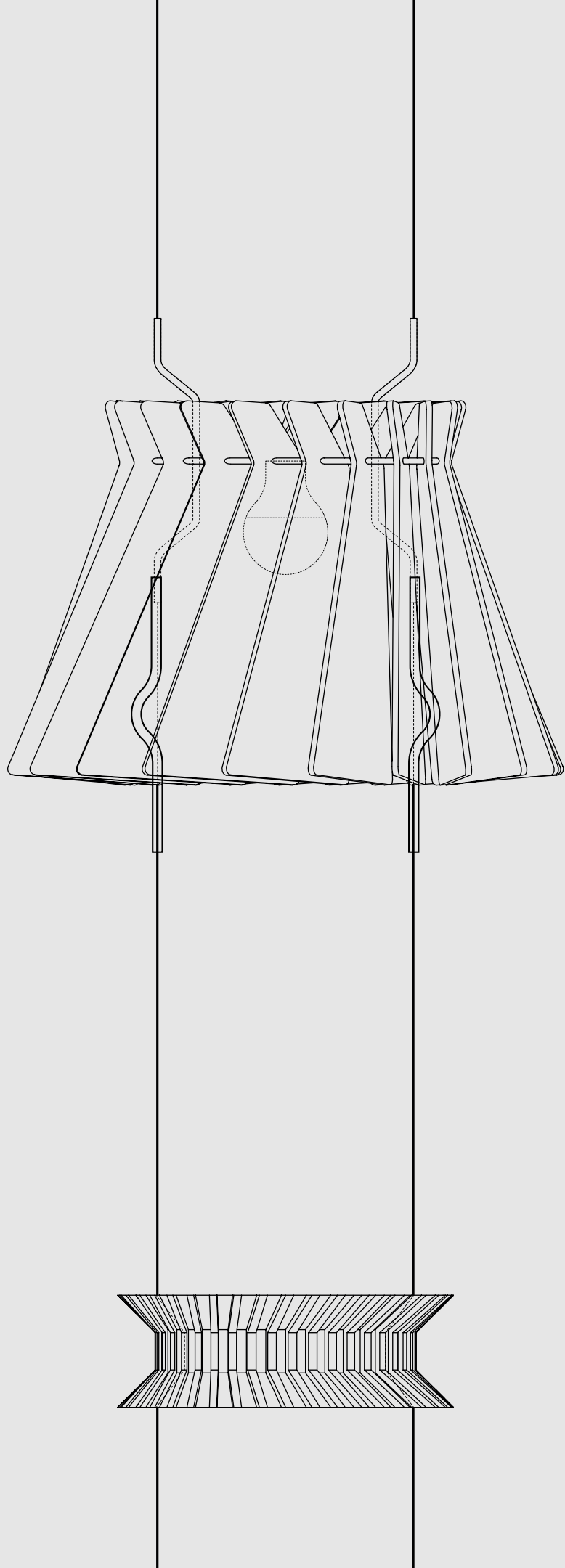
Regardless of the specific persona, all users share a desire for greater efficiency and flexibility, value technology that learns and adapts to their habits, and appreciate a sleek design that integrates seamlessly into their environment.

WHY “SAILA”

The name Saila is inspired by the fluidity, adaptability, and guided movement of a sail. Just like a sail harnesses the wind to adjust and navigate efficiently, our system adapts dynamically to user needs, offering flexible positioning, automated adjustments, and seamless modular integration.

EARLY SKETCHES

The development of Saila began with an exploration of form, functionality, and adaptability. Through early sketches, we refined the idea we had for our ecosystem. These initial drawings capture the evolution of the concept, laying the foundation for its seamless interaction and intuitive lighting experience.



TENSIONED CABLE TRACK

This system uses metallic cables for both structural support and electrical power, enabling seamless module attachment and repositioning. Its dynamic design offers exceptional flexibility, while the minimalist aesthetic ensures effortless integration into modern interiors.

MOTORIZED SAILS

Integrating dynamic, motorized sails, the system allows for adjustable light diffusion and directional control. These elements enhance ambiance, providing both functional and atmospheric lighting through seamless movement and precision.



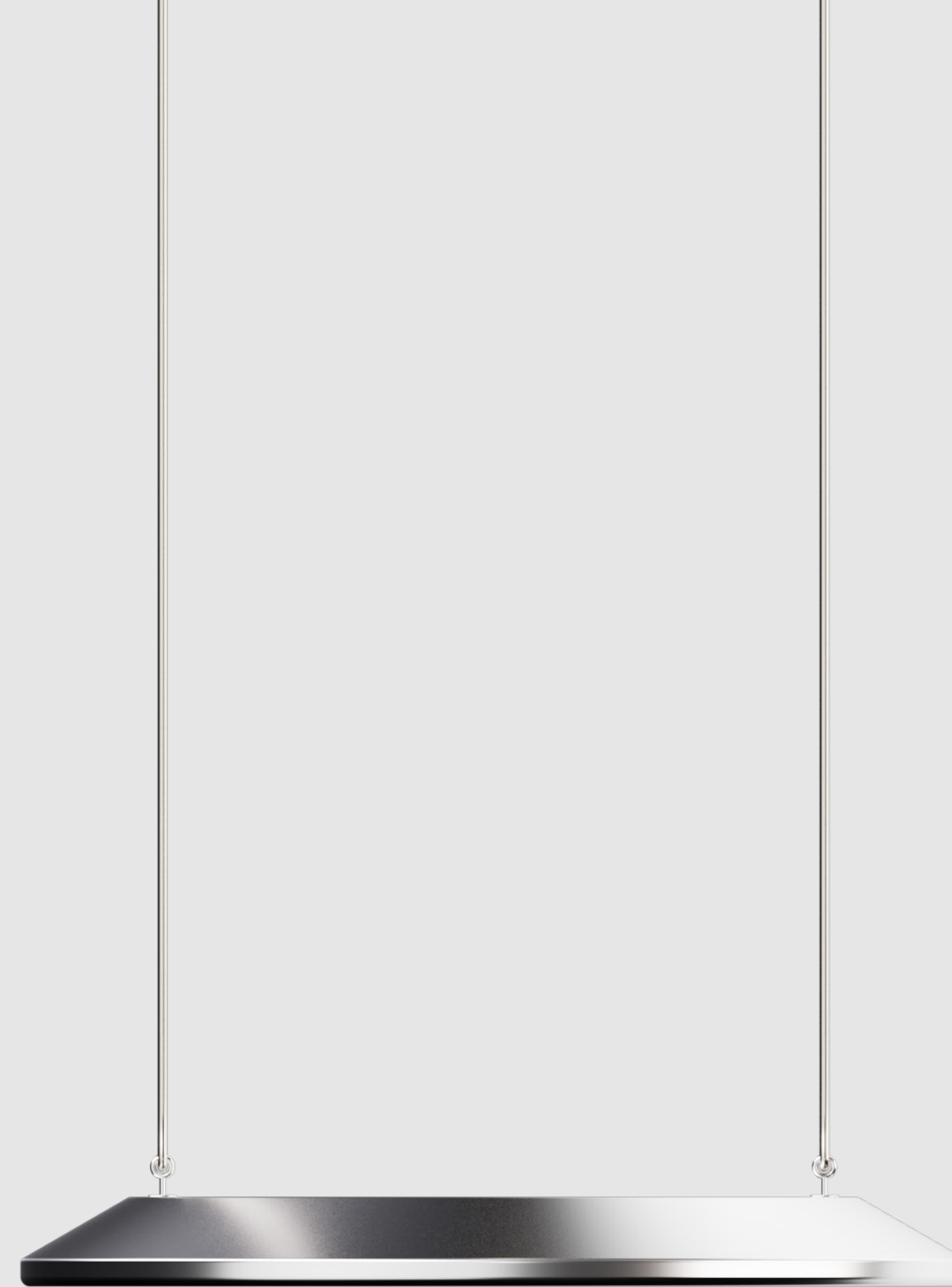
INTEGRATED CHARGING HUB

Seamlessly embedded in the cable system, the charging hub discreetly powers smart modules when not in use. This ensures all components stay fully charged and ready while maintaining the system's clean, sophisticated design.



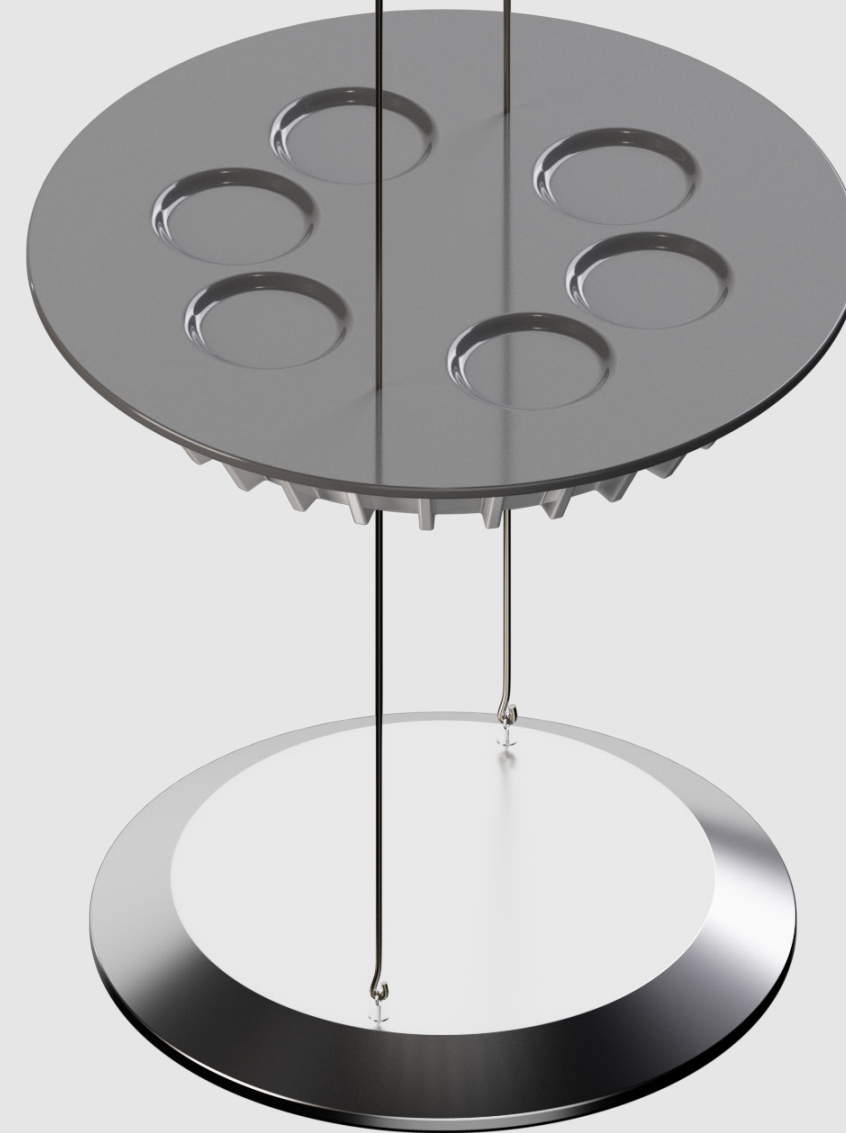
COUNTERWEIGHT SYSTEM

The pendant lamp features a carefully designed counterweight system that ensures stability and effortless height adjustment. This mechanism allows smooth positioning along the tensioned cables, balancing functionality with a sleek, modern aesthetic.



