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HORIZONT NRW

STAR CONSTRUCT

# Employing Plasma Technology for Medical Implant Production through the Synthesis of Fiberglass-Reinforced Hydroxyapatite Layers on the Surface of Titanium Alloy or the Synthesis of Hydroxyapatite Layers on the Surface of Fiberglass-Reinforced Titanium Alloy

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|---|---|
| **Presented** | Dr.Eng. MohammedAlqasim Alsabti |
| **Institution** | MGM Star Construct SRL |
| **Project Focus** | Plasma-based synthesis of biocompatible coatings for orthopedic and dental implants |

# Project Summary

## Objective

- ✅ Improves bone integration & antimicrobial properties
- ✅ Increases adhesion strength & wear resistance
- ✅ Ensures scalability & ISO 10993 compliance

## Main Characteristics

- ✅ Plasma Deposition Techniques – Magnetron Sputtering & Thermal Plasma Spray.
- ✅ Enhanced Biocompatibility – Hydroxyapatite for osteointegration & Fiberglass reinforcement for durability.
- ✅ Industrial Applicability – Designed for scalable and cost-effective production

## Advancement

- ✅ First-of-its-kind HA-Fiberglass-Titanium composite for medical implants.
- ✅ Multifunctional surface engineering for improved integration & infection resistance.
- ✅ Revolutionizing implant coatings with advanced plasma technology.
- ✅ Stronger, safer, and more durable medical implants through plasma innovation!

# Seeking Collaborations with:

## Biomedical Research Institutions

Expertise in biomaterial testing, bioactivity evaluation & pre-clinical validation

## Medical Device Manufacturers

Interested in scaling up & commercializing innovative implant technologies

## Surface Engineering & Plasma Technology Experts

Specializing in thin-film coatings, surface functionalization & plasma-assisted synthesis

## Regulatory & Clinical Validation Bodies

Ensuring compliance with EU medical device safety & certification standards

# Topics for Future Horizon Europe Projects

## 1 Plasma-Based Coatings for Next-Gen Implants

- Enhancing osteointegration & antimicrobial resistance
- Development of multifunctional bioactive coatings

## 2 Advanced Plasma Deposition & Hybrid Coatings

- Combining magnetron sputtering & thermal plasma spray
- Multi-layered coatings for improved implant performance

## 3 Sustainable & Smart Biomaterials

- Functionalized biodegradable implants
- Plasma treatments for targeted drug delivery

## 4 Industrial Scale-Up & EU Certification

- Transitioning from lab-scale to industrial manufacturing
- Compliance with ISO 10993 & EU Medical Regulations

# Previous Scientific and Technological Expertise

## Expertise in Plasma-Based Coatings & Biomaterials

✅ **Development of Hydroxyapatite-Titanium Alloy Coatings for orthopedic and dental implants.**

✅ **Plasma Deposition Techniques:**

- Magnetron Sputtering – High-purity, uniform coatings with strong adhesion.
- Thermal Plasma Spray – Thick, bioactive layers for enhanced osseointegration.

## 🛠 Material Characterization & Testing

- Biocompatibility & Mechanical Evaluation (ISO 10993-compliant).
- Surface Morphology & Adhesion Strength Analysis.

## Key Scientific Contributions

- Ph.D. in Metallurgical Engineering, Politehnica University of Bucharest (2020).

**“Silver-Doped and Undoped Hydroxyapatite Coatings for Biomedical Applications”**

- Scientific Publications & Patents in plasma-based biomaterials.
- Industrial Collaboration with MGM Star Construct SRL & INFLPR.

## Major Research Projects

- EU & Horizon Europe-Funded Research on Biomaterials.


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