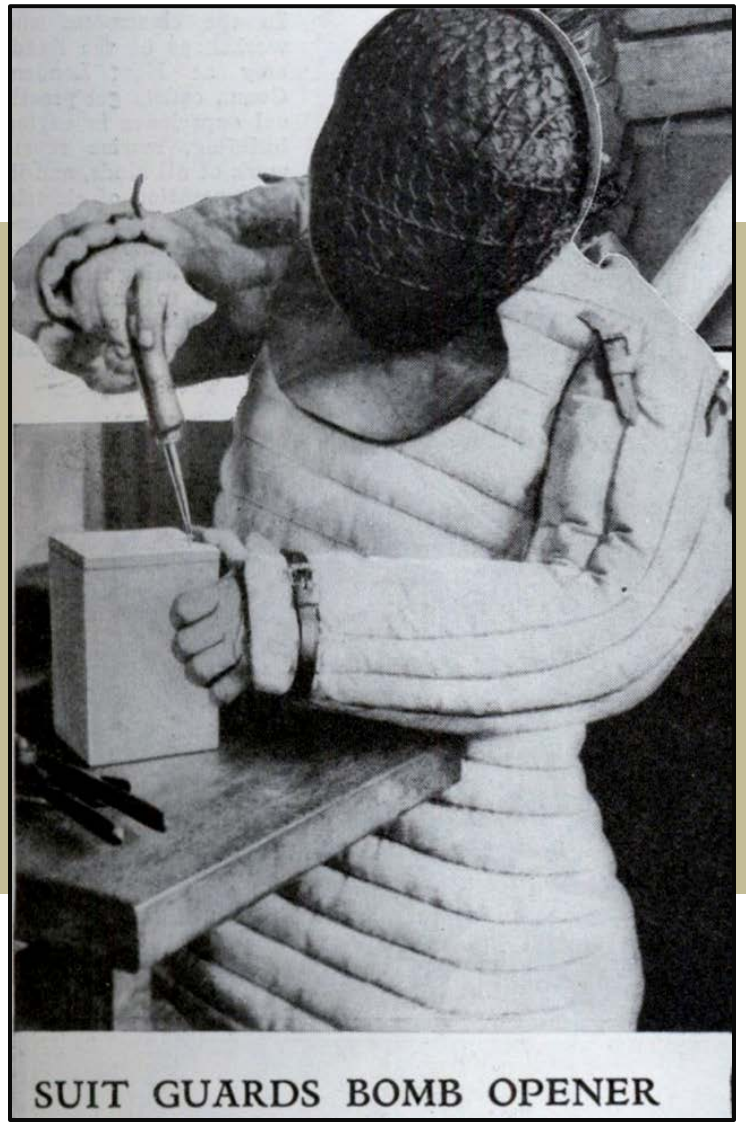
Global EOD Symposium & Exhibition

Technology and Training Enablers for EOD 2025

Capt. Vincent Martinez, USN
DOD Deputy Manager, EOD Technology
Commanding Officer, NSWC Indian Head EOD Technology Division