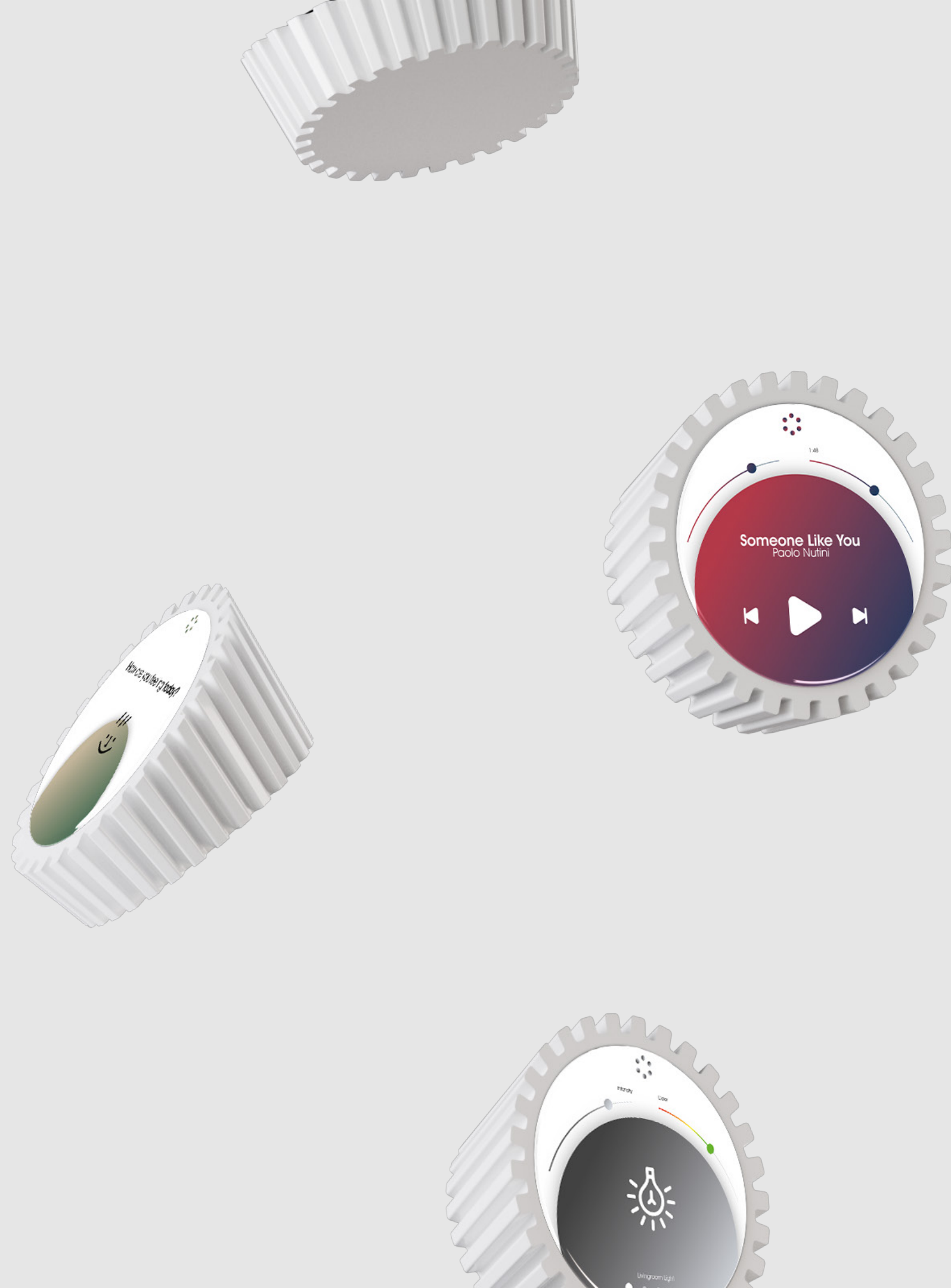
ADAPTIVE HEIGHT ADJUSTMENT

The adjustable base ensures comfortable use for all ages and heights, making smart interaction more inclusive. It also adapts to different environments, seamlessly integrating near a desk, sofa, or bedside table for optimal usability and aesthetics.



MULTIFUNCTIONAL MODULES

Designed for seamless integration, these modular components enhance both function and aesthetics. They include smart lighting with adaptive illumination and circadian support, along with features like voice assistants, health monitoring, productivity tools, and smart home management. Effortless attachment and detachment allow users to customize the system to their needs.

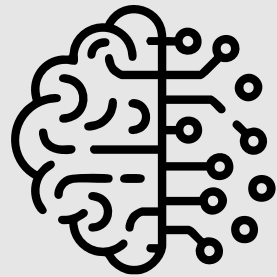






MODULE DISTRIBUTION

Saila's six multifunctional modules are designed to be placed in different rooms, ensuring personalized smart functionality throughout the home. This decentralized system enhances adaptability, allowing each space to benefit from custom lighting, automation, and environmental monitoring while maintaining seamless connectivity.



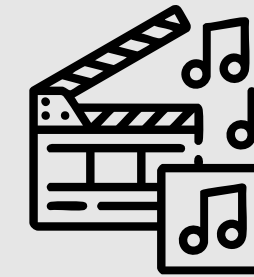
CORE AI & CONNECTIVITY

Acts as the intelligent hub, managing communication, learning user habits, and ensuring seamless integration with smart ecosystems.



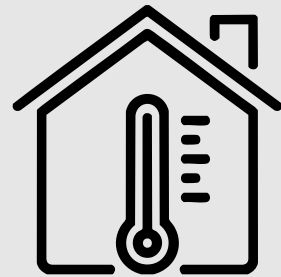
HEALTH & WELLNESS

Monitors sleep, fitness, and daily well-being, offering reminders for hydration, posture, and mindfulness.



ENTERTAINMENT & MEDIA

Enhances leisure with synchronized music, video, and ambient lighting, integrating seamlessly with streaming services.



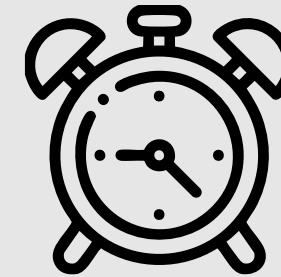
ENVIRONMENTAL MONITORING

Tracks temperature, humidity, and air quality, optimizing comfort through smart home integration.



SMART LIGHTING

Adjusts brightness and color temperature dynamically, supporting circadian rhythms for better sleep and productivity.



CLOCK

Provides smart alarms, schedule syncing, and customizable clock displays to enhance time management.



COMPANION INTERFACE



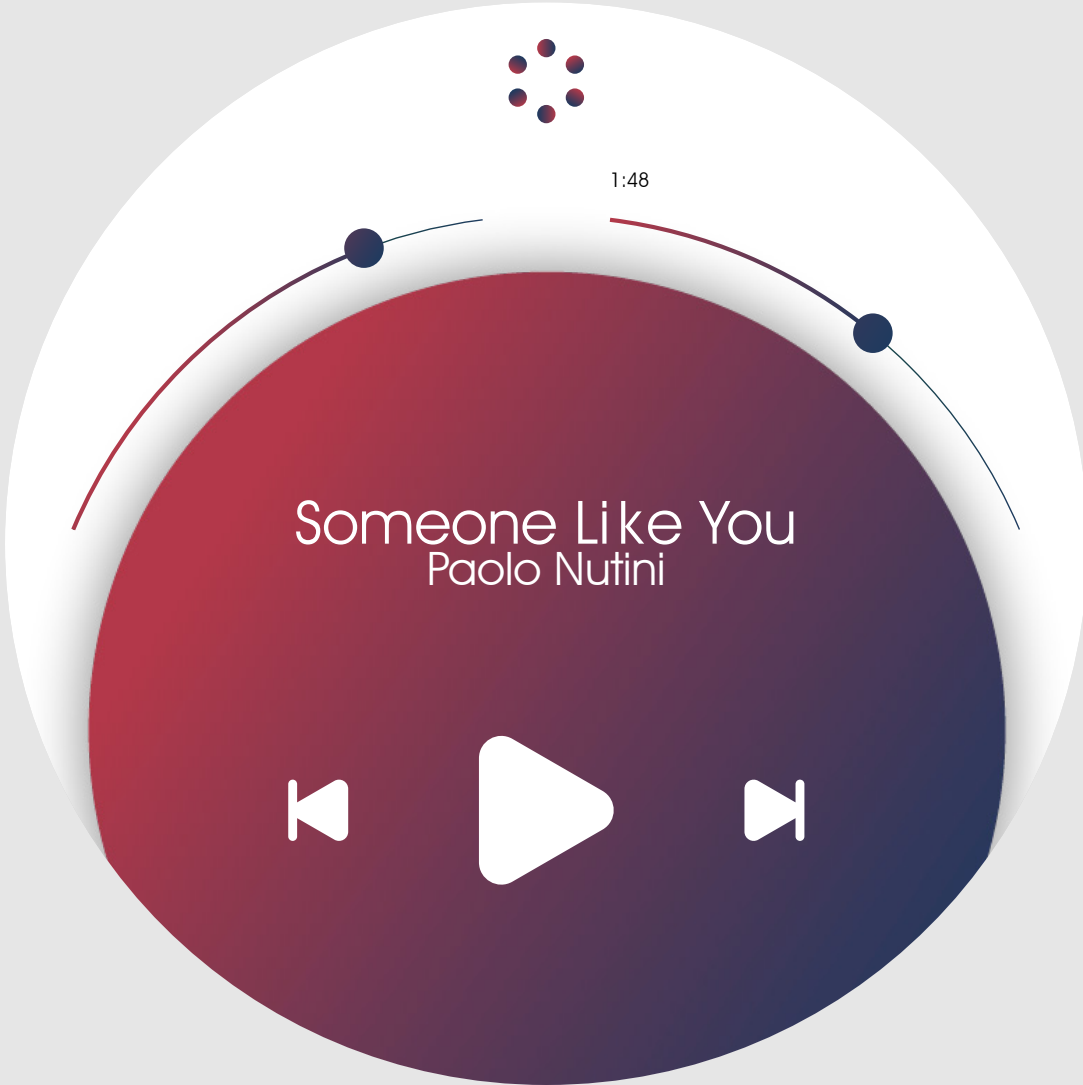
CLOCK



SMART LIGHTING



ENVIROMENTAL MONITORING



ENTERTEINMENT

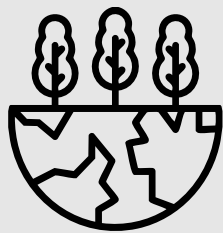


WELLNESS



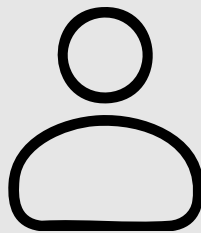
ADAPTIVE LIGHT & DYNAMIC SAILS

Saila’s motorized sails adjust dynamically, modifying their opening angle to control light diffusion based on context, user presence, and time of day. The system intelligently adapts brightness, color temperature, and hue, responding to:



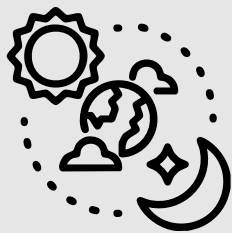
Environmental conditions

Adjusting to natural daylight levels and external weather.



