

**BRIEF TO:**  
**IES ALC Fall Conference 2010**  
**USMC EXPEDITIONARY AIRFIELD**  
**LIGHTING & MARKING**

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**EAF Lighting & Marking Engineer**  
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NAVAIR PUBLIC RELEASE 10-0476  
Distribution Statement A – "Approved for public release; distribution is unlimited"



***“Shorebased aviation weapons support system which permits deployment of landing force aircraft within effective range of ground forces.”***



**Building airfields in the backyards of people who don't want them there**

## **Airfield Surfacing**

AM2 Aluminum Matting

Synthetic Lightweight Matting

## **Aircraft Recovery**

M31 Expeditionary Arresting Gear

## **Airfield Lighting**

Legacy Hardwire System

Minimum Operating Strip Lighting System

Man-Portable Lighting

## **Terminal Guidance**

Fresnel Lens Optical Landing System

Tactical Precision Approach Path Indicator

## **OPNAV N88**

EAF & ATC Funding Sponsor

## **Headquarters Marine Corps APX-34**

Direct Command Responsibilities

Determine Fleet Needs

## **Naval Air Systems Command Headquarters PMA251**

Set Equipment Policies

Manage Certification Instructions

## **NAVAIR Lakehurst PMA251M / AIR-4.8 / AIR-6.6**

Cradle-to-Grave Lifecycle Support

Develop Technologies into EAF Systems

Technical Manuals / Certification Procedures

Adapt Other References (USN, USAF, FAA, NATO, ICAO...)



“Any Clime and Place”



Simulated Ship Facilities



Air-Ground Combat Facilities





Captured Airfields



Lightweight Mat Systems



AM2 Mat



Roadways

## 1960's & 1970's

"Standard Airfields"

Incandescent Technologies



## 1980's

Batteries!

AC 150/5345-50



## 1990's

Desert Storm Lessons Learned

Lighter & Faster = Slash & Burn



## 2000's

More Lessons Learned

LED Technologies



# HQMC “3-Tiered” Lighting Support



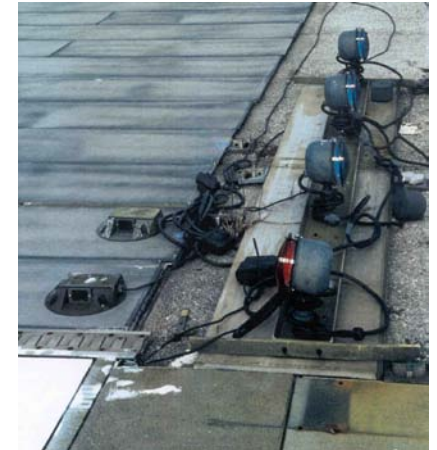
0-24hr “Air Assault”

FML & IML



24-72hr “Forward Operating Base”

MOSLS



≤90 day “EAF Mission”

Legacy HIRL System





# NAVAIR Minimum Operating Strip Lighting System



IOC - 1998

Developed by RAF concurrently with NATO STANAG 3534

## **Runway and Taxiway Support**

Extended Deployment Capable

## **VFR & IFR Capable**

STANAG 3534

## **In-house Supply Support**

NAVAIR Lakehurst



**20-yr Old Technology**

**Incandescent Lamps**

Battery drain

**Preventive Maintenance**

Battery charging

**Embark/Transport**

Designed for CUCV-NATO

**Supply Support**

Not without its challenges  
3<sup>rd</sup> Party sourcing

**STANAG Acceptance**



## Based on FAA Design Standards

### Cat I Capability

HIRL Edge Lights  
“Quasi-SALS” Approach Lighting

### Unique Capabilities

AM2 / Arresting Gear Interface  
OIF Installations  
OEF Installations

### High-Power Infrastructure

Specialized Current Regulators  
Intensive Maintenance

### Obsolescence

1980's Technology at BEST





## **Original = 10-Light System**

High Intensity w/ Sequenced Strobes  
“Equivalent System”

## **Reduced to 5-Light System (mid-1990’s)**

“Lighter and Faster” Reasoning  
Decreased Spacing  
NO Consideration for TERPS Requirements  
Recent Installations = NO Lighting Credits

## **MOSLS 2-Light Arrangement**

EAF Deviated from STANAG 3534

## ***EAF Working Separate from ATC***



## **“Man-Portable” System**

Under 50-lbs

Remote Controllable

Maximize Off-the-Shelf Technology

“All-Inclusive” (Lights, Mounting Hardware, Tools, Pack)

