



INNOVATIVE SYSTEMS INTEGRATION



Small Form Factor CEMA / EW Mission System and Trainer for Ground, Air, and Sea

June 2022

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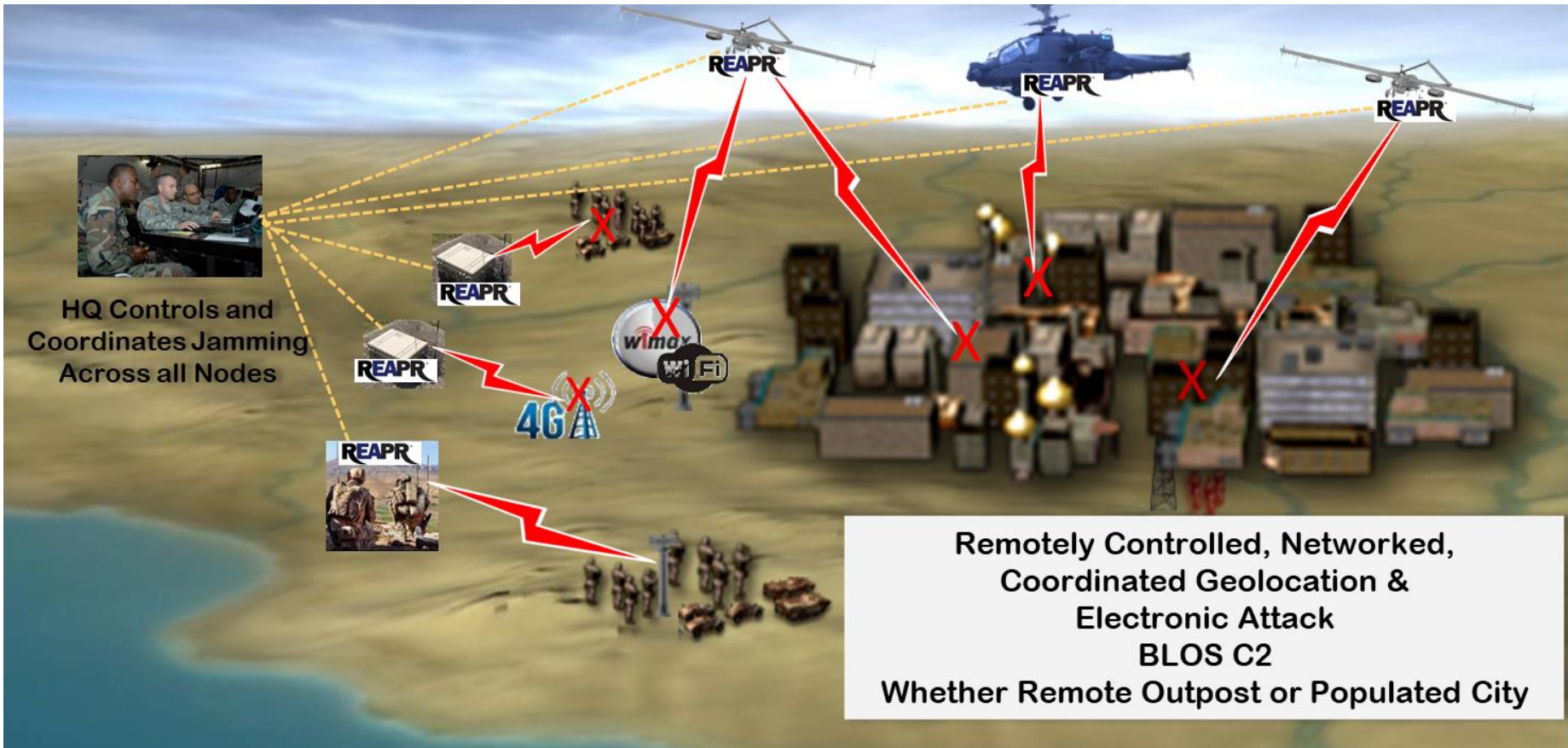
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REAPRTM Technology / Capability Overview

- Small SWaP, modular Electronic Warfare system
- Identifies, classifies, geolocates and disrupts target signals
- Precise jamming will not disrupt Blue Force comms
- Currently supports terrestrial and Shadow TUAS
- New models to support near-peer radios & FTUAS
- Modular, vendor-agnostic design enables REAPR to evolve rapidly as new target signals evolve
- Excellent investment that leverages current investment in Shadow and will cross over to Future TUAS eliminating any requirement for force retraining
- Any REAPR contract qualifies for SBIR Sole Source award



