

# CONCEPTUAL INNOVATION OVERVIEW – 2026

نظرة عامة على الابتكار المفاهيمي

Project Name : Counter-UAV Subsystem Project

مشروع النظام الفرعي لمواجهة الطائرات المسيّرة

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CREATIVE MILITARY  
SOLUTIONS

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- INNOVATION CONCEPT
- THE INNOVATION CONCEPT IS BASED ON A LIGHTWEIGHT, MODULAR, RECONFIGURABLE AIRBORNE PROTECTIVE NETWORK COMPOSED OF INTERCONNECTED TUBULAR MODULES. THE STRUCTURE CAN DYNAMICALLY ADAPT ITS GEOMETRY TO OPERATIONAL REQUIREMENTS, ENABLING THE CREATION OF CONFIGURABLE THREE-DIMENSIONAL PROTECTIVE FORMATIONS AROUND CRITICAL ASSETS. BEYOND PROVIDING A PHYSICAL PROTECTIVE FRAMEWORK, THE CONCEPT IS INTENDED TO SUPPORT MULTIPLE DEFENSIVE FUNCTIONS, INCLUDING SURVIVABILITY ENHANCEMENT, COMPATIBILITY WITH DIRECTED-ENERGY SYSTEMS, AND ADAPTATION TO EVOLVING AERIAL THREATS, WHILE MAINTAINING A MODULAR AND RECONFIGURABLE ARCHITECTURE.
- CONCEPTUAL FUNCTIONAL ELEMENTS
- THE INNOVATION CONCEPT INCORPORATES SEVERAL COMPLEMENTARY CONCEPTUAL ELEMENTS THAT COLLECTIVELY SUPPORT ITS INTENDED OPERATIONAL ROLE. THESE INCLUDE A UNIVERSAL JOINT (U-JOINT) ARTICULATION MECHANISM THAT ENABLES MULTI-AXIS STRUCTURAL RECONFIGURATION, A LIGHTWEIGHT AIRBORNE DEPLOYMENT CONCEPT UTILIZING HELIUM-ASSISTED LIFT TOGETHER WITH COMPACT PROPULSION UNITS, PLASMA-BASED CAMOUFLAGE INTENDED TO REDUCE DETECTABILITY BY DRONE SENSORS, ELECTROMAGNETICALLY CONTROLLED MAGNETIZED MATERIALS CONTAINED WITHIN THE TUBULAR MODULES, AND THE POTENTIAL INTEGRATION OF LASER-BASED NEUTRALIZATION INTENDED TO ENHANCE ENGAGEMENT EFFICIENCY THROUGH INTERACTION WITH THE RELEASED MATERIAL. THE CONCEPT ALSO INCLUDES COMMAND AND CONTROL (C2)-GUIDED POSITIONING TOWARD OPERATIONALLY ADVANTAGEOUS LOCATIONS, THE CAPABILITY TO FORM A FULL 360-DEGREE PROTECTIVE DOME AROUND CRITICAL INFRASTRUCTURE, ELECTROMAGNETIC COUPLING MECHANISMS THAT ALLOW INDIVIDUAL MODULES TO SEPARATE UNDER EXCESSIVE EXTERNAL FORCE TO REDUCE STRUCTURAL LOADING, AND AN ARCHITECTURE INTENDED TO IMPROVE RESILIENCE AGAINST ELECTRONIC WARFARE WHILE COMPLEMENTING EXISTING AIR-DEFENSE SYSTEMS.

In addition, the concept incorporates specialized materials within the tubular modules that are conceptually intended to enhance the probability of target detection, particularly against low-observable targets, subject to future technical validation. Furthermore, the overall structural design is intended to incorporate stealth technology design principles, including low-observable shaping, to help reduce the system's detectability by missile, smart munition, and drone sensors while preserving its intended protective function.

its key advantage can be summarized as enhancing the efficiency of target neutralization and target detection.

### الأنبوب المغناطيسي - وحدة أساسية

MAGNETIC TUBE - BASIC MODULE

**نظرة عامة**  
OVERVIEW

أنبوب شفاف يحتوي على نظام الحث الكهرومغناطيسي ويوردة الحديد. يولد مجالاً مغناطيسياً داخلياً يحافظ على وجود المادة المغنطة (بودرة الحديد شبه الغازية) في حالة طفو مستقرة حتى بعد سقوط الأنبوب.

A transparent tube containing an electromagnetic induction system and iron circuit board, generating an internal magnetic field that keeps the magnetized powder (semi-gaseous iron particles) levitating stably even after the tube falls.