User presence & activity

Enhancing focus, relaxation, or ambient comfort.



Time of day

Supporting circadian rhythms by shifting from cool daylight tones to warm evening hues.

**GRAPHITE
SHADOW**

A dark, neutral gray with a sleek, modern feel, adding contrast and stability.



**POLAR
MIST**

A soft, icy blue-gray, evoking Arctic fog and a minimalist elegance.



**LUNAR
SAND**

A warm, muted beige with a subtle gray undertone, timeless and sophisticated.



**ABYSS
BLUE**

A deep, rich blue reminiscent of the ocean at night, adding depth without overwhelming.



**FOREST
VEIL**

A deep, misty green inspired by lush forests, grounding and serene.



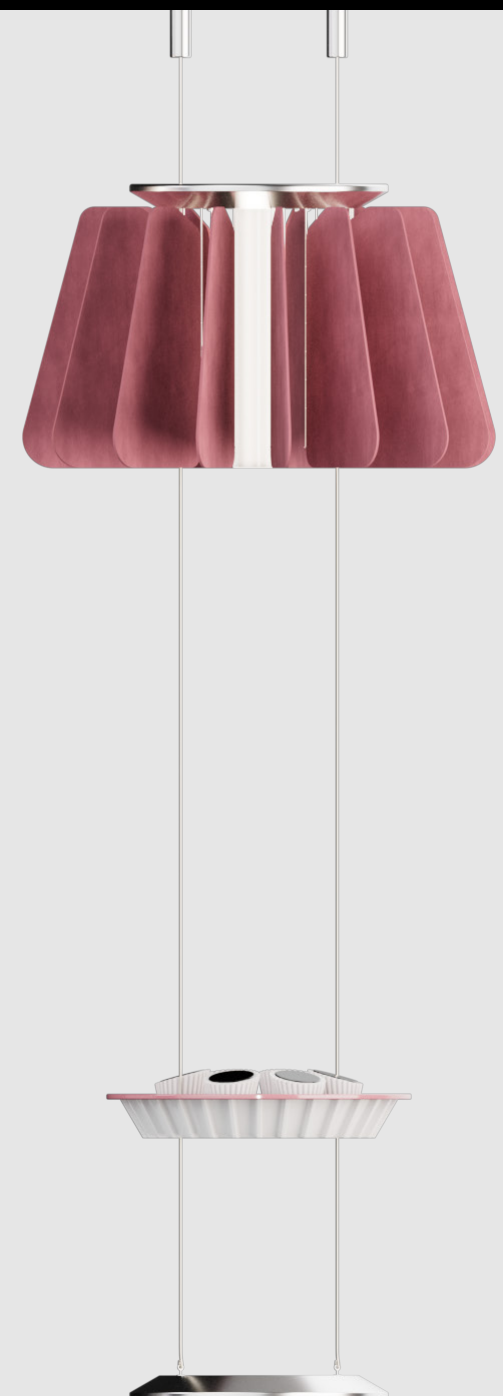
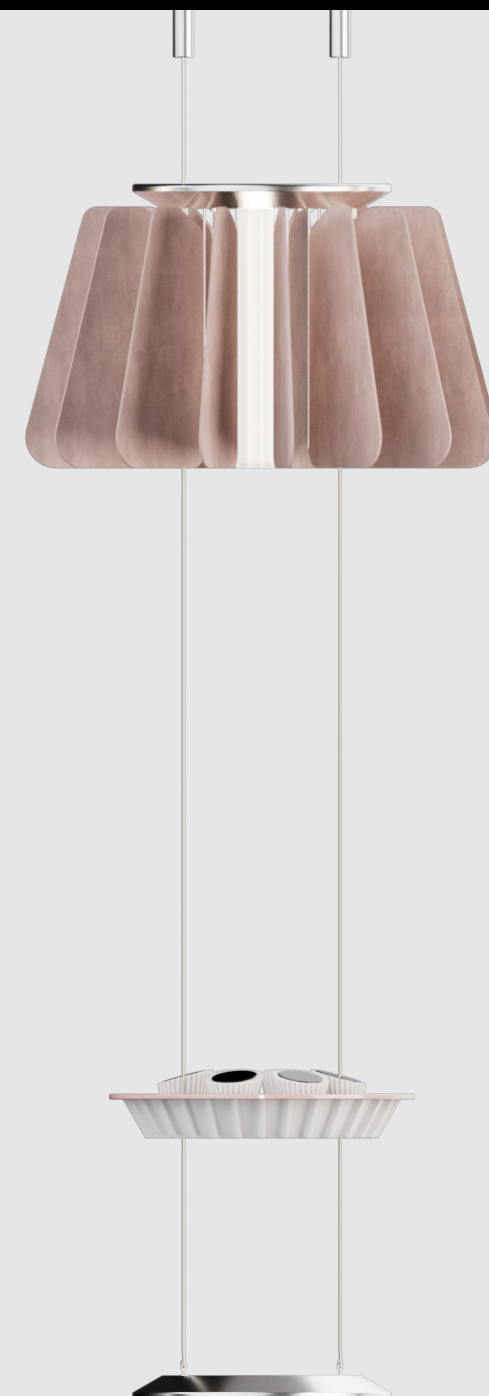
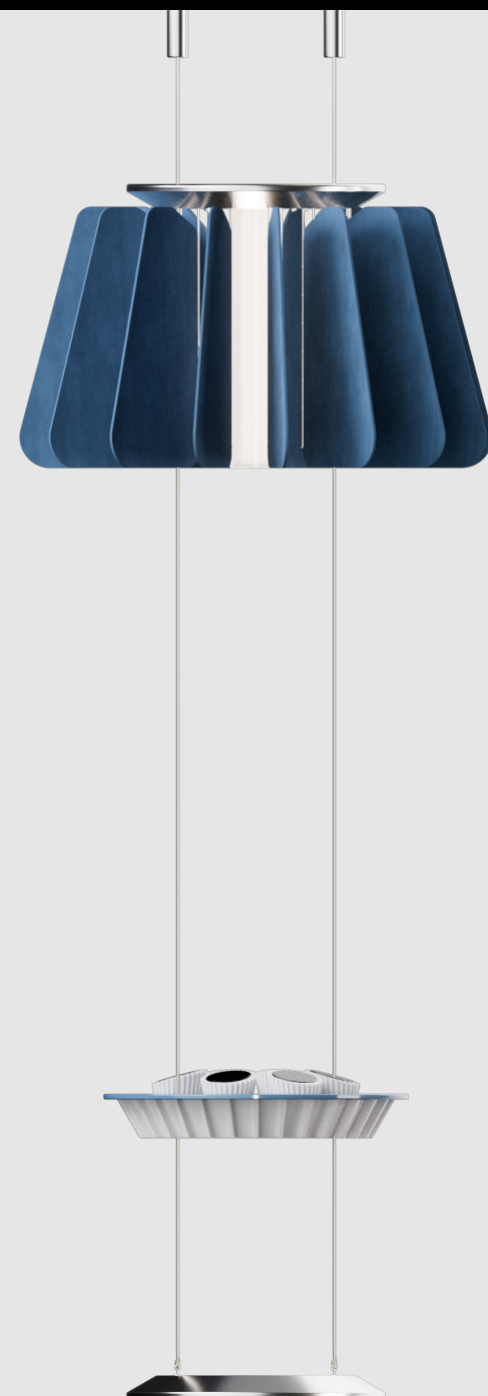
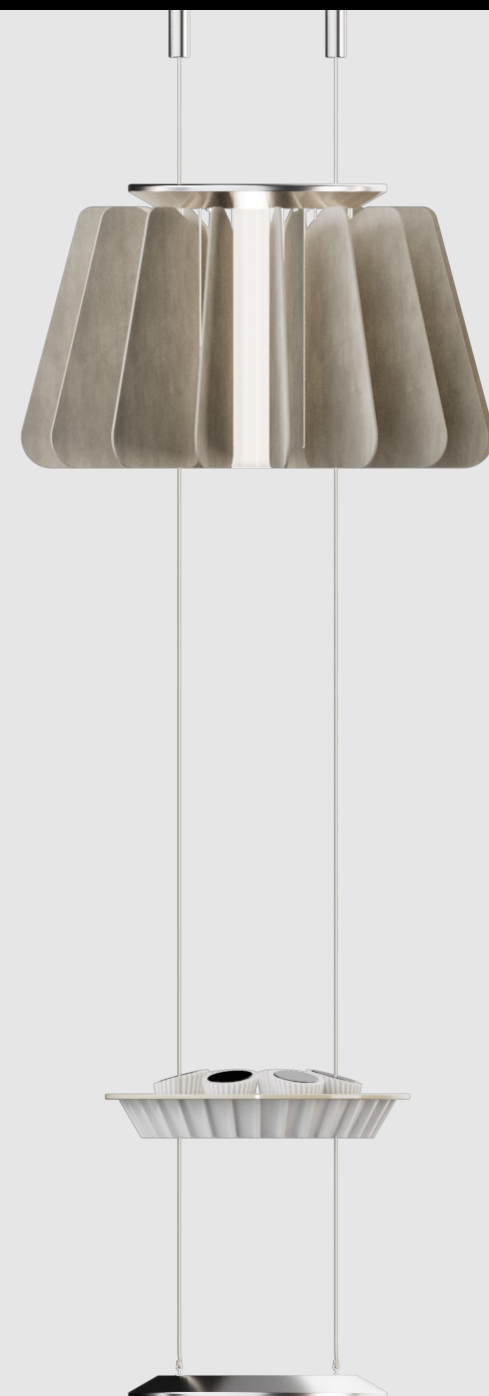
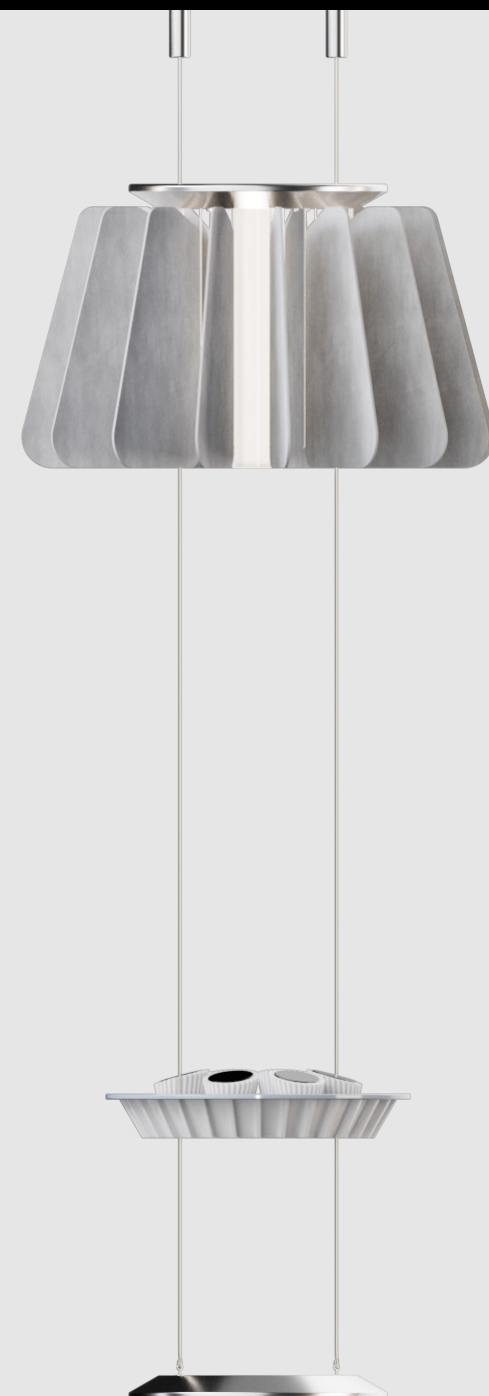
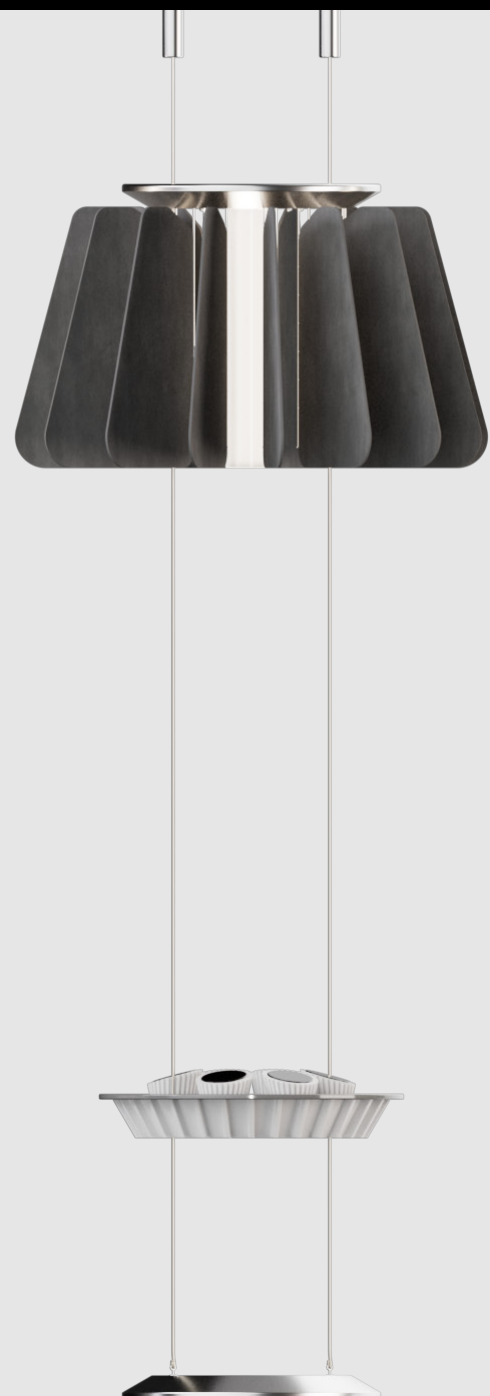
**DUSTY
CORAL**

