

# **The Changing Character of Warfare: Defense Dominates the Battlespace**

Dr. T. X. Hammes  
Institute for National Strategic Studies  
National Defense University

# **The Key Rule of Military History**

## **Leave Mountain People Alone**

# Purpose

- What drives changes in character of warfare?
- What is driving change today?
- What forms will future conflict take?

**Underlying**  
**NATURE OF WAR**  
**does not change,**

**CHARACTER OF**  
**WARFARE**  
**changes continually**

# Key Question -

Why does the  
character of war  
evolve?

# Character of War Reflects Societies

- Economic
- Political
- Social
- Technical

**Technical is least important**

# Warfare is evolving

- Widespread agreement
- What it will be – continuing disagreement
- Three types of enemy
  - State, Insurgent, Terrorist
  - Crime is always present

# Emergent Capabilities

- Pervasive Surveillance
- Mass with precision
  - Drones/rockets/missiles with Task Specific AI
  - Advanced (3D) manufacturing
- C4ISR that can exploit both

**Tactical defense becoming dominant**



# **Pervasive Surveillance: Satellites and Drones**

# Pervasive Surveillance

- Visual/IR - 24 hours; Targeted – 10x/day
- SAR - Capella Space – 6 hours going to 15 mins
- EW – Hawkeye 360 - locate to 3 KM - every hour
- 100,000 small sats by 2030
- Cyber/Social Media – Continuous

## Change Detection Software

# Surveillance Drones

- Endurance from 15 minutes to days
- Range - 15 km to thousands of miles
- Sensors – EO, IR, SAR, radar, EW
- In Ukraine
  - Initially - intel and fire direction
  - Now – critical combined arms system
  - Both sides using 10,000s per month
  - Ukraine plans 4,000,000 drones in 2025

# **Mass with Precision**

## **Artillery, rockets, drones**

# Artillery/rockets/missiles



Swedish Archer 155 mm  
Range: 50 km  
Emplace, 3 rounds, displace  
72 seconds

Typhon  
Tomahawk 1500 km  
16 missiles/battery



HIMARS – PrSM  
800 km

Ares Cruise Missile  
\$300K  
Hundred of miles





- Harop – loitering munition
- **600 Miles** – 50 lbs
- VTOL
- Autonomous – Visual, IR, EMS
- Operational in over 10 nations



- C-130 w/ Cleaver
- **1,000 miles** – 250 lbs
- **4,000 miles** – 1,000 lbs
- JASSM-ER – **600 miles**
- Allied use too



- XQ-58A Valkyrie
- **3,000 miles** – 600 lbs
- VTOL
- \$2-5 million
- 5 variants

**450 Valkyries = 1 F-35A**



# Cheap Attack Drones



- PLA Sunflower
- 1,100 NM
- 90 lbs payload
- Autonomous
- Digital Scene Matching Area Correlator (DSMAC)

**13,500 Sunflowers = 1 F-35A**

# Ukrainian Attack Drones



- Homemade
- 10-15 km
- Anti-armor
- \$400
- Wire-guided



- Dragon
- Thermite
- 15 km



- Palyanitsa
- 45 lb warhead
- 430 miles
- \$1M

**4 million in 2025 – 12 Autonomous systems** 16



# Naval Surface Drones



- Ukraine – Magura V 2023
- 350 NM - 1,850 lbs
- 18 ft long
- \$273,000

- Saronic Corsair
- 1000 NM – 1,000 lbs
- 24 ft long
- Autonomous/swarming
- 100s in 2025

**3,600 Magura V = 1 Constellation class frigate**

# Uncrewed Underwater Vehicles



## Hugin (Norway)

- 2,000 KM
- Autonomous
- 3,400 meters



## Ghost Shark (Australia)

- Autonomous
- 3 years to develop

# Containerized Systems

## Platform Agnostic



**Missiles**



**ISR & Comms**



**Drones**



# 3D: Capability + Volume



2024

GPS independent

\$500

5 hr print; 2 assemble



# Before and After 3D printing – Space X



# Impact of Drones

- Nagorno-Karabakh - 70% of vehicle kills
- Ukraine – Russian vehicles destroyed
  - Summer of 2023
    - 42% of tanks
    - 39% of IFV
  - Early 2024 – 90% of vehicle kills
- Long-range strike – out to 2000 km
  - 17% of Russian Gasoline refining
  - Russian AF retreated

# **Countering Mass?**

## **Auto-cannons and Directed Energy Weapons**

# Auto-cannons

- Advantage
  - Speed
  - Accuracy

## Gephard 35mm



## CIWS 20mm

- Disadvantage
  - Range
  - Magazine capacity



# Directed Energy: Lasers and Microwave

- Advantage to land-based defense
  - Massive power generation advantage
  - Concealment
- Weakness
  - Lasers - smoke, haze, reflective coatings
  - Microwave – Faraday cages; hardened electronics