## **“Sustainment” System**

Deployment and Training Sites

“Interactive” Remote / User Interface

Battery-Operated, Multi-Source Capable

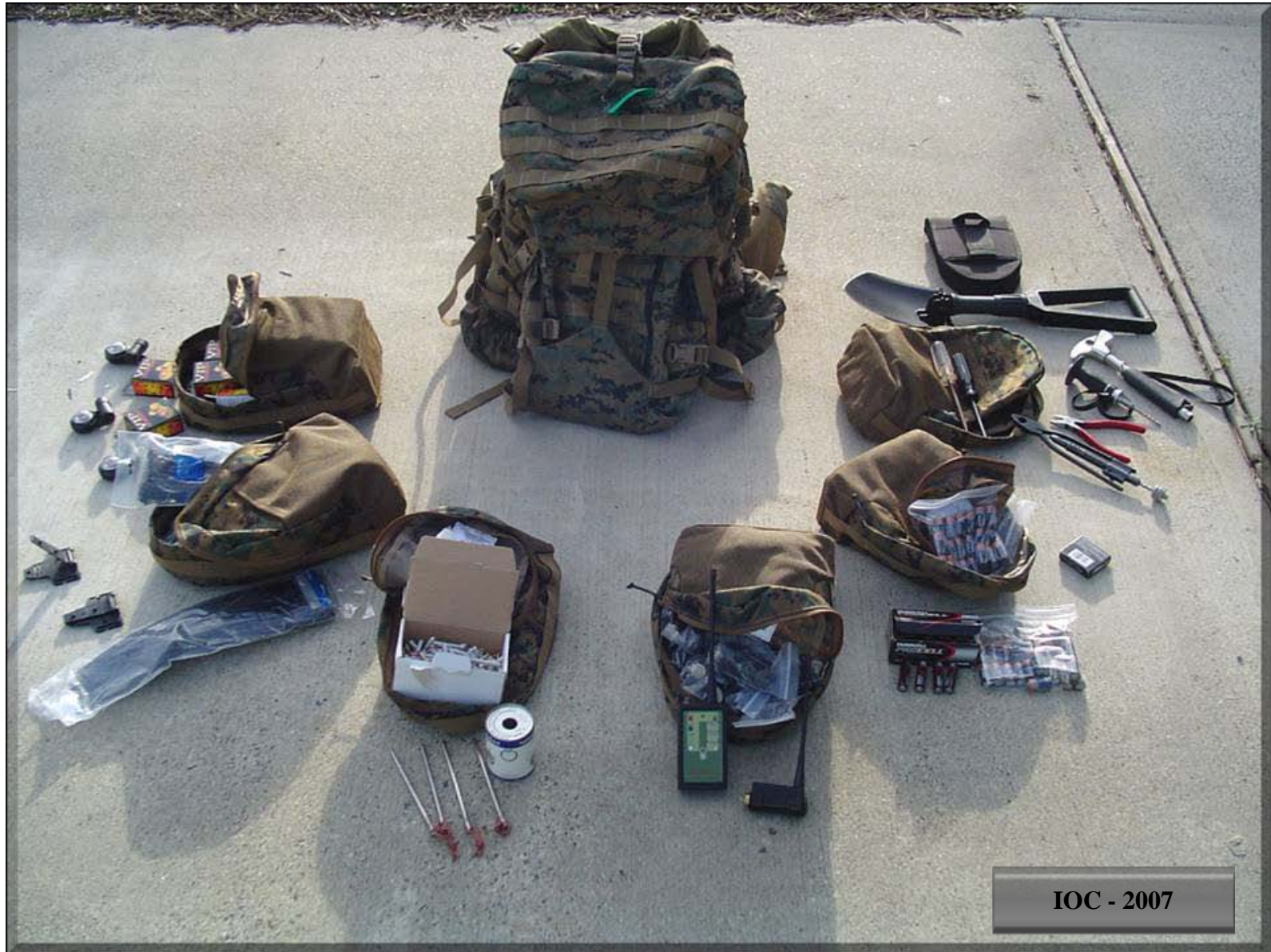
Maximize Inter-Service / International Conformance

MIRL / IFR / VFR (threshold)

CAT I (objective)

“Economy” Taxiway Lights

# “Man-Portable” L204 Package



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# Present EAF Capabilities

Specification

Intensity (cd)

09-6



VIPIR

AZL-15



15

LIRL



L94

25

NATO

MOSLS



50

MIRL

125

HIRL



Legacy

10,000



**Helo Landing Zone?**

**Cargo/Transport Landing Zone?**

**Vertical Takeoff and Landing?**

**“Runway”**

Helos?