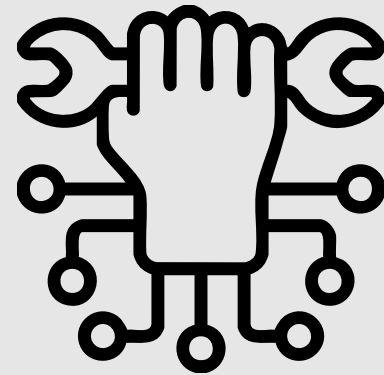
A muted coral-pink, warm and inviting without being overpowering.



**CRIMSON
DUSK**

A refined, deep red, balancing vibrancy with sophistication.





TECHNICAL OVERVIEW

Our modular system seamlessly combines automation, adaptability, and efficient power management within a tensioned cable structure.

Designed for precision and ease of use, it integrates smart control, intuitive interactions, and a seamless charging solution.

This approach ensures a functional, elegant, and user-friendly experience, maintaining a refined analog aesthetic.

Microcontroller

Arduino Nano for motor and lighting control, with optional wireless connectivity.

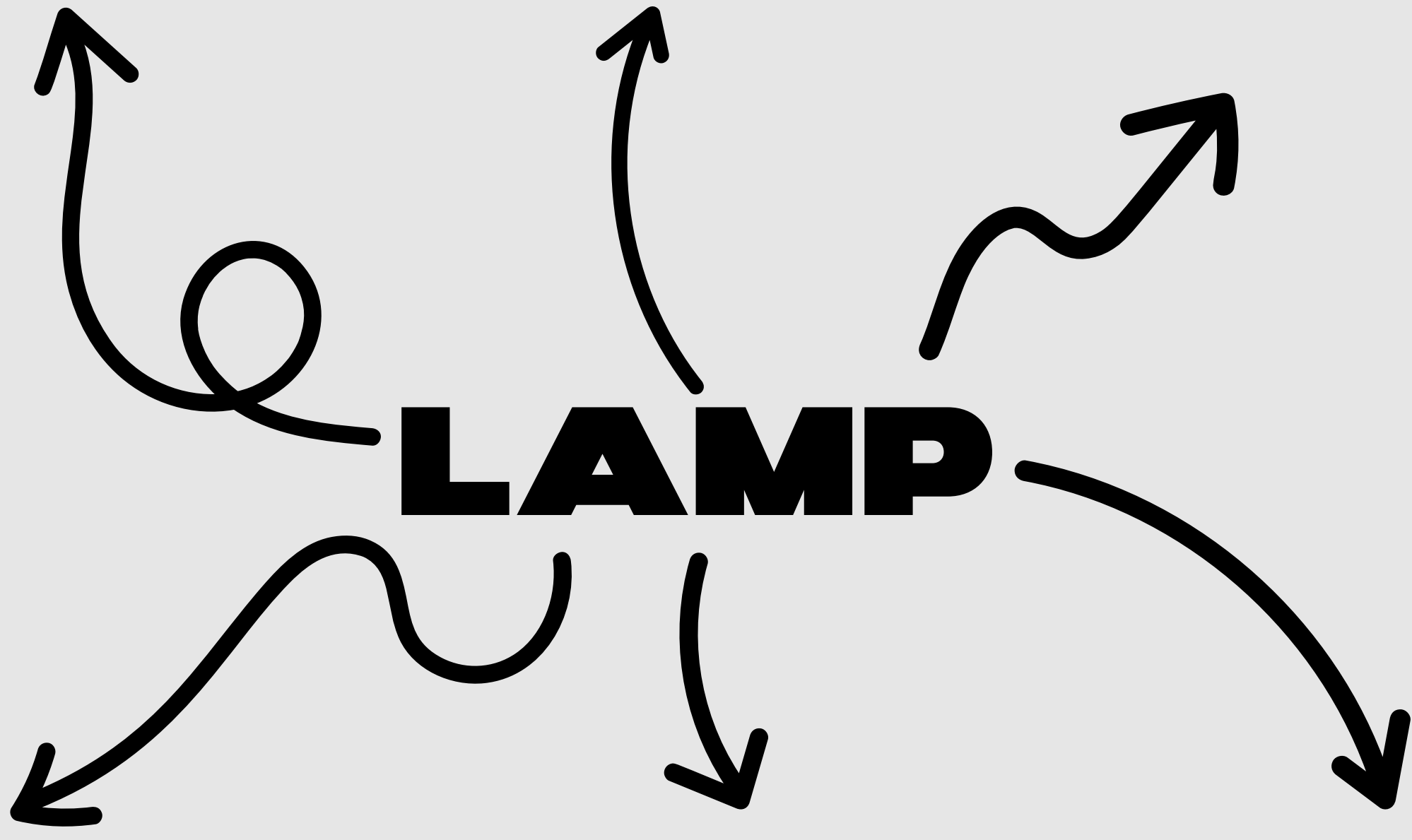
Position Sensors

IMU (MPU6050 / BNO055) for orientation detection and automatic light direction adjustment

Motor Driver

DRV8825 / L298N to control motors for light positioning and sail movement.

LAMP



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graph TD; LAMP((LAMP)) --> Microcontroller; LAMP --> PositionSensors[Position Sensors]; LAMP --> MotorDriver[Motor Driver]; LAMP --> Motors; LAMP --> ManualControls[Manual Controls]; LAMP --> PowerSupply[Power Supply];
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Motors

Servo Motors (SG90 / MG995) or Stepper Motors (NEMA 17) for smooth directional adjustments.

Manual Controls

Analog potentiometers or sliders to adjust brightness and color temperature.

Power Supply

DC-DC Converter (LM2596 / XL4015) to stabilize voltage from the conductive cables.

Microcontroller

Arduino Nano to manage charging and communication with the modules.