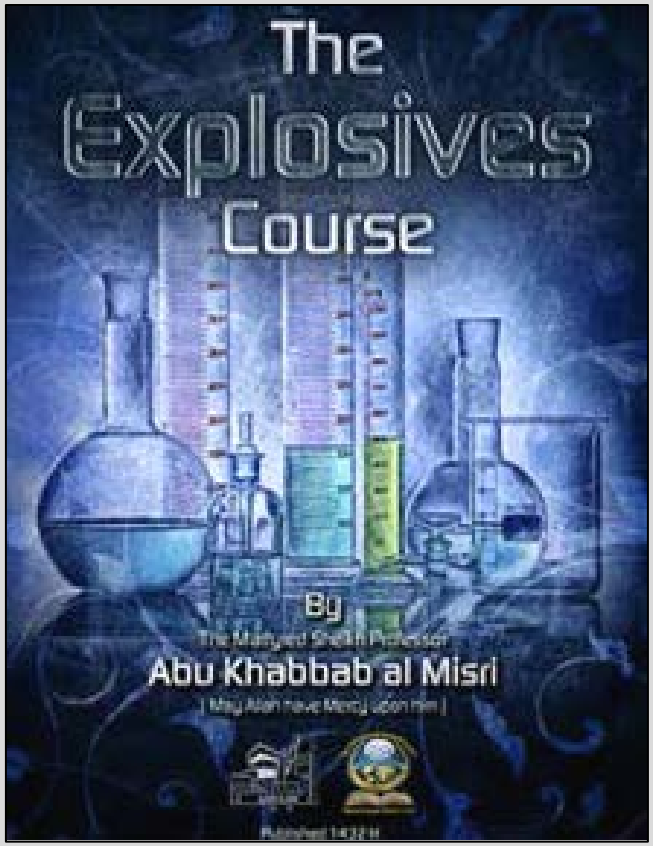
Past – Tools were the Technology



SUIT GUARDS BOMB OPENER

Today – Technology are the Tools

Al-Qaeda bomb manual published on the internet



Today's advanced EOD technology serves as our primary tool

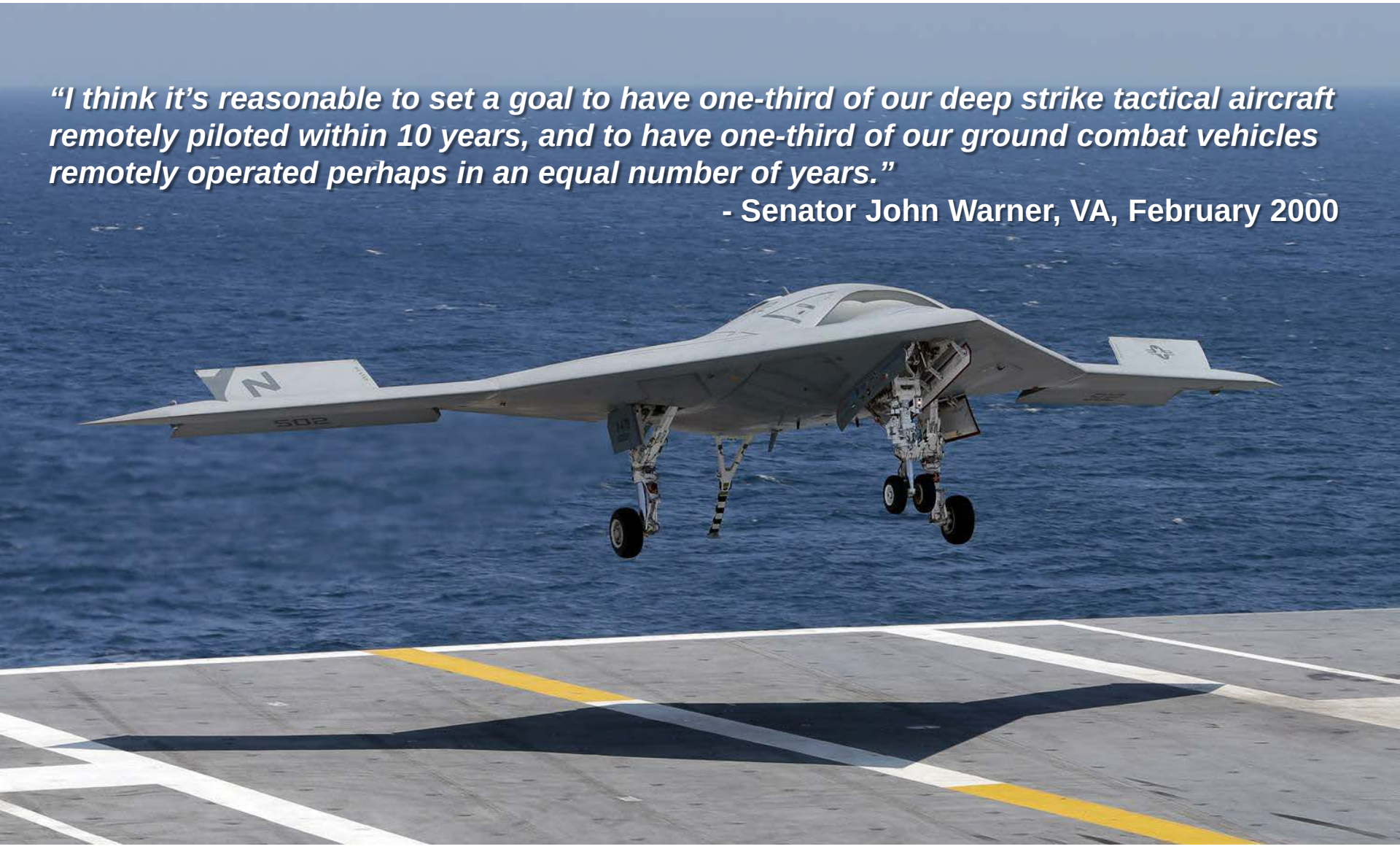
The Cost

Why We Are Here?

Current and Emerging Situations

- **Enemies exploiting commercial technology at break-neck speed**
- **January 2015 - ISIS'S budget at $2B AND surplus of $250M "diverted towards their war effort"**
- **Unmanned platforms: quintessential weapons of our age?**
- **Cyber and Information Technology: current AND future threat**
- **Proliferation of WMD**
- **Multiple fronts: peer competitors, asymmetric and terrorism**

Predicting the Future



"I think it's reasonable to set a goal to have one-third of our deep strike tactical aircraft remotely piloted within 10 years, and to have one-third of our ground combat vehicles remotely operated perhaps in an equal number of years."