# **C4I:** **Exploit advances**

# C4I - Ukraine

## Demonstrated capability

- Delta – decision support/sit awareness
  - Based on Diya
  - Runs on any platform
  - Routed through Starlink
  - AI assisted – Palantir
  - Inputs from sats, radars, sensors, phones
- Much more than “Uber for fires”
  - Unit to national communications package

# C4I

## ● Israel

- Lavender – 37,000 people
- The Gospel – 20,000 buildings
- Where's daddy – active tracking

## ● United States

- Army – Project Convergence
- Navy – Project Overmatch
- Air Force – Advanced Battle Management System
- Joint Fires Network – deep strike weapons

# **Tactical Impacts:** **C4I, Pervasive Surveillance, and** **Mass w/ Precision**

# Irregular War

- Long-range precision strike; swarms
- Convergence favors non-state actors
  - Little infrastructure to protect
  - Weak drone/missile defense
  - State infrastructure vulnerable
  - Defense of logistics – civil and military
- Powerful role for outside sponsors
- Old tech still works



Oklahoma City  
1995 3 tons



Beirut Port  
2020  
1.1 Kilotons

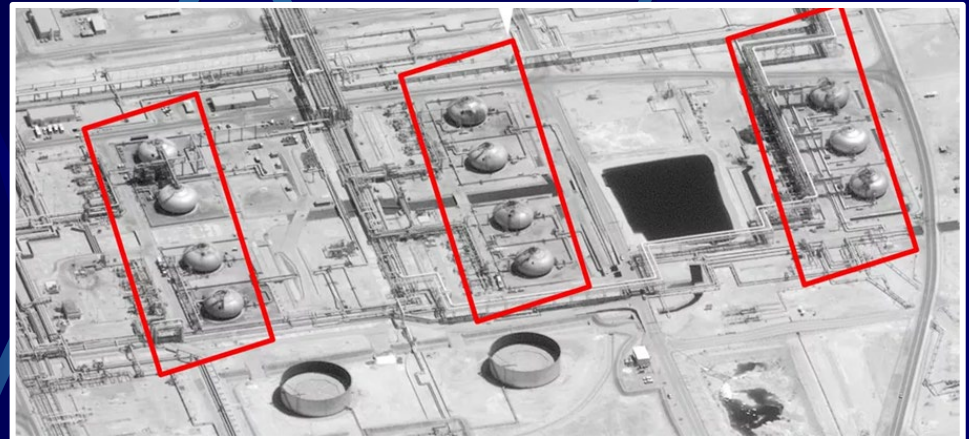


Ukrainian  
Ammunition Depots  
250,000 tons

**Bring the detonator**



# Houthi attacks





# Ground Domain

- Defense becomes dominant
  - Signature minimized – organic ISR
  - Attackers move and converge
- Numbers are essential
- Dispersed commercial containers/pods
  - Independent or networked firing batteries
  - Range allows massing fires from distance

**Can you maneuver with 1,000 hunters overhead?**

# Sea Domain

- Land defense dominant to increasing ranges – concealment/magazine depth
  - Confined seas mutual denied areas
  - Choke points closed – mines, missiles, drones
- Small states/insurgents challenge navies
- Weapons not platforms
  - Any ship can kill any other ship
  - # ship killers = # ships with containers