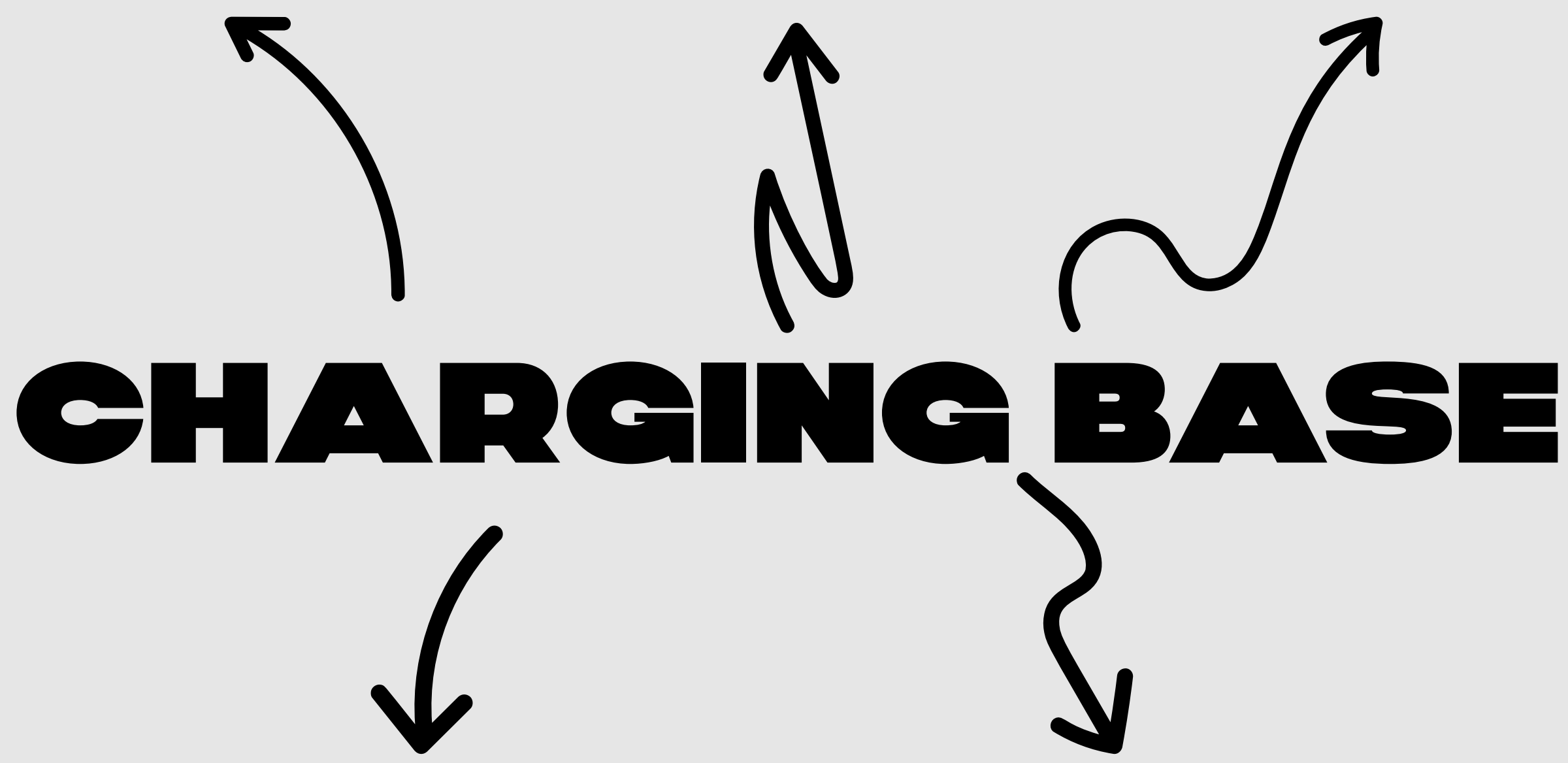
Charging Module

TP4056 (for Li-Ion batteries) or an inductive charging module for contactless power transfer.

Power Connectors

Conductive metal contacts for direct charging from the tensioned cables.

CHARGING BASE



Power Management

Buck Converter (LM2596) to regulate output voltage for charging.

Magnetic Docking

Neodymium magnets + conductive contacts for secure attachment and efficient power transfer.

Microcontroller

Arduino Nano for processing and wireless communication.

Wireless Protocols

Wi-Fi (smart home integration), Bluetooth (local control), optional Zigbee (IoT ecosystems).

Power Supply

Conductive docking via magnetic contact points for seamless charging.

DIGITAL MODULES



Inductive Charging

Qi-compatible wireless power transfer for uninterrupted operation.

Energy Optimization

Low-power standby mode to minimize consumption and maximize efficiency.

MANUFACTURING TECHNIQUES

To ensure precision, durability, and sustainability, Saila's components are produced using advanced digital fabrication techniques and eco-friendly materials.

SAILS

Technique: CNC cutting & thermoforming
Why: Ensures precise shaping and seamless integration, while thermoforming enhances durability and light diffusion.

MATERIAL	
Recycled PET Fabric	

METALLIC TENSIONED CABLES

Technique: Precision Wire Drawing & Surface Treatment
Why: Guarantees high tensile strength and electrical conductivity, with protective coatings for longevity.

MATERIAL	
High-Tensile Stainless Steel with Conductive Coating	

CASING (Upper Lamp Structure)

Technique: CNC Milling & Anodizing
Why: Provides robustness, heat dissipation, and a premium finish, ensuring lightweight structural integrity.

MATERIAL	
Anodized Aluminum	

CASING (Multifunctional Modules)

Technique: SLS 3D Printing
Why: Enables lightweight, customizable enclosures with complex geometries and rapid prototyping adaptability.

MATERIAL	
Nylon (PA12)	

BASE & DOCKING SYSTEM

Technique: Injection Molding
Why: Ensures structural strength, impact resistance, and modular adaptability.

MATERIAL	
Recycled ABS / Polycarbonate Blend	

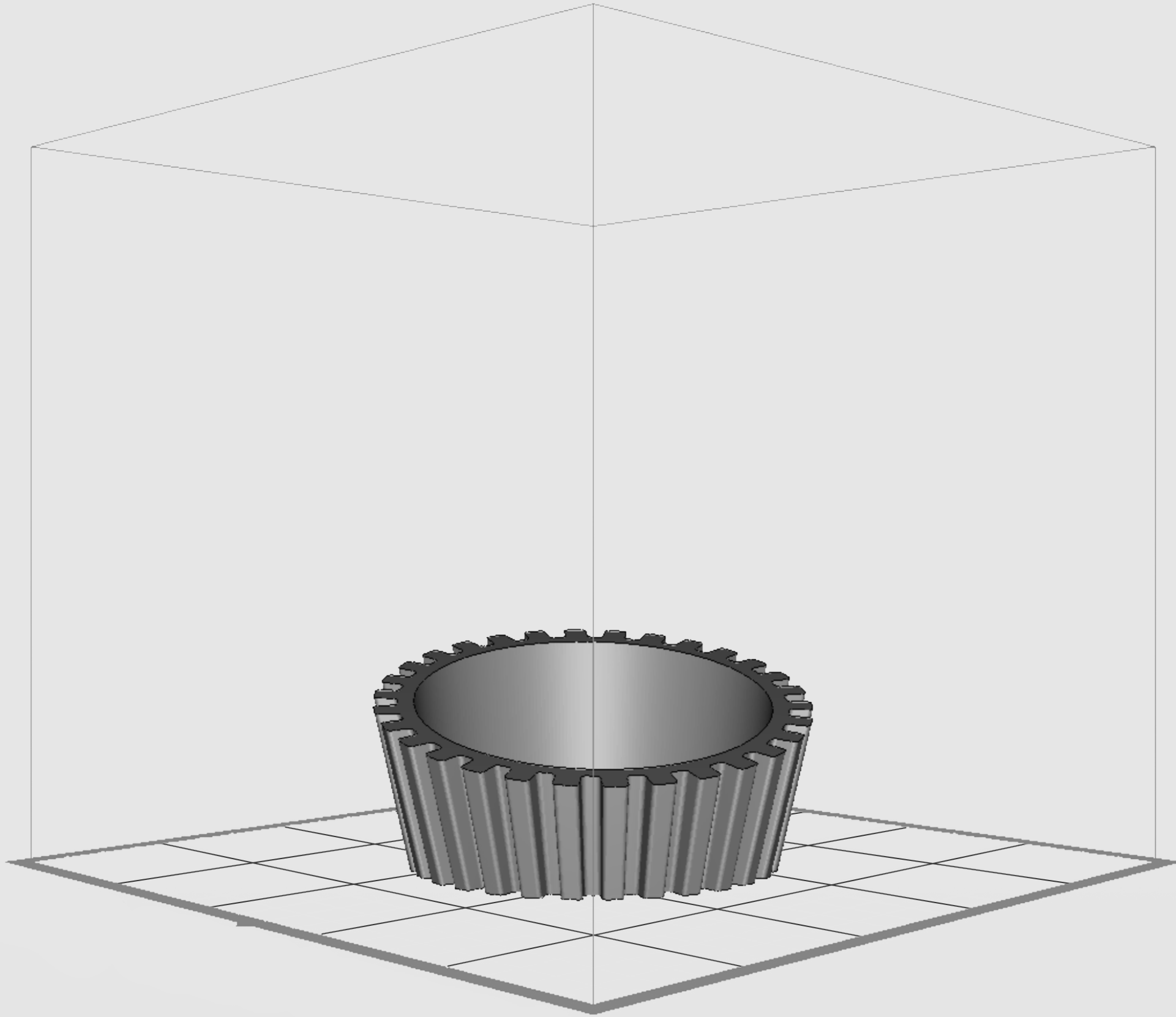
COUNTERWEIGHT

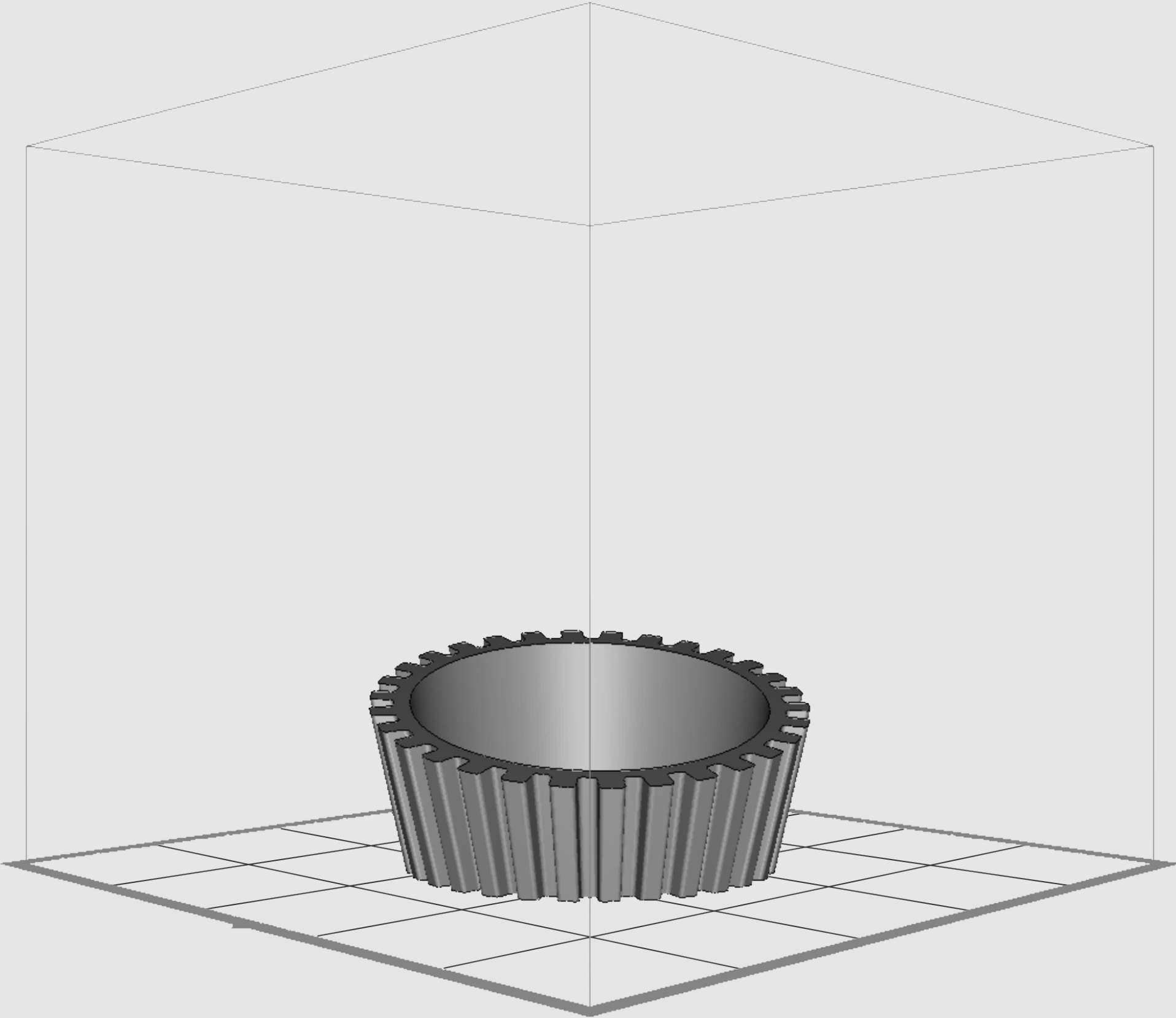
Technique: Die Casting

Why: Ensures structural strength, impact resistance, and modular adaptability.