BLUF – BOTTOM LINE UP FRONT

Problem:

- Warfighters, especially SOF, need readily available small-SWaP Electronic Warfare assets - and, importantly, to extend the utility of SOF's numerous deployed Group 2-3 UAS

Background:

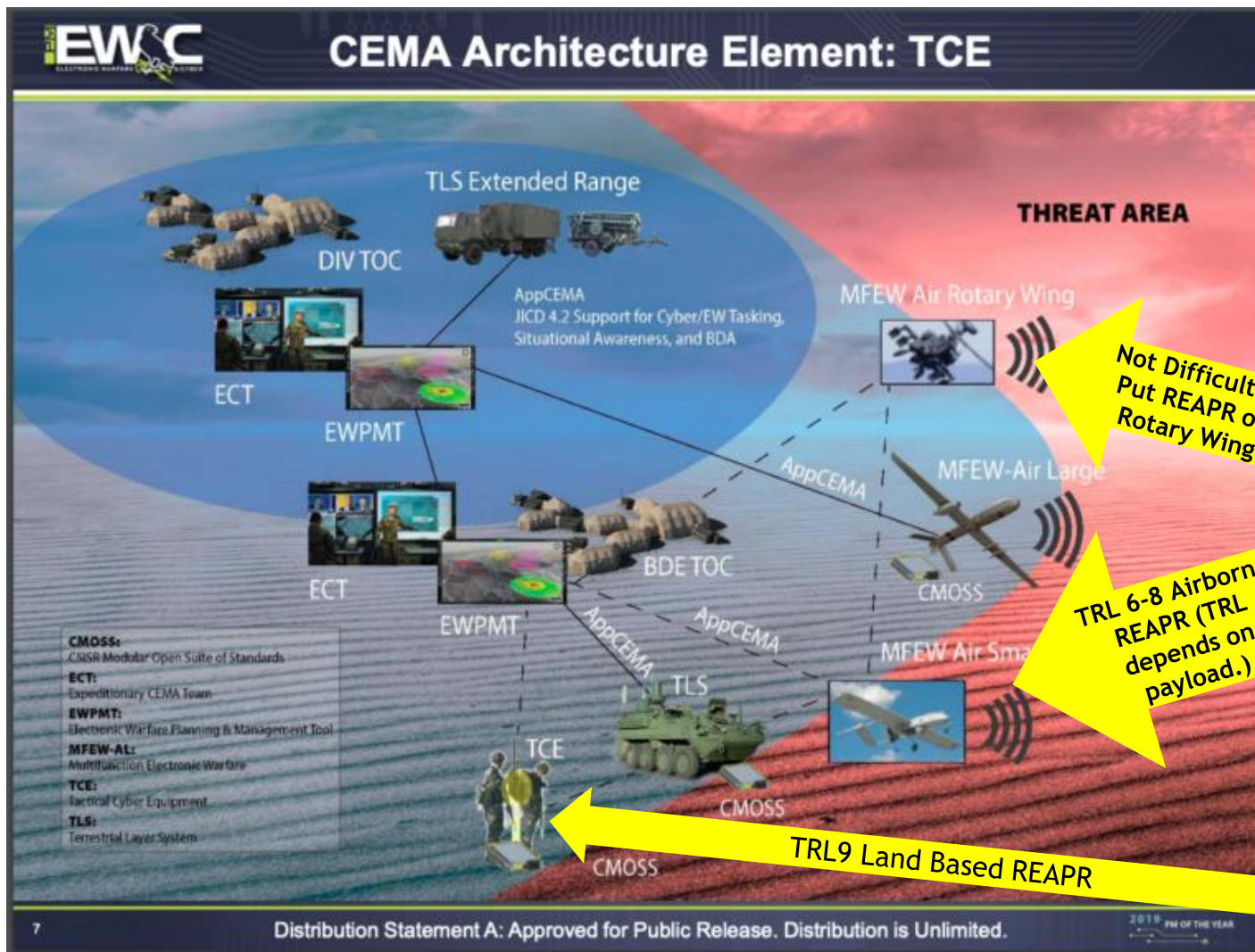
- Kerberos has developed the Reactive Electronic Attack Portable Radio (REAPR)
 - Modular, vendor-agnostic full function EW suite
 - TRL9 for ground/land use and
 - TRL6-8 (depending on payload) on Shadow RQ-7B
 - Kerberos has proven ability to integrate and fly full EW suite on Shadow (Feb 21, 2021)



