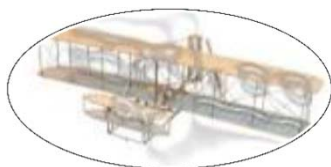




2011 Illuminating Engineering Society Government Contacts Subcommittee Fall Meeting



USMC Expeditionary Airfield (EAF) Markings



2011-IESALC
Wilmington, NC

Rob Rinderer
NAVAIR Lakehurst EAF Lighting & Marking
17 October 2011



EAF Definition



“The EAF is a shorebased aviation weapons support system which permits deployment of landing force aircraft within effective range of ground forces.”





EAF Marking History

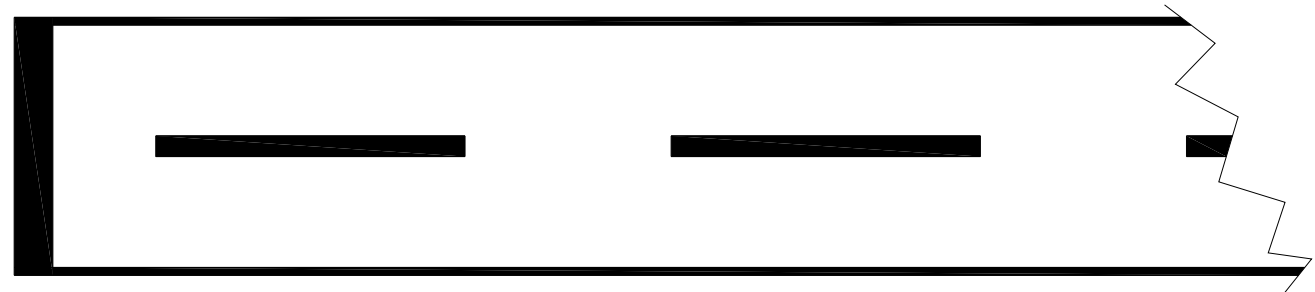


- ***“Tone Down” strategy***

- Based on 1960’s NATO procedures
- Reduced runway threshold markings
- Reduced runway holding position markings

- ***Benefits***

- One-size-fits-all
- Less paint
- Fewer questions



- ***Downfalls***

- Not sufficient for Instrumented Flight Rules (IFR) operations
- Confusion by joint service/commercial operators

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



The EAF Environment



- ***Most markings applied manually***
 - Inconsistent application quality
 - Only diesel fuel available
 - Lack of potable water for cleanup