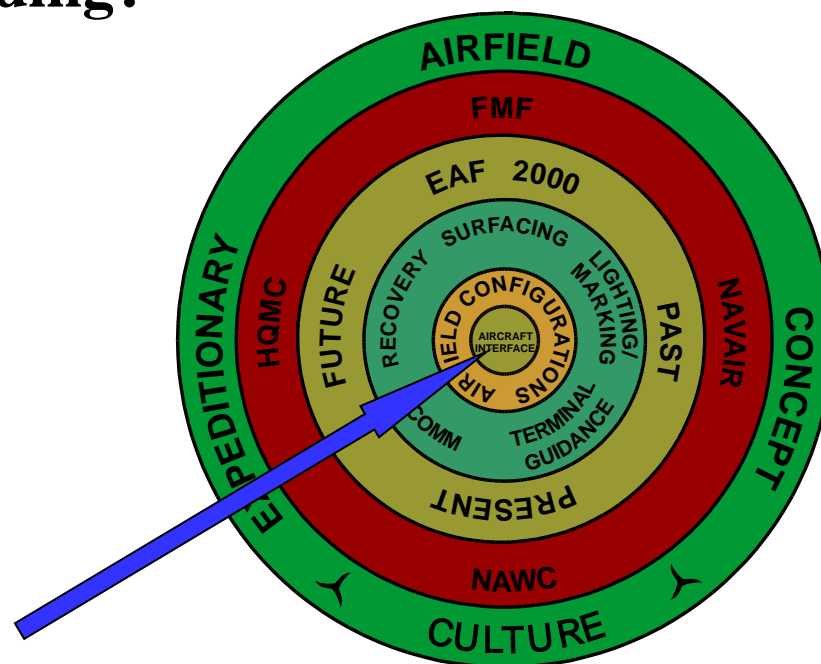
Cargo/Transport?

Tactical?

S/VTOL?

Commercial Logistics?

UAS?



**How many solutions are necessary?**

## **“Requirements-Based” Documents**

UFC 3-535-01

NAVAIR 51-50AAA-2 “...not to be used for... Expeditionary Airfields”