ملفات الحث الكهرومغناطيسي  
Electromagnetic Induction Coils

المادة المغنطة (بودرة الحديد شبه الغازية)  
Magnetized Material (Semi-gaseous Iron Powder)

بودرة الحديد (دائرة مغلقة)  
Iron Circuit Board (Closed Magnetic Circuit)

مجال مغناطيسي داخلي مستقر  
Stable Internal Magnetic Field

#### آلية العمل

WORKING PRINCIPLE

1. تقوم ملفات الحث بإنشاء مجال مغناطيسي داخلي قوي.
2. مجال الحديد (البودرة) يوجه ويبرز المجال المغناطيسي داخل الأنبوب.
3. المادة المغنطة تتحول إلى حالة شبه غريبة وتبقى معلقة في المنتصف.
4. يبقى الطفو مستقرًا حتى بعد سقوط الأنبوب أو لقطع الحركة الخارجية.

المادة المغنطة (بودرة الحديد شبه الغازية)  
MAGNETIZED MATERIAL (SEMI-GASEOUS IRON POWDER)

- شبه غازية  
Semi-gaseous
- خفيفة الوزن  
Lightweight
- مغنطة لفترة طويلة  
Long-lasting Magnetization
- مستقرة في الطفو  
Stable in Levitation

#### المكونات الداخلية

INTERNAL COMPONENTS

1. غطاء طرفي (كربون)  
End Cap (Carbon)
2. الحث الكهرومغناطيسي  
Electromagnetic Coil
3. بودرة الحديد (دائرة مغلقة)  
Iron Circuit Board
4. المادة المغنطة (بودرة الحديد شبه الغازية)  
Magnetized Material (Semi-gaseous Iron Powder)
5. مستشعرات وتحكم  
Sensors & Control
6. وحدة اتصال  
Connection Module

مجال مغناطيسي داخلي  
Internal Magnetic Field

طفو مستقر  
Stable Levitation

مادة مغنطة طويلة الأمد  
Long-lasting Magnetization

مقاوم للصدمات والسقوط  
Shock & Fall Resistant

#### حالة الطفو أثناء التشغيل

LEVITATION DURING OPERATION

المادة المغنطة تبقى معلقة في المنتصف  
The magnetized material remains suspended in the center

#### حالة سقوط الأنبوب

TUBE FALLING CONDITION

بعد السقوط، يبقى المجال المغناطيسي فعالاً والمادة مغنطة ومعلقة  
After the fall, the magnetic field remains active and the material stays magnetized and levitated

#### الطوفان المستقر بعد السقوط

STABLE LEVITATION AFTER FALL

حتى بعد السقوط أو الصدمة، يبقى الطفو مستقرًا ولا تترسب المادة في السطح  
Even after falling or impact, the levitation remains stable and the material does not settle at the bottom

ملاحظة  
تم تصميم النظام للحفاظ على المجال المغناطيسي الداخلي لمدة دقائق إلى ساعات حسب إعدادات الطاقة والتحكم  
Note: The system is designed to maintain the internal magnetic field for several minutes to hours depending on power and control settings.

### Two Rectangular Carbon Fiber Tubes Connected by a Horizontal Universal Joint

Rectangular Carbon Fiber Tube

Horizontal Universal Joint

Rectangular Carbon Fiber Tube

Top View (Straight)

Front View

Articulation / Movement

+45°

-45°

## واجهة التحكم (UI)

### محطة التحكم الرئيسية

#### Portable Control Station (PCS)

**المميزات الرئيسية**

- تحكم كامل وأبويون
- عرض البيانات البصرية
- إدارة المهام والمسارات
- اتصال آمن ومستقر
- واجهة سهلة وبديهية
- مصمم للبيئات القاسية

**الشاشة الرئيسية (Dashboard)**

10:24:30 100%

STATUS: System OK, Battery 80%, Link Strong

SPEED: 1.25 m/s

BATTERY: 85% Remaining 02:45:30

**التحكم (Control)**

SPEED: 1.25 m/s

MODE: Manual / Auto

APPLY

**الكاميرات (Cameras)**

CAM 1: REC

CAM 2, CAM 3, CAM 4

**المستشعرات (Sensors)**

IMU: Normal

Temperature: 32.6 °C

Humidity: 41 %

Pressure: 1032 hPa

Proximity: 0.85 m

Light: 125 lux

**المهام والمسارات (Missions)**

MISSION: RECON\_01

Waypoints: WP\_01, WP\_02, WP\_03, WP\_04, WP\_05

EDIT, SAVE, START

**الاتصالات**

RF Module: 2.4 / 5.8 GHz

Wi-Fi: 802.11ac

Ethernet: 100/1000 Mbps

4G / 5G (اختياري)

Video Out: HDMI / SDI

**المواصفات العامة**

حماية عالية: IP65

معد الصدمات: MIL-STD-810G

درجة حرارة التشغيل: -20°C إلى +55°C

بطارية قابلة: 8 إلى ساعات

وزن الجهاز: ≈ 6.5 Kg

**منظر الجهاز**

منظر أمامي, منظر جانبي, منظر خلفي

## شكل سحابة (فارغة)

### CLOUD SHAPE (HOLLOW) - 3D

الشكل مكون من وحدات مستطيفة متصلة بمفاصل Universal Joint في جميع الاتجاهات لتشكيل هيكل ثلاثي الأبعاد على شكل سحابة مستطيفة فارغة من الداخل.