Solution:

- Upgrade and Air Qualify REAPR payload to support:
 - Near Peer Radios
 - Smaller SWaP to work on Shadow, other Group 2-3 UAS and FTUAS
 - Harness design for field installation
 - Approx. \$10 Million and 12 months

STATED REQUIREMENTS AT PROGRAM LEVEL

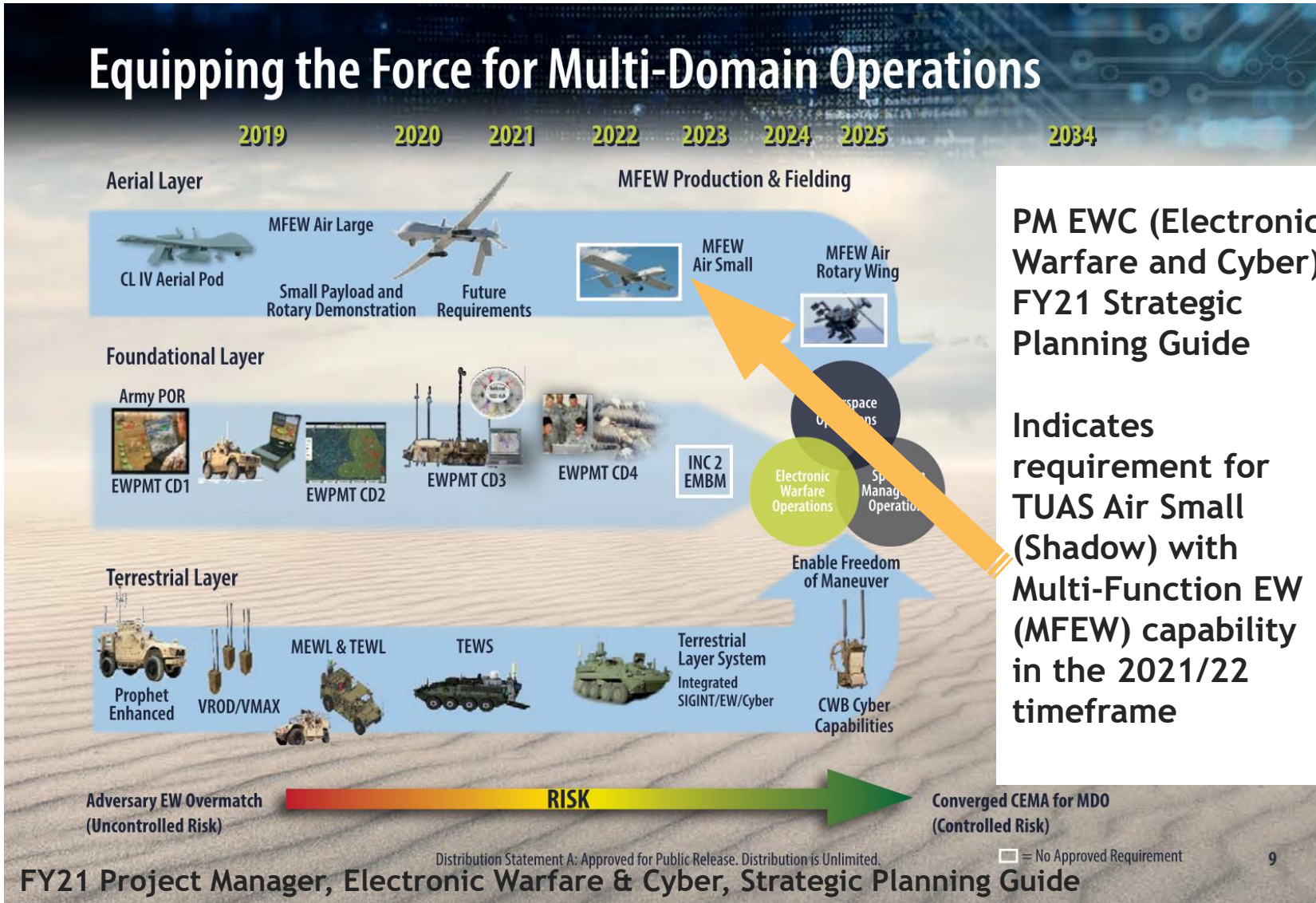


From PM EWC
(Electronic Warfare
and Cyber)