## **“Equipment-Based” Documents**

EAF Library

## **FAA Advisory Circulars**

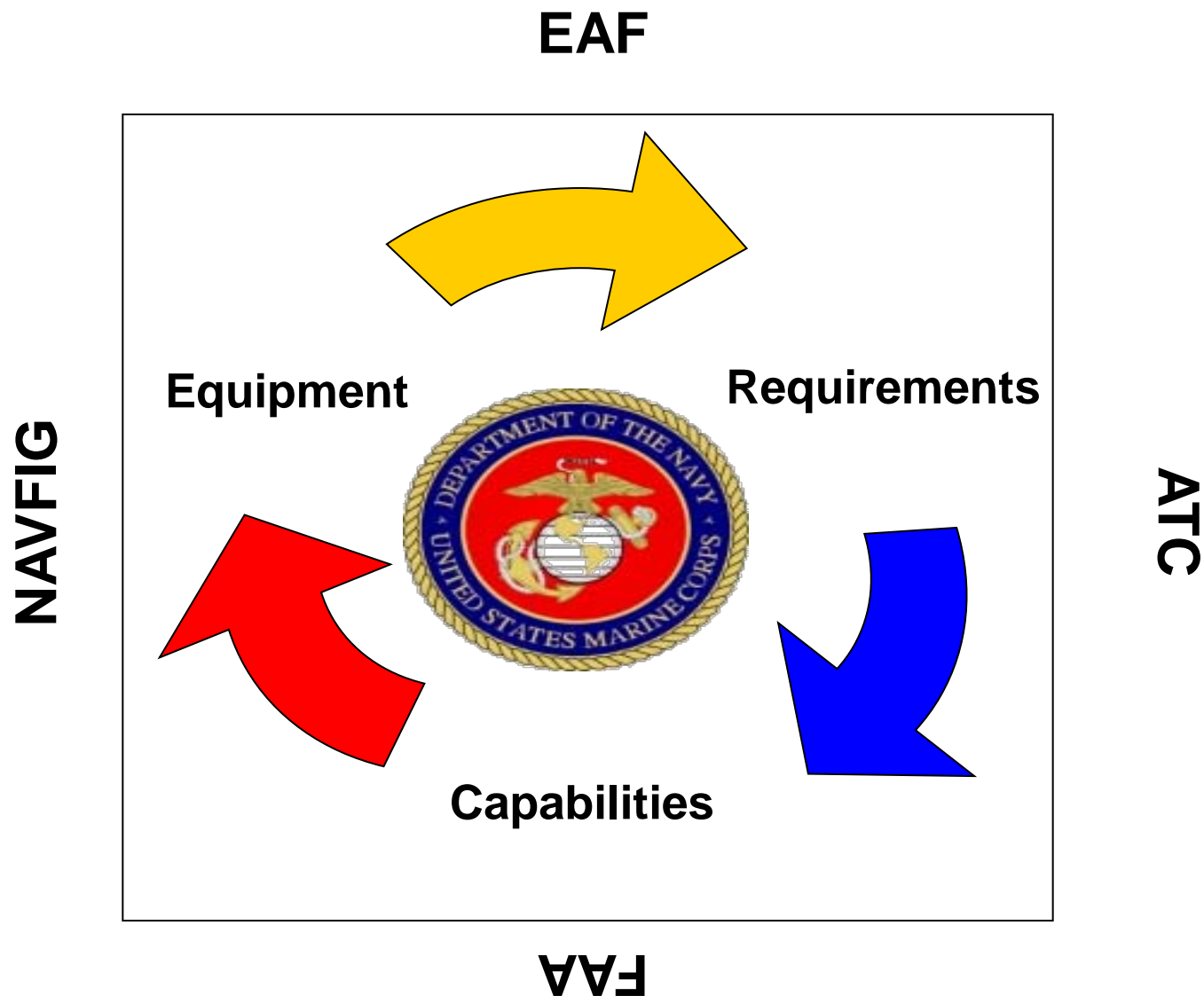
Beneficial Data, but Cannot be Applied 100%

## **TERPS**

*“We are an EAF until someone else shows up.” - NAVFIG*

## So what applies?

# Sustainment Vision



## **Breaking Technologies**

LEDs

Solar

## **Power Infrastructure**

Not Bound to Existing CCR Loops

Can Develop Most Efficient

## **“DOD Requirements are DOD Requirements”**

“Equivalent” Sub-systems

Maintainability



## **VFR Requirements**

MIRL Baseline

## **IFR Requirements**

ODALS Baseline and/or Equivalent

## **CAT I Requirements**

MALSR Baseline and/or Equivalent

## **Specialty / Ancillary Equipment**

Diagonal Line-up

Frangible Tower

Rotating Beacon

Airfield Marking

Flush-Deck

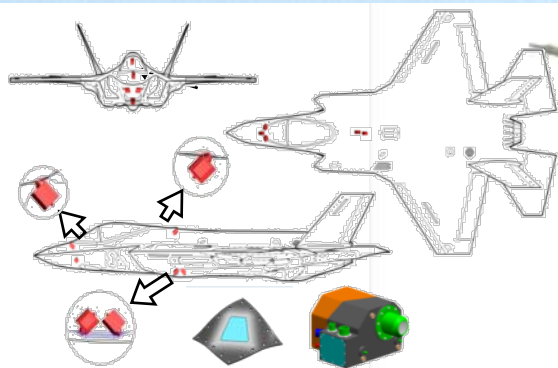
Wind Indicator

Packaging

Obstruction Light

# EAF Performance Challenges

VTOL Operations



Aircraft  
Platform  
Interface



Visioning Systems



Arresting Gear



# EAF Survivability Challenges



## Simulated Ships

Attempting to Standardize

Unique Requirements

Unique Infrastructure

CVN

LHD

LPD





## **“Tone Down” Strategy**

Works for VFR, *but....*

Threshold

Runway Holding Position

## **IFR Requirements**

## **Unique Concerns**

Aircraft / Ordnance Clearances as Expanse Grows

Hammerheads w/ VTOL

Application Methods

Mat Re-use

Obliteration

Night Vision Effects on “Masking”

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Airport Safety & Technology Section

**Naval Flight Information Group (NAVFIG)**

**IES Airfield Lighting Committee**

**Don Raman**