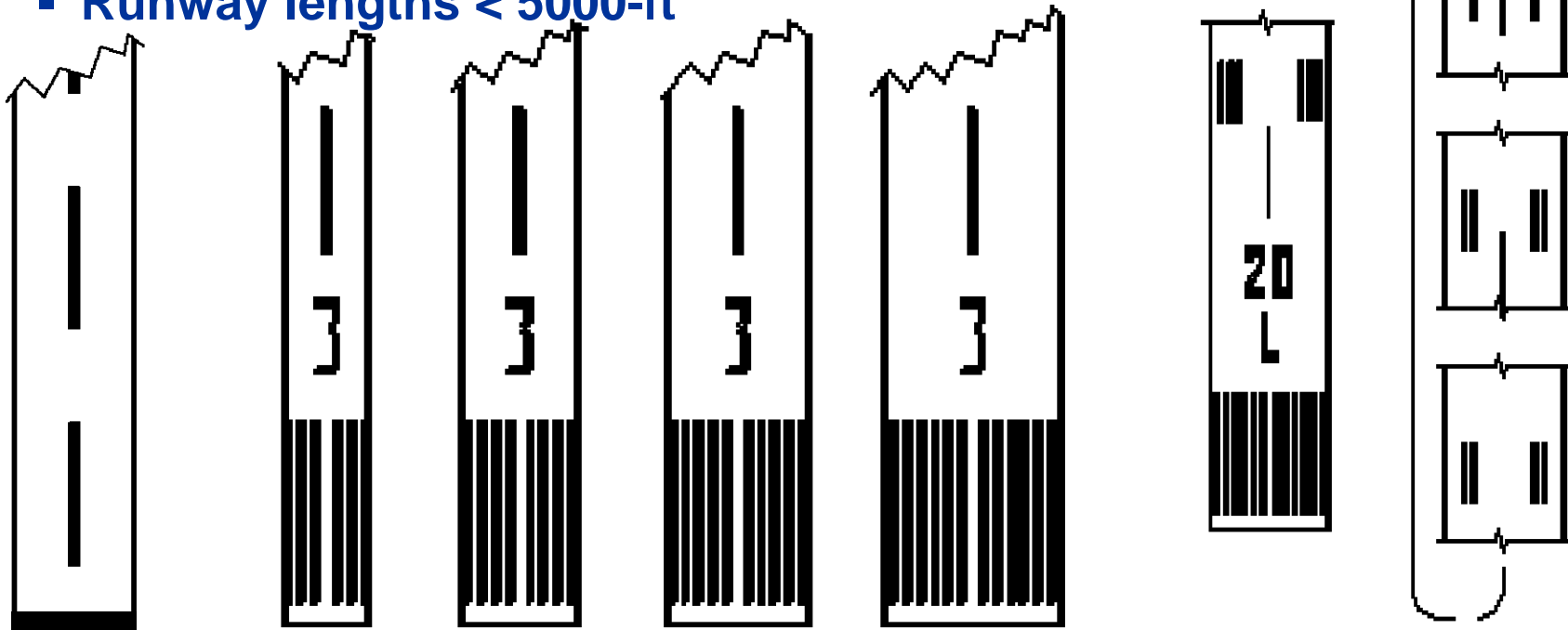




Accommodating Expanded IFR Markings



- ***Instrumented approaches***
 - Require more detailed markings
- ***Challenges***
 - Scaling for runway width < 100-ft
 - Runway lengths < 5000-ft





AV-8B Landing Gear and Short Fields



- ***Ship-style markings adopted***
 - Improved friction when wet
 - Proven configuration
 - Field experience





Parking Area Configuration Changes



- ***Marking configurations may change to support:***
 - Aircraft separation and/or ordnance clearances
 - As expanse grows
 - As type/model/series change and evolve





EAF Marking Durability



- ***Markings affected by:***
 - Petroleum-oil-lubricants
 - Vectored thrust exhaust
 - Surface material (non-porous)