الهيكـل يتكوـن من: 8 مربعات داخلية (فارغة)

**منظر علوي**

TOP VIEW

**منظر جانبي**

SIDE VIEW

**منظـور ثلاثي الأبعاد**

3D PERSPECTIVE

**الوحدة الأساسية**

BASIC MODULE

كل وحدة تتكون من أنبوبين من ألياف الكربون متصلين بـ Universal Joint

**تفاصيل المفصل العالمي**

UNIVERSAL JOINT DETAIL

±90°

**المخطط التخطيطي (ثلاثي الأبعاد)**

SCHEMATIC DIAGRAM (3D)

# CMS CONCEPTUAL\_INNOVATION\_OVERVIEW

## Additional details

- INNOVATION CONCEPT
- THE MOST IMPORTANT REQUIREMENT IS THAT THE INNOVATION'S DESIGN SHOULD INCORPORATE STEALTH TECHNOLOGY, PARTICULARLY IN THE SHAPING OF ITS EDGES, TO REDUCE THE LIKELIHOOD OF DETECTION BY MISSILE AND SMART MUNITION SENSORS.
- PLEASE ALSO NOTE THAT EACH COMPONENT, INCLUDING THE TUBE, CAN EXTERNALLY BE DESIGNED AS A PLASMA SCREEN FOR CAMOUFLAGE PURPOSES, WITH THE AIM OF REDUCING THE LIKELIHOOD OF DETECTION BY DRONE SENSORS THROUGH PLASMA-SCREEN CAMOUFLAGE TECHNOLOGY.
- THIS ADDRESSES THE MOST SIGNIFICANT VULNERABILITY BY MAKING THE SYSTEM MUCH MORE DIFFICULT TO DETECT. UNLIKE CONVENTIONAL SOLUTIONS THAT ARE DESIGNED PRIMARILY FOR DECEPTION, THIS CONCEPT IS INTENDED FOR AN ENTIRELY DIFFERENT PURPOSE.
- THIS SOLUTION IS SPECIFICALLY DEVELOPED FOR DRONES WITH CHARACTERISTICS SIMILAR TO CRUISE MISSILES, PARTICULARLY LOITERING MUNITIONS.
- PLEASE DISTINGUISH THIS CONCEPT FROM DECOYS AND FROM DECISION-CHAIN DECEPTION SOLUTIONS. WHILE THERE MAY BE CERTAIN SIMILARITIES, THIS CONCEPT IS FUNDAMENTALLY DIFFERENT IN ITS PURPOSE AND OPERATIONAL APPROACH.
- THE CONCEPT INCLUDES A SMALL JET-BASED PROPULSION UNIT, SEVERAL TUBES CONTAINING HELIUM GAS, AND COMPACT INTEGRATED PROPELLERS. TOGETHER, THESE ELEMENTS ENABLE THE CLOUD-LIKE STRUCTURE TO BECOME AIRBORNE WITH EASE AND MAINTAIN A STABLE POSITION AT A DESIGNATED LOCATION.
- HOWEVER, DUE TO ITS LIGHTWEIGHT DESIGN, IT WOULD NOT REQUIRE A SIGNIFICANT AMOUNT OF ENERGY. POWER WOULD PRIMARILY BE NEEDED DURING THE INITIAL PHASE TO REACH AND STABILIZE AT A DESIGNATED POSITION IN THE AIR.
- POWER WOULD ONLY BE REQUIRED AGAIN WHEN RELOCATING THE SYSTEM SO THAT IT CAN REPOSITION AND STABILIZE AT A NEW LOCATION.
- THE JET PROPULSION UNIT IS INTENDED TO BE USED ONLY DURING THE INITIAL DEPLOYMENT PHASE.
- THE HELIUM FOLLOWS THE SAME PRINCIPLE AS A BALLOON, REDUCING THE AMOUNT OF LIFT THAT MUST BE GENERATED MECHANICALLY.
- THE COMPACT INTEGRATED PROPELLERS ARE THE COMPONENTS POWERED BY ELECTRICITY AND PROVIDE THE CONTINUOUS THRUST REQUIRED TO MAINTAIN POSITION.