# US carriers out of action



USS Oriskany – 1966  
5 months



USS Enterprise -1966  
51 days



USS Forrestal – 1967  
9 months

**Ford CV + Air Wing = 175 Missile Merchants + 7,000 missiles**

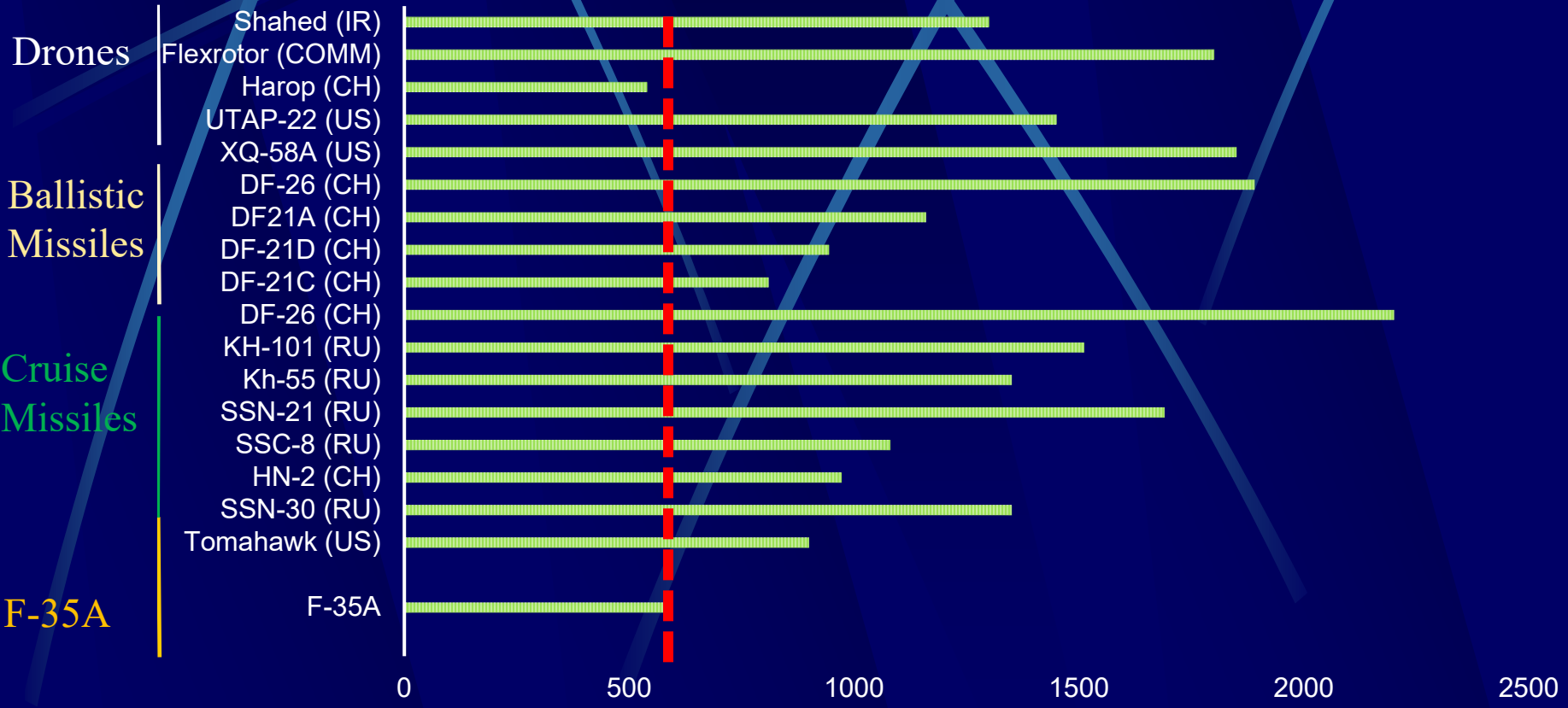
# Air Domain

- Weapons not platforms
- Fixed bases become untenable
- Evolved cruise missiles and drones take over many missions
- With right weapons, mobile air defense denies airspace

**Are manned aircraft range obsolete?**

# F-35A vs Missiles/Drones

## Operational Range in Nautical Miles



# Space Domain

- Heavily congested and contested
- Everyone has access to space
  - Surveillance, Communications, Attack
- Rapid space replacement evolving
  - Commercial space, drones, balloons
- Key issue = PNT for civilians

# Cyber Domain

- Nodes vulnerable to precision strike
- Conventional wisdom – offense dominated
  - Ukraine shows the opposite
- Historical precedence
  - Espionage
  - Theft
  - Destructive attacks



# Conventional – Electromagnetic

- The critical domain??
- Contested by combined arms
- Russia claims 90% of drone kills are EW
- China – SSF
- Driving long-range precision to GPS independent autonomy



# Transition pattern

- Historical pattern – takes time
- Helper – Partner – Replacement
- Pike to musket; battleship to carrier
- Manned A/C to cruise missiles/drones
  - Helper – Gulf War I – IADS suppression
  - Partner – Gulf War II/Afghanistan
  - Replacement –
    - Strike vs heavily defended
    - Long-endurance missions

# Operational Implications

- Connected C2 critical
- Defense dominates air, sea, land domains
- Space and electromagnetic contested
- Cyber uncertain
- Power projection much more costly

# Strategic Implications

- Major Allied advantage in Europe/Asia
  - Geography favors the defense
- Smaller states/non-states deny major powers
- Greater allied contributions
- Mass production returns
- National mobilization required

# Big Questions

- Should joint operating concepts focus on defense?
- Are we buying the wrong stuff?
- Production for long wars?
- Implications for joint/combined forces?

# The entire history the Marine Corps summed up



I was extremely drunk that day.



# Contact Information

txhammes1@gmail.com



<https://www.youtube.com/watch?v=kifaWlUahps>

<https://www.youtube.com/watch?v=j5K4bzaQEEg>

# Air Domain

## Cost/Benefit Analysis

- Sunflower Autonomous - \$100,000
- Harop Loitering Munition - \$350,000
- XQ-58A Valkyrie = \$3,000,000
- F-35A costs per aircraft
  - Purchase + O & M = \$450,000,000
  - 1 F35A = 150 Valkyries or 1,200 Harops or 4,500 Sunflowers
- Actually 3 times that number for FMC