MATERIAL	
Zinc Alloy	

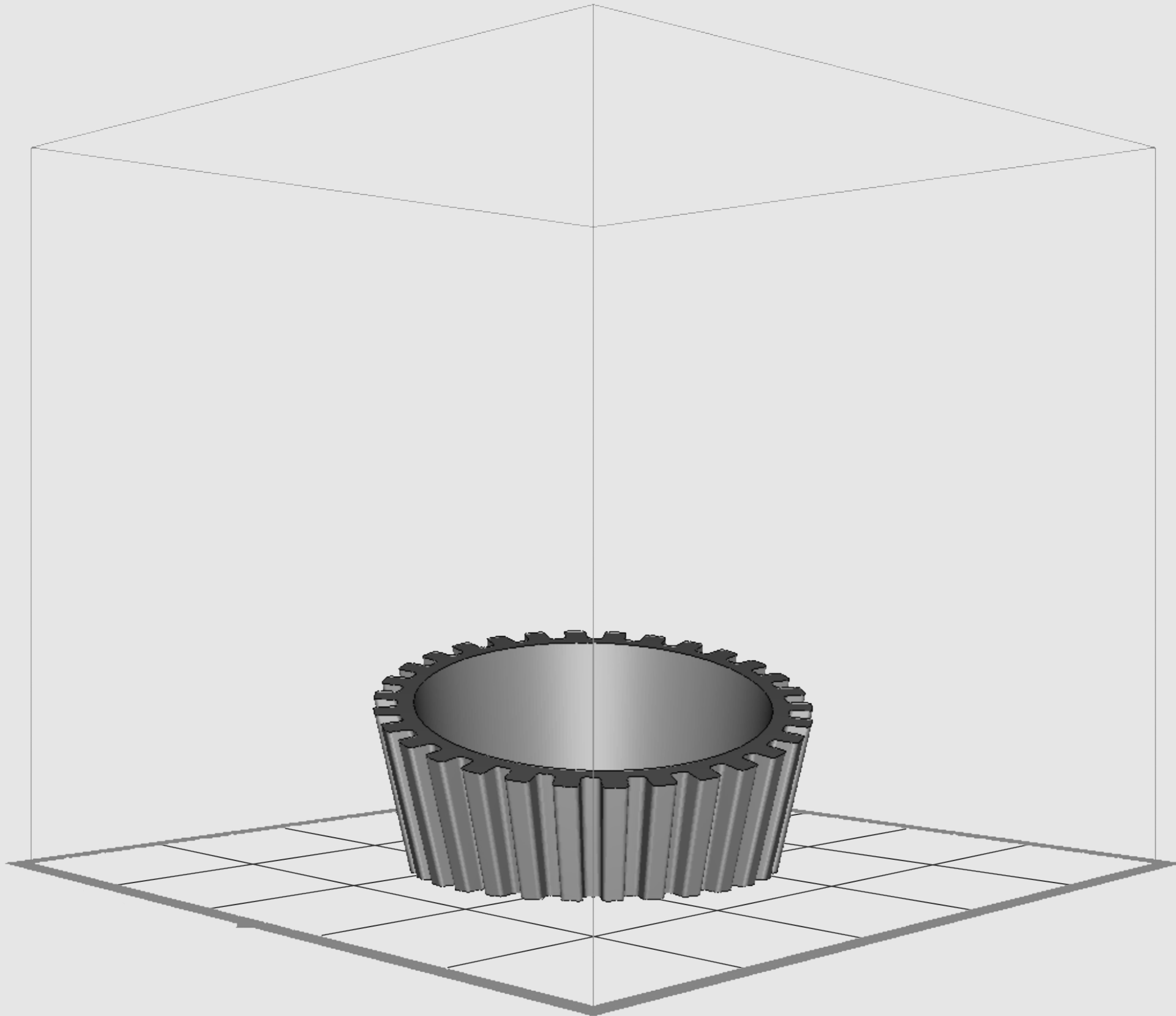
3D Printing - Positioning on plate





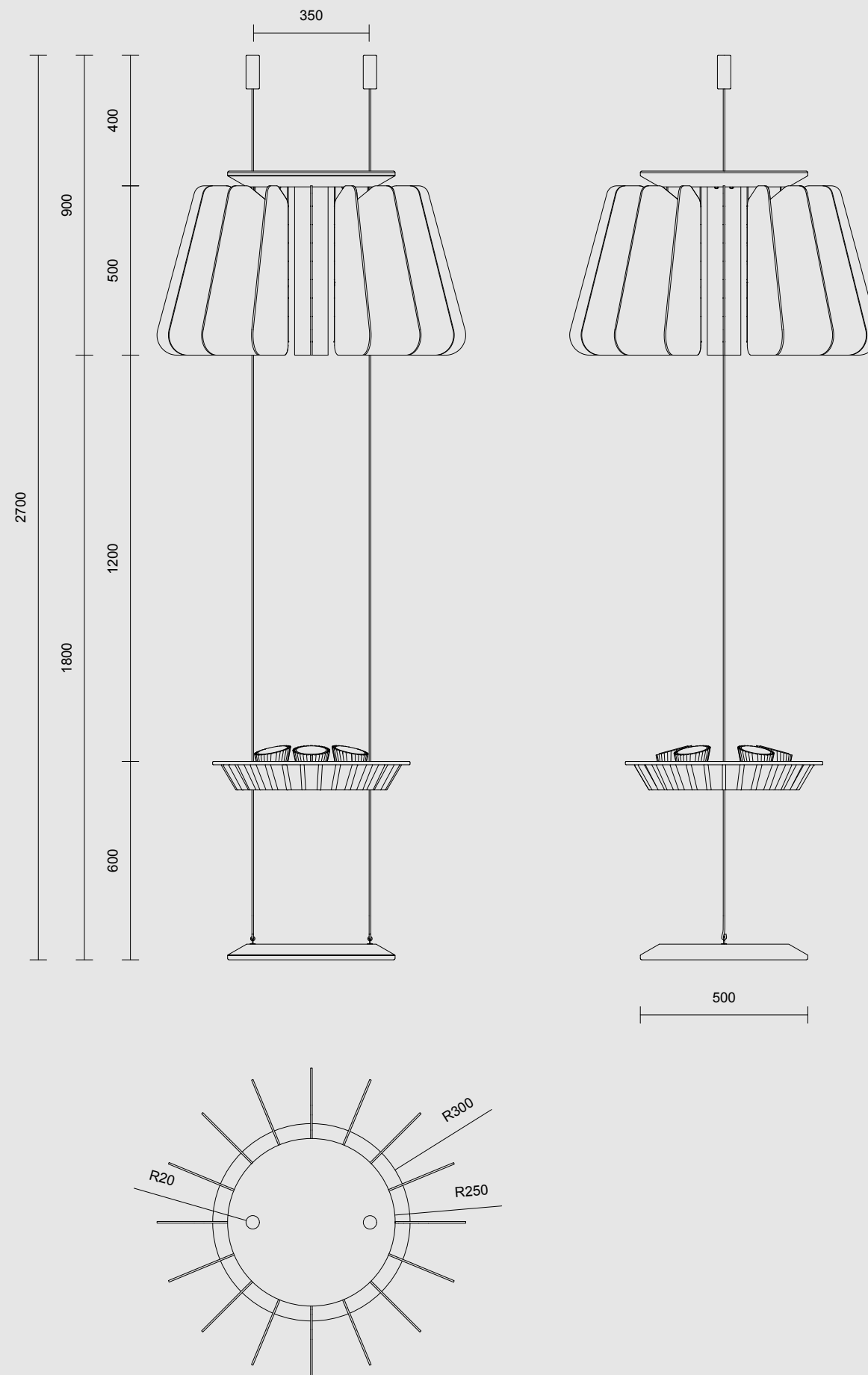
3D Printing - Print Settings

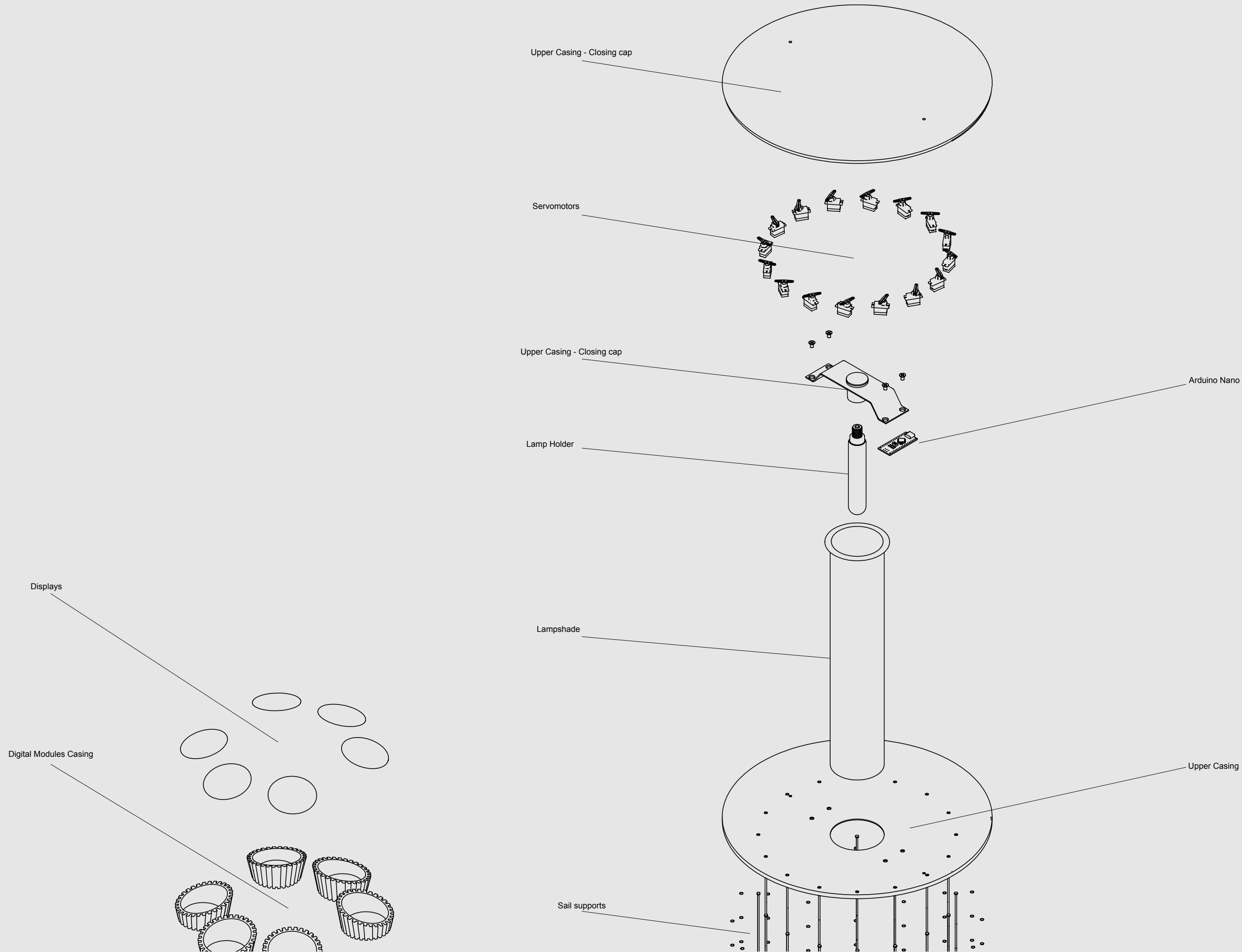
NOZZLE DIAMETER		0.4		▼							
LAYER THICKNESS		0.15		▼							
PRINT QUALITY		HIGH DRAFT									
TEMPERATURE		EXTRUSION TEMP.	210	°C	PLATFORM TEMP.	30	°C				
TYPE		NORMAL MESH SOLID SHELL				PATTERN		PATT. 0 PATT. 1 PATT. 2 PATT. 3 PATT. 4 PATT. 5 PATT. 6			
INFILL DENSITY		MESH NORMAL SOLID				20		+	-	%	
OUTER WALLS		NUMBER	3	+	-	pcs					
SURFACE LAYERS		TOP	7	+	-	pcs	BOTTOM	4	+	-	pcs
OFFSET		OUTER CONTOURS	0.00	+	-	mm	HOLES	0.00	+	-	mm
		INNER CONTOURS	0.44	+	-	mm					
SEAM		AUTO									
		☒ AVOID OVERHANGS									
FAN SPEED		☒ AUTO									
THIN WALLS		☐ PRINT TOO THIN WALLS									
FIRST LAYER		FLOW RATIO	100	+	-	%	DENSITY	100	+	-	%
		PRINT SPEED	100	+	-	%	INNER CONTOURS OFFSET	0.44	+	-	mm
FIRST LAYER GAP		 0.30									
RAFT		☒ ENABLED		DENSITY		100	+	-	%		
		LAYERS	7	+	-	pcs	PRINT SPEED	100	+	-	%
		PLATFORM-RAFT GAP	0.26	+	-	mm	FLOW RATIO	100	+	-	%
COOLING TOWER		☐ ENABLED									