CEMA Architecture

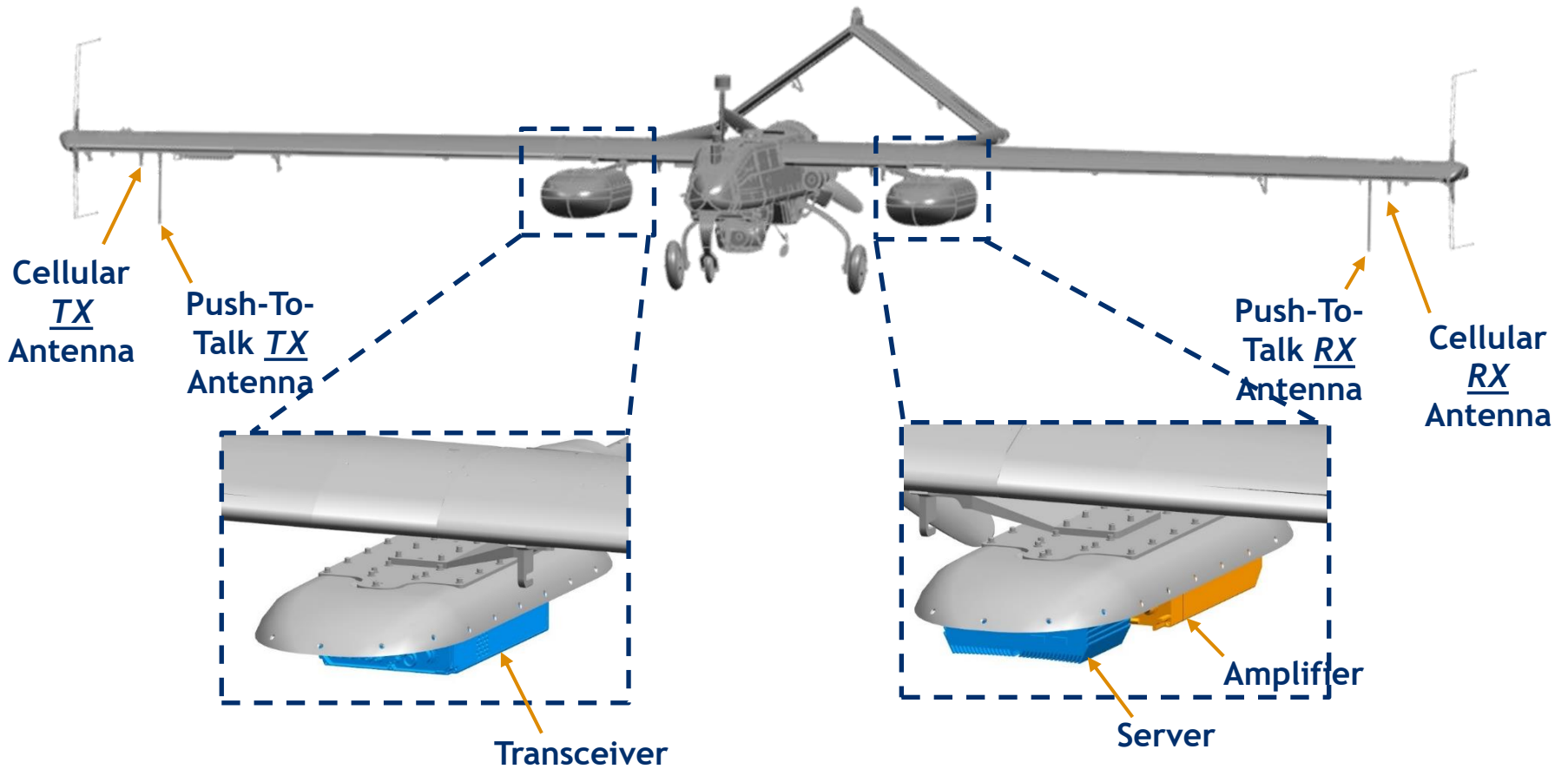
- Indicates requirement for MFEW Air Rotary - easily put REAPR here
- Indicates requirement for MFEW Air Small - EW on the Textron Shadow (or similar UAS) - Proven
- Proven Land-Based REAPR can operate here