Maintenance and Removal of Markings



- ***Exploring new technologies***

- ***Water-jet***

- **AM2 non-skid profile**

- ***Chemical***

- **Safety**
- **Effectiveness**

- ***Thermoplastics***

- **Adhesion**
- **Survivability**

- ***Lesser-duty paints***





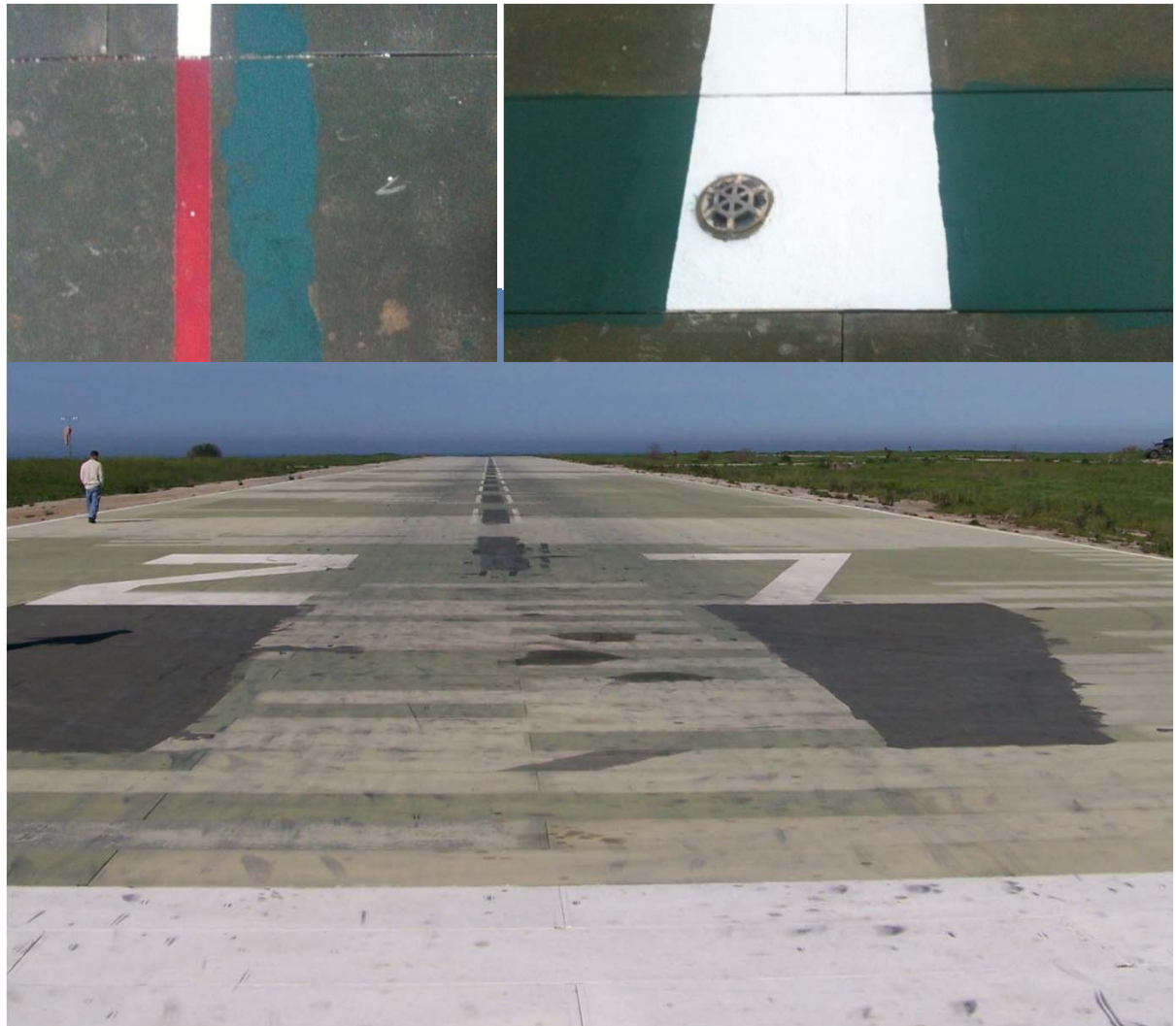
“Masking” Does Not Work

- **Color**

- Difficult to match shades in the field

- **Contrast**

- All of these masks will be visible under night vision devices





Unmanned Aerial Systems (UAS)



- ***Issue***

- Runways for UAS-only operations can be easily constructed of AM2 mat, but may not be capable of supporting manned aircraft

- ***Challenge***

- Deter manned aircraft from landing

- ***Approach***

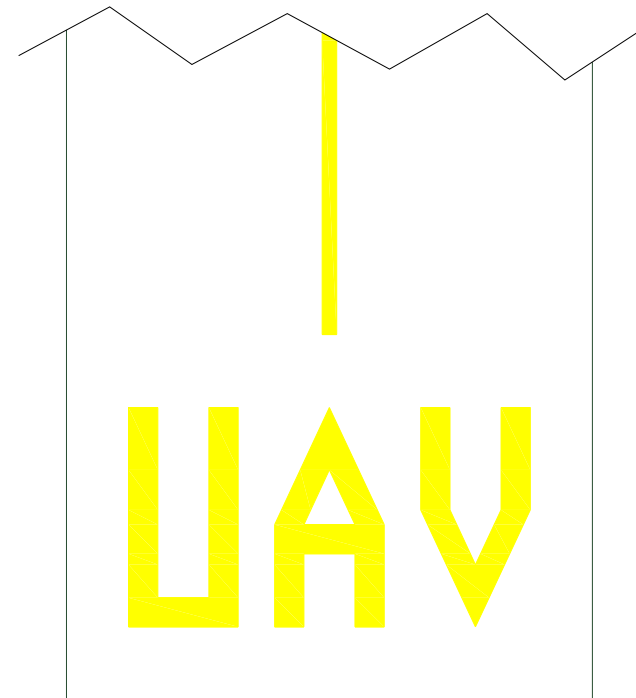
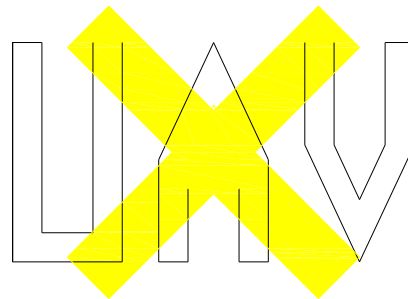
- Query other agencies and UAS operators
- Mimic NTSB taxiway recommendations
- Be *inconsistent* with “typical” runway markings
- Maintain cradle-to-grave oversight
(design-build-maintain-remove)