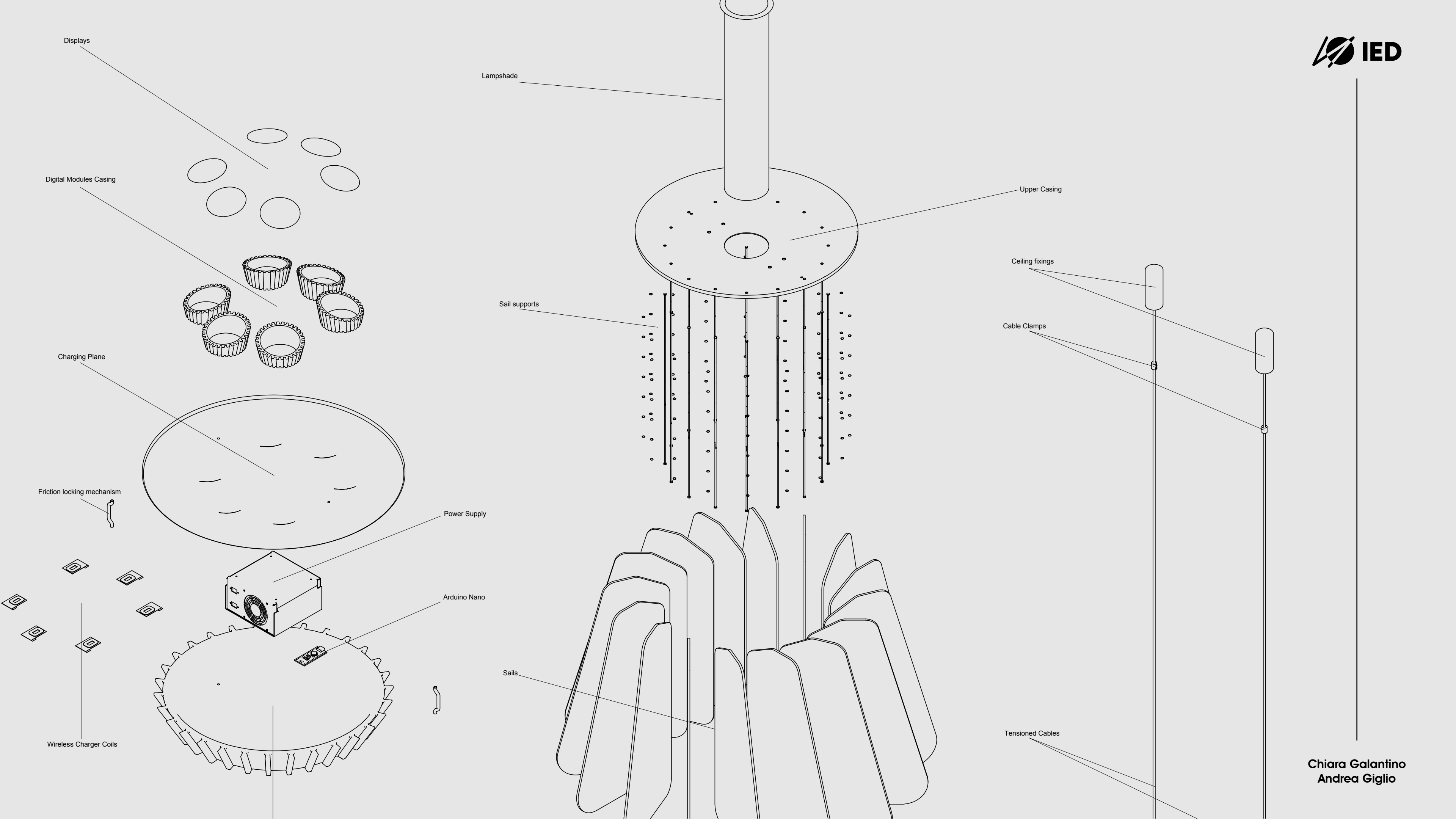


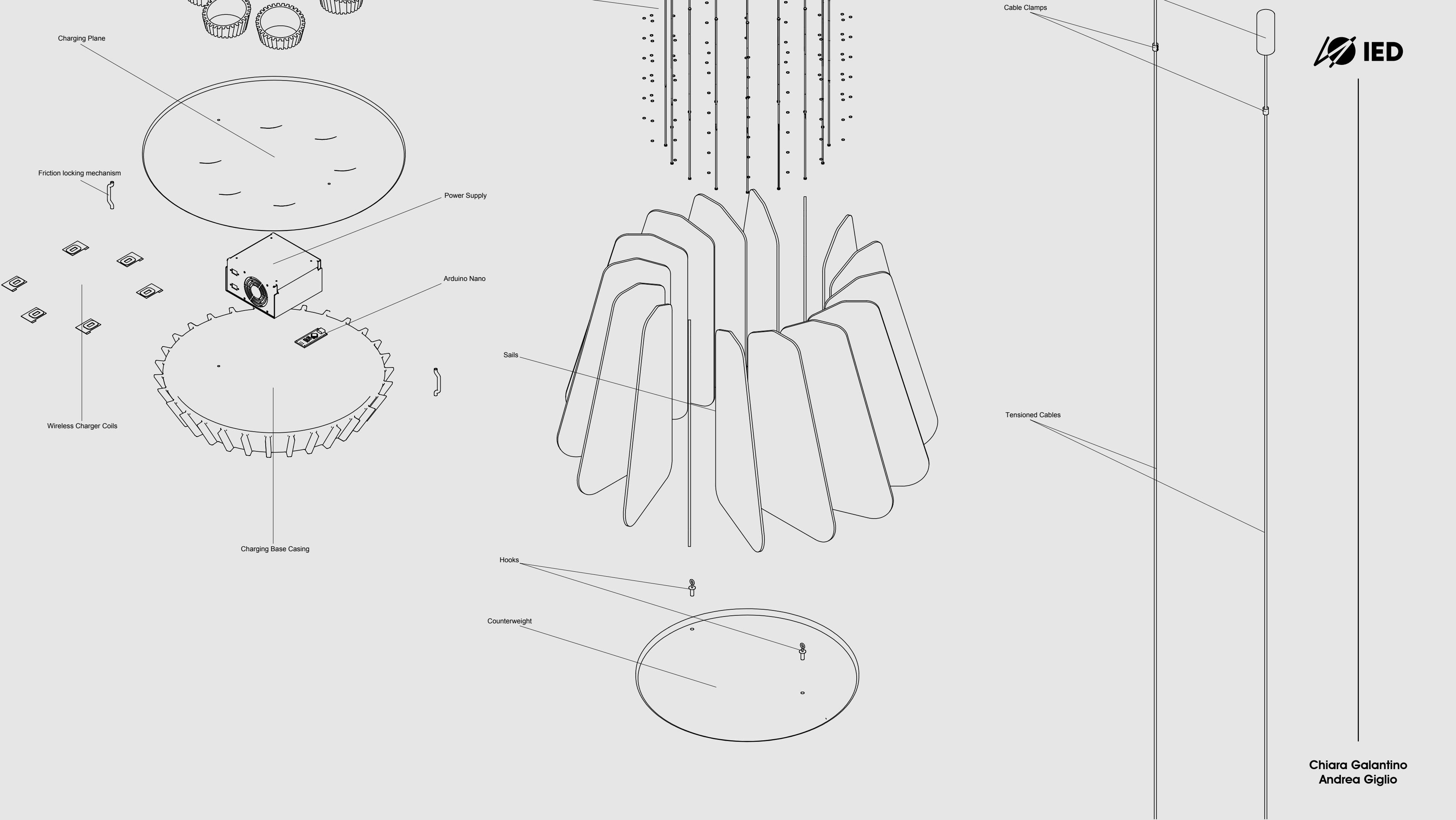
Print Report

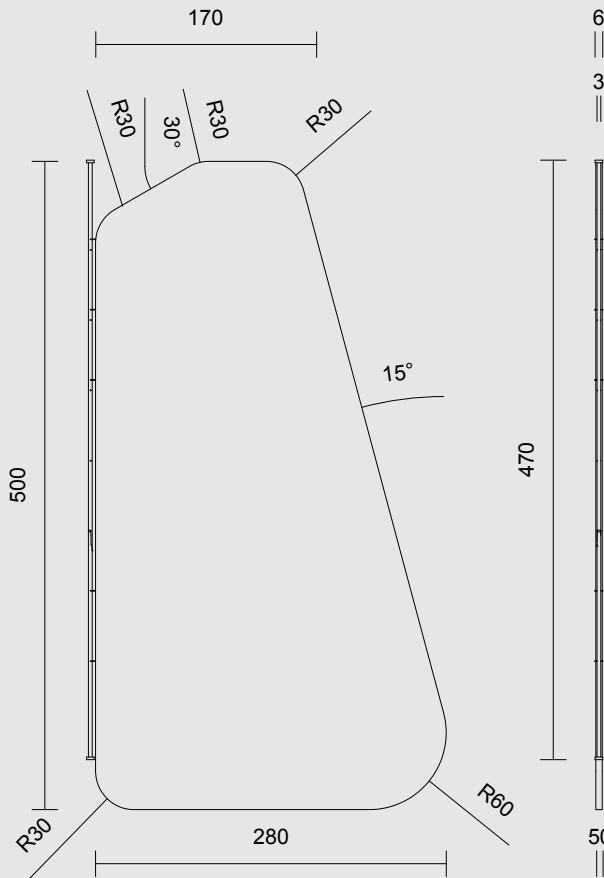
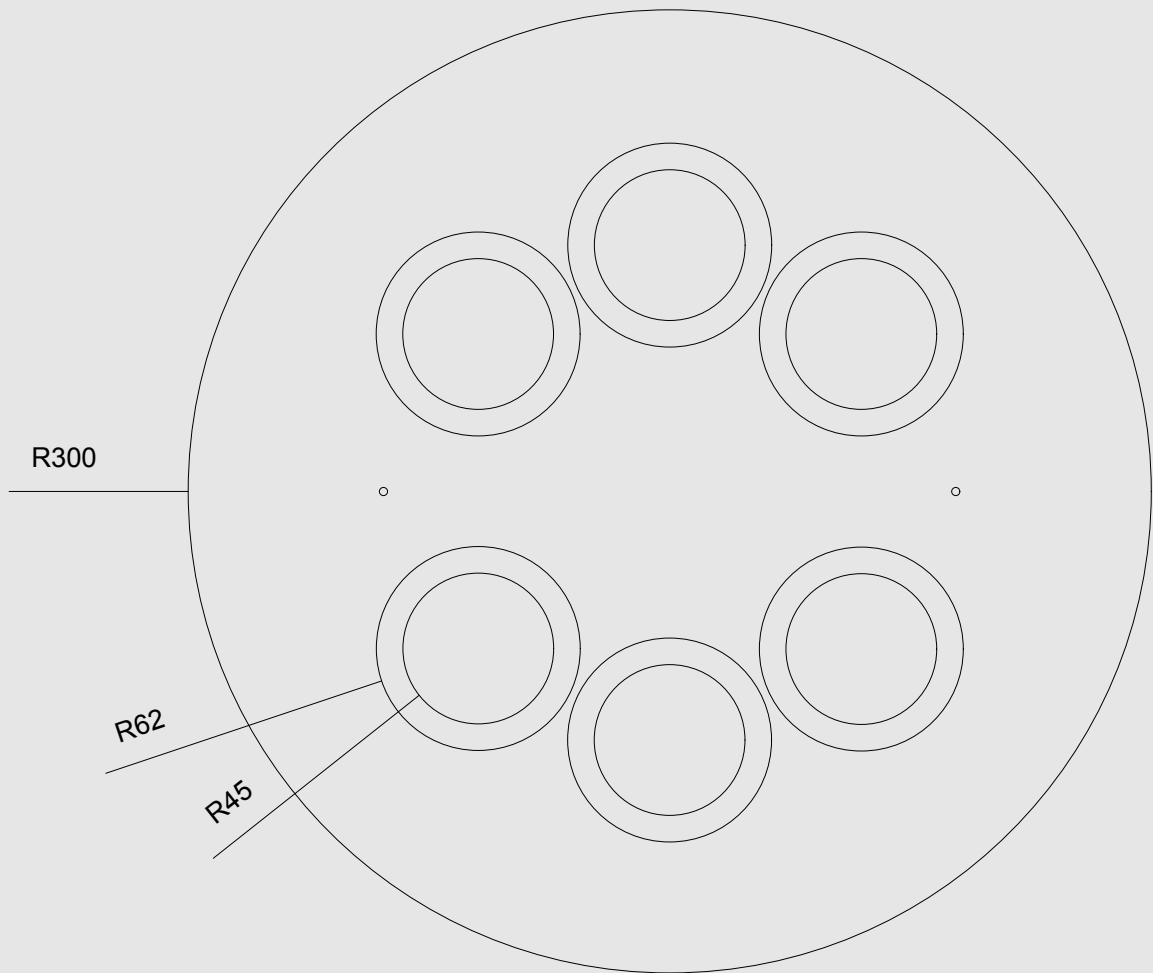
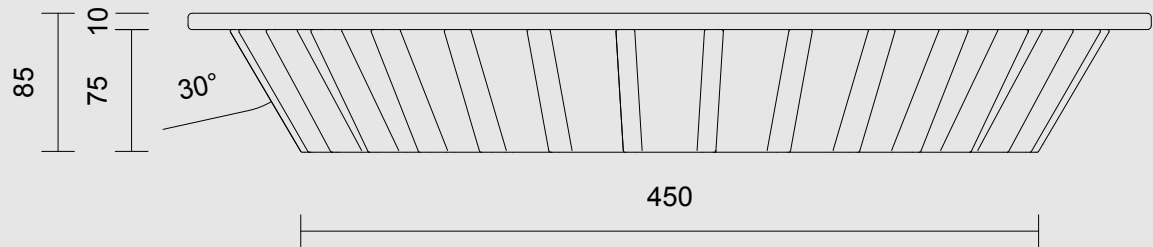
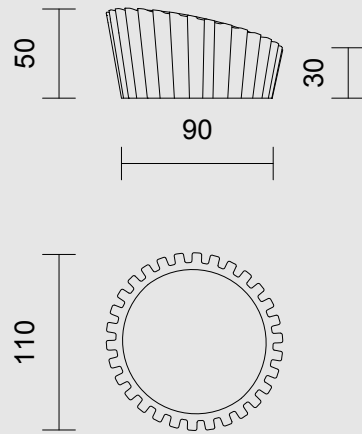
Estimated print time: 13h 47m
Material usage: 29.20m (83g)
Printer: Zortrax M200 Plus
Profile: Last settings
Support type: Editable
Material: Z-PLA
Nozzle diameter: 0.4 mm
Layer: 0.15 mm
Quality: High
Infill: 20%
Fan speed: Auto
Seam: Auto
Avoid overhangs: Yes
Outer contours: 0.00
Holes: 0.00
Inner contours Offset: 0.44
Surface layers Top: 7
Surface layers Bottom: 4
Support Life: No