- THE INNOVATION CONCEPT CONSISTS OF A NETWORK OF LIGHTWEIGHT TUBULAR MODULES INTERCONNECTED THROUGH UNIVERSAL JOINTS (U-JOINTS). THESE JOINTS PROVIDE MULTI-AXIS ARTICULATION, ALLOWING THE STRUCTURE TO FLEX, REORIENT, AND ADAPT ITS GEOMETRY WHILE MAINTAINING THE MECHANICAL CONNECTION BETWEEN INDIVIDUAL TUBES.
- THE OVERALL GEOMETRY OF THE STRUCTURE IS CONTROLLED BY A DEDICATED CENTRAL CONTROL UNIT AND ONBOARD COMPUTER. BY COORDINATING THE MOVEMENT OF THE INTERCONNECTED MODULES THROUGH THE UNIVERSAL JOINTS, THE SYSTEM CAN COMMAND AND CONFIGURE A WIDE VARIETY OF STRUCTURAL SHAPES AS REQUIRED BY THE OPERATIONAL SCENARIO OR MISSION OBJECTIVES.
- THE INNOVATION CONCEPT CONSISTS OF TUBES CONTAINING, AS AN EXAMPLE, MAGNETIZED IRON POWDER. THE OBJECTIVE IS FOR THE MATERIAL TO BE TRANSFORMED, THROUGH ELECTROMAGNETIC INDUCTION, INTO A GAS-LIKE STATE. THE INTENDED REQUIREMENT IS THAT, EVEN AFTER THE SYSTEM IS OPENED, THE MATERIAL SHOULD RETAIN THE ABILITY TO REMAIN SUSPENDED IN THE AIR FOR AT LEAST 30 MINUTES AS A MAGNETIZED GASEOUS MEDIUM. ACHIEVING THIS OBJECTIVE WOULD REQUIRE EXPERTISE FROM SPECIALISTS IN CHEMISTRY.
- ACCORDINGLY, THE TUBES ARE DESIGNED TO FUNCTION SIMILARLY TO ELECTROMAGNETIC COILS, ENABLING THE GENERATION OF THE REQUIRED ELECTROMAGNETIC FIELD AROUND THE CONTAINED MATERIAL.
- FINALLY, THE C2 (COMMAND AND CONTROL) SYSTEM DIRECTS THE SYSTEM TOWARD RADAR BLIND SPOTS. THIS CONCEPT IS INTENDED TO ADDRESS CHALLENGES ASSOCIATED WITH ELECTRONIC WARFARE AS WELL AS TECHNOLOGIES INVOLVING STEALTH AND LOW RADAR CROSS-SECTION (RCS), SINCE AN AIRCRAFT PASSING THROUGH THE AREA WOULD MOVE THROUGH THE ATTACHED MATERIAL.
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- THE MODULAR STRUCTURE INCORPORATES ELECTROMAGNETIC COUPLING MECHANISMS BETWEEN ADJACENT TUBES. THESE COUPLINGS ARE DESIGNED TO DISENGAGE UPON THE APPLICATION OF SUFFICIENT EXTERNAL FORCE, ALLOWING INDIVIDUAL MODULES TO SEPARATE RATHER THAN TRANSFERRING EXCESSIVE MECHANICAL STRESS THROUGHOUT THE STRUCTURE. THIS APPROACH IS INTENDED TO ENHANCE MODULARITY AND REDUCE STRUCTURAL LOADING DURING UNEXPECTED IMPACTS. TO LET THE TARGET PASS INSTEAD OF INTERCEPTING IT. AND HERE, THERE IS ANOTHER OPTION: USING LASERS TO NEUTRALIZE DRONES.
- THIS CONCEPT IS BASED ON THE ASSUMPTION THAT THE MATERIALS CONTAINED WITHIN THE TUBES COULD INTERACT WITH THE LASER ENERGY, POTENTIALLY CREATING A STRONGER NEUTRALIZATION EFFECT. IF VALIDATED, THIS INTERACTION COULD REDUCE THE LASER'S REQUIRED ENGAGEMENT TIME AGAINST A DRONE.
- OR IT MAY BE POSSIBLE TO MAKE TARGETS DETECTABLE, EVEN IF THEY ARE STEALTHY.
- OF COURSE, I FORGOT TO MENTION THAT THIS CONCEPT COULD BE CONFIGURED AS A FULL 360-DEGREE PROTECTIVE DOME FOR SAFEGUARDING CRITICAL INFRASTRUCTURE AND OTHER IMPORTANT BUILDINGS.