

CONCEPTUAL INNOVATION OVERVIEW – 2016

UNIT INSTANT SEARCH (UIS)

CONCEPT OVERVIEW

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- **CONCEPT OVERVIEW :**
- **UNIT INSTANT SEARCH (UIS) IS A CONCEPTUAL AIR-INTEGRATED SUPPORT UNIT DESIGNED TO ENSURE IMMEDIATE AND RELIABLE POST-INCIDENT LOCALIZATION OF AIRCRAFT, ELIMINATING THE TRADITIONAL DEPENDENCY ON DELAYED SEARCH OPERATIONS.**
- **THE CONCEPT IS BASED ON THE PRINCIPLE THAT AN AIRCRAFT SHOULD NEVER BECOME “LOST” AFTER FAILURE, BY DEPLOYING AN AUTONOMOUS SECONDARY UNIT THAT SEPARATES FROM THE MAIN AIRCRAFT UNDER PREDEFINED RISK CONDITIONS AND CONTINUES INDEPENDENT TRACKING AND REPORTING FUNCTIONS.**

- **OPERATIONAL PRINCIPLE :**
- **THE UIS CONCEPT INTRODUCES A SECONDARY AERIAL UNIT CARRIED ONBOARD THE PRIMARY AIRCRAFT.**
- **UPON DETECTION OF CRITICAL ANOMALIES (E.G., EXTREME TEMPERATURE, MECHANICAL FAILURE, OR SYSTEM-LEVEL RISK PREDICTION), THE SYSTEM INITIATES :**
- **AUTONOMOUS SEPARATION OF THE SECONDARY UNIT MAINTENANCE OF A SAFE TRACKING DISTANCE FROM THE PRIMARY AIRCRAFT CONTINUOUS MONITORING OF FLIGHT STATUS AND TRAJECTORY.**
- **IN THE EVENT OF A CRASH :**
- **THE UNIT MAINTAINS A MONITORING POSITION.**
- **IT DETERMINES AND PRESERVES PRECISE CRASH COORDINATES**
- **IT INITIATES IMMEDIATE TRANSMISSION OR ALTERNATIVE DATA PRESERVATION PROTOCOLS**

- **CORE CONCEPTUAL SHIFT :**
- **THE UIS CONCEPT REFRAMES THE TRADITIONAL PARADIGM :**
- **FROM : POST-INCIDENT SEARCH (REACTIVE)**
- **TO : PRE-INCIDENT TRACKING & INSTANT LOCALIZATION (PROACTIVE)**
- **THIS ELIMINATES RELIANCE ON :**
- **BLACK BOX RECOVERY DELAYS**
- **LONG-DURATION SEARCH OPERATIONS**
- **ENVIRONMENTAL UNCERTAINTY AFFECTING EVIDENCE RETRIEVAL**

- **FUNCTIONAL CHARACTERISTICS :**
- **AUTONOMOUS OPERATION INDEPENDENT OF THE PRIMARY AIRCRAFT AFTER SEPARATION**
- **ABILITY TO FUNCTION UNDER ALL WEATHER CONDITIONS**
- **CAPABILITY TO OPERATE WITH OR WITHOUT SATELLITE DEPENDENCY**
- **CONTINUOUS MONITORING OF CRITICAL FAILURE INDICATORS**
- **PRESERVATION OF TECHNICAL EVIDENCE INTEGRITY OVER TIME**

- **STRATEGIC VALUE (CIVIL AVIATION & SAFETY) :**
- **IMMEDIATE LOCALIZATION OF CRASH SITES (TARGET: MINUTES INSTEAD OF DAYS/MONTHS)**
- **SIGNIFICANT REDUCTION IN SEARCH AND RESCUE TIME AND COST**
- **PRESERVATION OF CRITICAL INVESTIGATION DATA BEFORE ENVIRONMENTAL DEGRADATION**
- **REDUCED OPERATIONAL BURDEN ON EMERGENCY RESPONSE SYSTEMS**
- **ENHANCED AVIATION SAFETY, TRANSPARENCY, AND ACCOUNTABILITY**

- **CONCEPT CLASSIFICATION :**
- **DOMAIN: AIR TRANSPORT SAFETY**
- **NATURE: CONCEPTUAL / STRATEGIC INNOVATION**
- **FUNCTION: AUTONOMOUS POST-INCIDENT LOCALIZATION & EVIDENCE PRESERVATION**
- **SYSTEM CHARACTERISTICS :**
- **NON-INTRUSIVE, PLATFORM-COMPATIBLE, NO STRUCTURAL REDESIGN REQUIRED**
- **CONCEPTUAL CHALLENGES :**
- **AUTONOMY, ENDURANCE, OPERATIONAL RANGE, AND RELIABILITY UNDER EXTREME CONDITIONS**