Smart bridges: Yes
Outer walls Number: 3
First layer Density: 100%
First layer Print speed: 100%
First layer Flow ratio: 100%
First layer Inner contours Offset: 0.44mm
First layer gap: 0.30 mm
Raft Enabled: Yes
Raft layers: 7
Platform-raft gap: 0.26 mm
Raft Density: 100%
Raft Print speed: 100%
Raft Flow ratio: 100%
Extrusion temp.: 210
Platform temp.: 30
Support Density: 3.00 mm
Gap XY: 0.16
Cooling tower: No
Print too thin walls: No



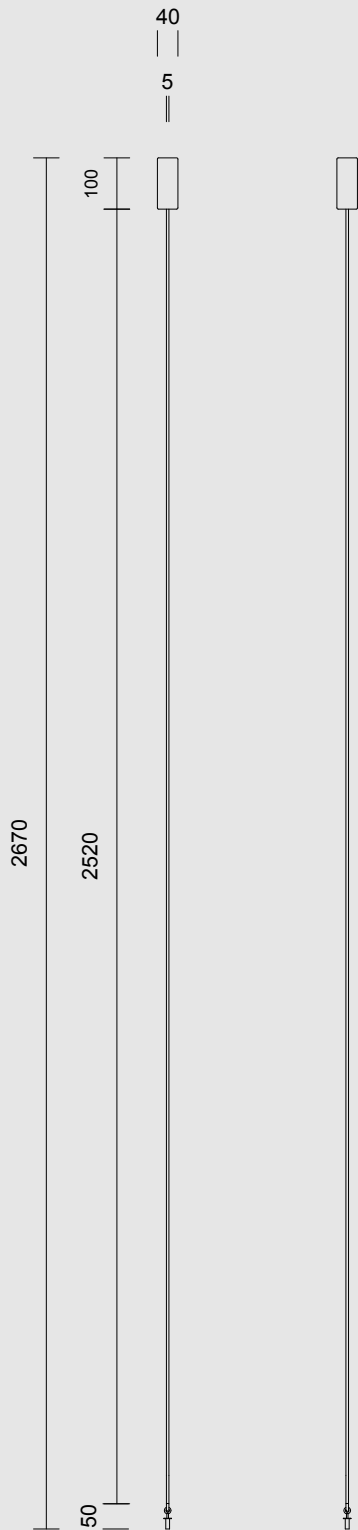




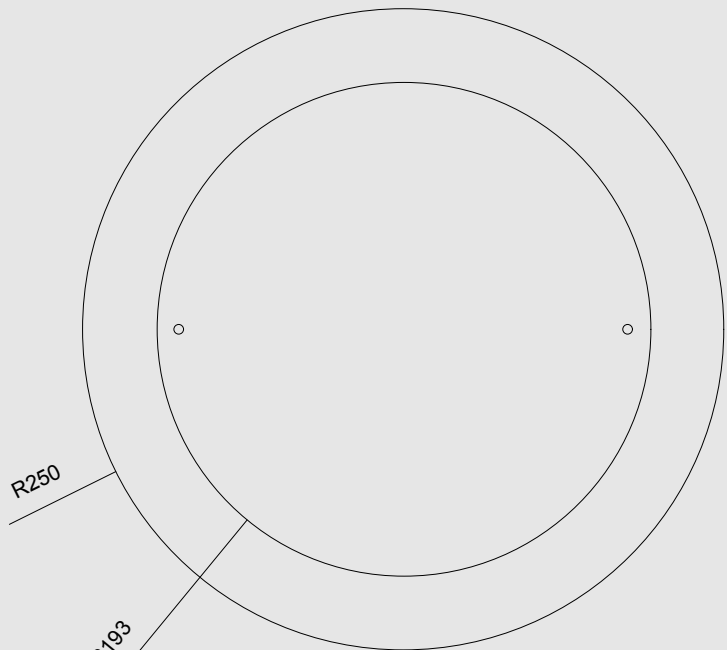




Scala 1:2



Scala 1:5



Scala 1:2



Digital Modelling Techniques

Prof: Alice Barki

Students: Chiara Galantino - Andrea Giglio