STATED REQUIREMENTS AT PROGRAM LEVEL

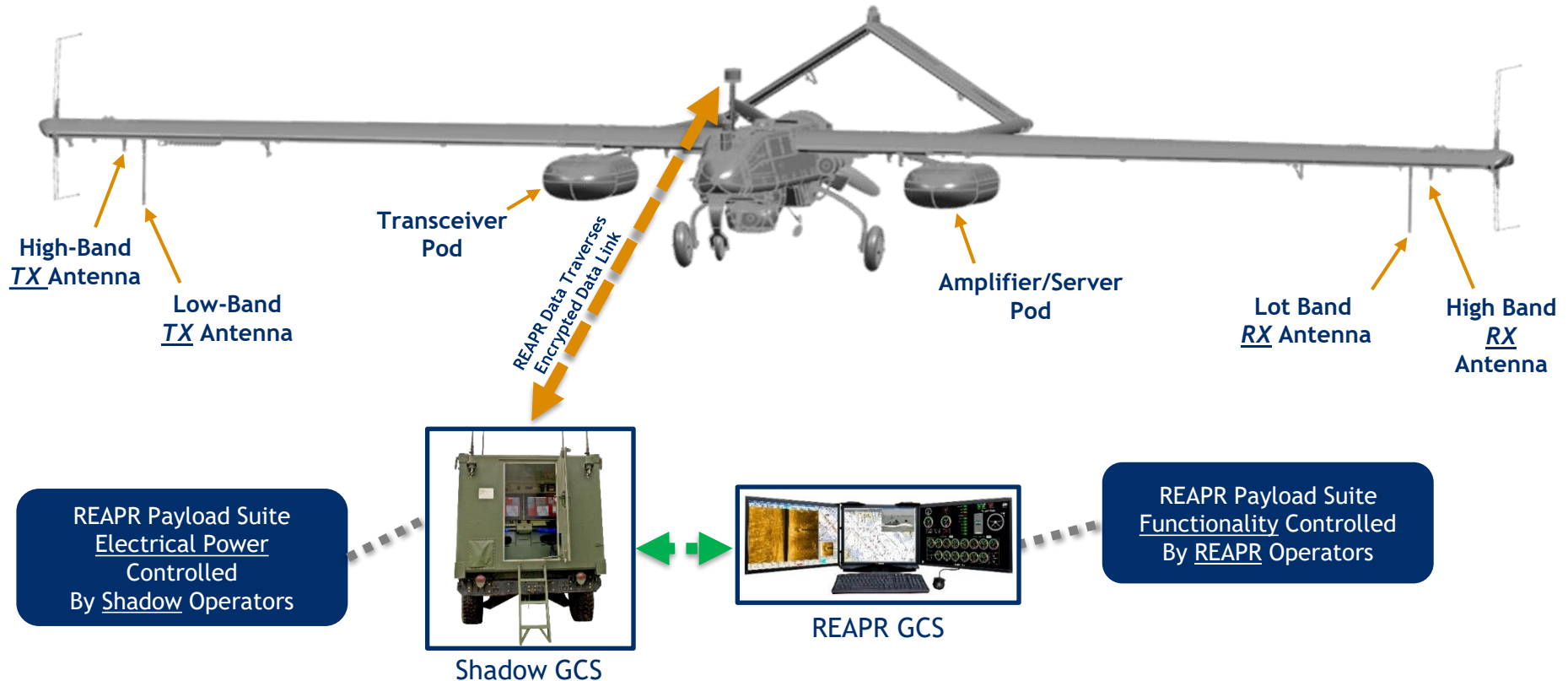


FY21 Project Manager, Electronic Warfare & Cyber, Strategic Planning Guide

Shadow RQ-7B Integration Overview



Shadow RQ-7B Integration Overview



- Delivers EW capability on the Textron RQ7 Shadow & can be adapted to other TUAS
- Identify and geolocate target RF signals between 20 MHz to 2200 MHz with current antennas. Can switch antennas to cover 20MHz to 6 GHz.
- Automatically and reactively jam RF signals between 20 MHz to 500 MHz and from 800 MHz to 2200 with current antennas and power amplifier
- Precise Jam without interfering with signals +-25kHz from target signal
- Airborne model can detect, characterize, classify, geolocate, jam, and spoof multiple types of modern communication radios

REAPR ENHANCED SHADOW – NOW AND FUTURE

Current Function and Status:

- ❑ **Live demonstration of following functions in Feb 2021:**
 - ❑ **Identify and classify target signals between 20 MHz to 2200 MHz**
 - ❑ **Land Mobile Radios**
 - Reactive jam/disrupt target signals between 20 MHz to 500 MHz and from 800 MHz to 2200 MHz
 - Precise jamming - disrupted radios without disrupting nearby radios that were < 25 kHz from target signal
 - Jamming proven up to 40 slant miles (limited by range size with additional margin)
 - Geolocation (via multi-node JICD 4.2) to provide Shadow operator with target coordinates
 - Decode/decrypt to listen to the actual radio conversation
 - ❑ **GSM Cell Phones**
 - Disrupt/Jam GSM cell phones via mimicking cell tower and “capturing” the target phone
 - Geolocation to provider Shadow operator with target coordinates
 - Spoof GSM cell phone to send “fake” text messages
 - Decode/decrypt GSM cell phone to listen to the actual phone conversation
- ❑ **SWaP: ~0.35 ft³, ~35 lbs, <275 W**
- ❑ **Flight Time: Approx 6 hours**
- ❑ **Ready to start flight qualification**

REAPR ENHANCED SHADOW – NOW AND FUTURE

What SOF Warfighters Are Saying:

- ❑ Current function is excellent as first-of-its-kind Group 3 EW capability .. but
- ❑ Priority SOIs have evolved since REAPR project started in 2017
- ❑ Want support for FTUAS platforms
 - ❑ FTUAS approximately 3 to 5 years away
 - ❑ Shadow expected to be fielded until 2035
 - ❑ Support for TUAS and FTUAS eliminates retraining issues
- ❑ Need support for near-peer radios
- ❑ Top Priority: Need single aircraft Direction Finding ability for near-peer radios and cell phones with cell phone interrogation
- ❑ Secondary Priority: Need to disrupt near-peer radios
- ❑ REAPR is modular, platform-agnostic Electronic Warfare platform

We Can Deliver Everything They Are Asking For **NOW**

❑ Existing Payload:

- ❑ Needs two or three REAPR nodes to DF radios
- ❑ Cannot disrupt near peer frequency-hopping radios well
- ❑ Would work well in AFRICOM AOR or other AORs targeting land mobile radios

❑ Several Options to Upgrade Payload:

- ❑ Smaller SWaP to support Shadow and FTUAS
- ❑ Extended frequency range support
- ❑ Single air vehicle direction finding/geolocation
- ❑ Support for disrupting near peer radios
- ❑ Support for 3G, 4G and 5G cellular interrogation

*** ROM estimates could be shorter depending on test range availability and less expensive if USG can provide the Shadow and crew.*

ADDED VALUE FOR US DOD, ARMY AND SOF

□ Immediate Capability Now and Investment for Future

- Leverage previous investment in Shadow
- Some capabilities will be demonstrated on Textron's Aeresonde Future TUAS at Cyber Quest 22
- Fly now on TUAS and later on FTUAS with same payload
- Implement on Shadow now and no retraining when upgrade to FTUAS
- Delivers long-term function sooner than planned
- Some REAPR configurations are officially supported in EWPMT CD4

PHASED DELIVERY – SPEEDS CRITICAL FUNCTION TO THE FIELD

- ❑ Phases would focus on delivering highest priority needs first. We recommend breaking them down by capability drops, prioritized according to your requirements. Options include:
 - ❑ Addition of modern cellular interrogation capabilities (including 5G)
 - ❑ Counter near-peer radio modification
 - ❑ Addition of DF capabilities
 - ❑ SIGINT/ES only - passive modification (very low risk)
 - ❑ Flight test, qualification and field
 - ❑ FTUAS preparation and planning

CONTRACTING AND LICENSING

- REAPR was developed initially as a STTR / SBIR contract
- Ground based REAPRS are TRL9 and eligible for a sole source SBIR Phase 3 contract
- Airborne REAPR purchase and/or development/testing/certification is eligible for a sole source SBIR Phase 3 contract (any UAS or rotary wing)

REAPR ENHANCED SHADOW – SUMMARY

- ❑ CEMA Program Defined Requirement for MFEW Air Small
- ❑ SOF User Defined Requirement for TUAS and FTUAS EW Suites
- ❑ Some capability available now - ready for flight qualification
- ❑ Users want additional capability:
 - ❑ Support for Future TUAS
 - ❑ Single aircraft DF for Near Peer Radios and Cell Phones
 - ❑ Cell phone interrogation, emitter identification
 - ❑ Electronic Attack (secondary priority)
- ❑ **We can deliver these features now on Shadow and on Future TUAS when available**
- ❑ Qualifies for Sole Source SBIR Phase 3 Contract - REAPR Enhancement

THANK YOU!

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