UAS-Only Runways



- **Solution**
 - Yellow
 - “UAV” at both thresholds
 - 6-in wide centerline
 - Accommodate closed facilities
 - “Living” criteria



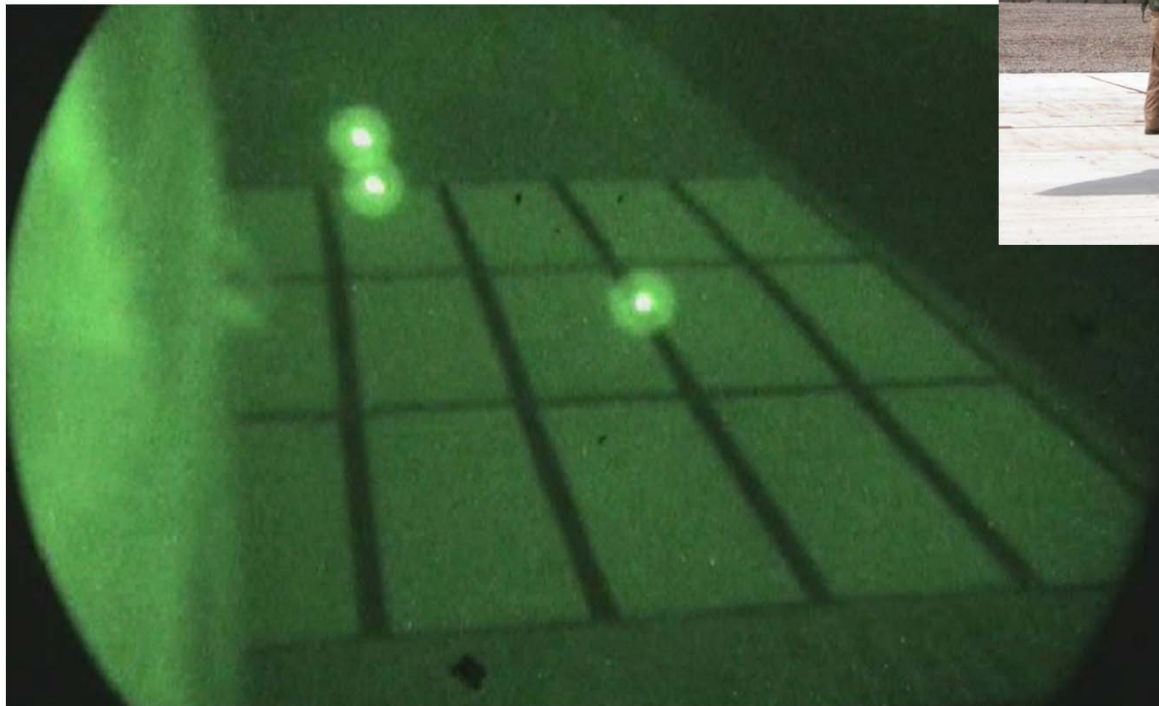
“It’s everybody else we are worried about landing there.”



Accommodating Synthetic Mat Surfaces



- ***Factory-applied borders***
 - Enhance daytime acquisition
 - Enhance night vision contrast
 - Provide position/drift reference





Recently Improved Guidance



■ **“Then”**

- Visual Flight Rules (VFR) runway

- Taxiway centerline

- Reduced hold-short

■ **“Now”**

- VFR runway
- IFR non-precision runway
- IFR precision runway
- UAS-only runway

- Taxiway centerline
- Taxiway designation
- Taxiway edge
- Non-operating area
- Myriad parking spots

- **“Compliant” hold-short**