- Senator John Warner, VA, February 2000

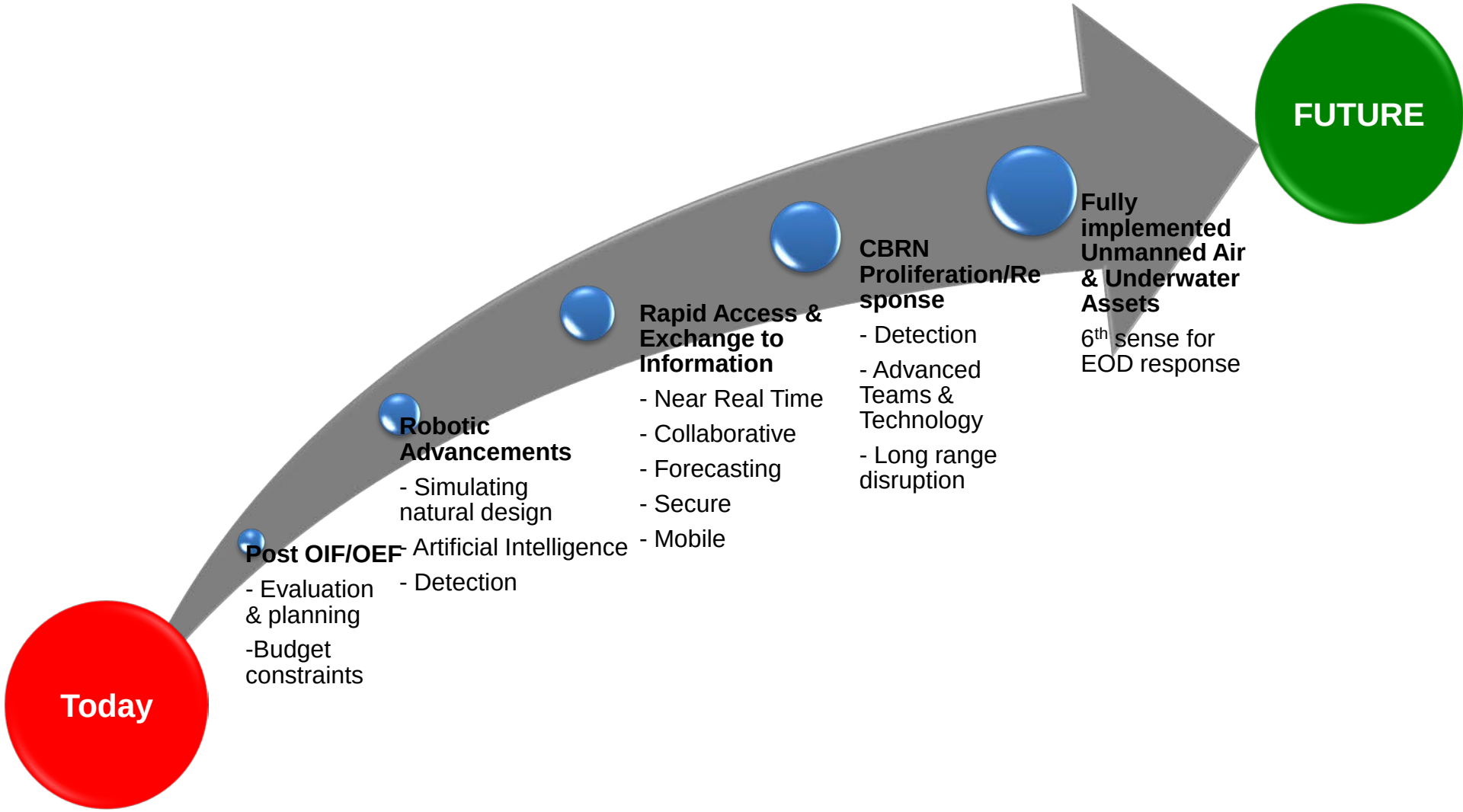
Assumptions

- **Irregular warfare threat continues to evolve**
- **Early, Accurate Detection capabilities critical**
- **Need to be immersed in productive intelligence and information channels to obtain prediction and forecasting advancements**
- **Warfighter requires collaborative atmosphere from allies, inter-agencies, industry and academia to meet demands quickly**
- **EOD Forces shall respond and conduct RSPs to unmanned threats through autonomous technologies.**
- **Operating environment is dynamic, fast and getting faster**

Operational Environment

ARTIC
URBAN
CHEM / BIO
WATERWAYS
JUNGLE
DESERT
SMOKE / FOG
NIGHT
ALITUTDE
POPULATED
REMOTE
EXPEDITIONARY

Progression Towards 2025



USER CENTERED FOCUS FOR REQUIRMENTS GENERATION

Innovation Challenges

Battery technology

- One type, size for majority of equipment
- Modular with ability to add-on for increase power usage
- Charge within system or equipment
- Charge while gear, equipment, and personnel are moving or being carried
- Reduce maintenance

Study to understand the user's task

- Identify, reduce mundane task
- Eliminate burden, stress and basic planning

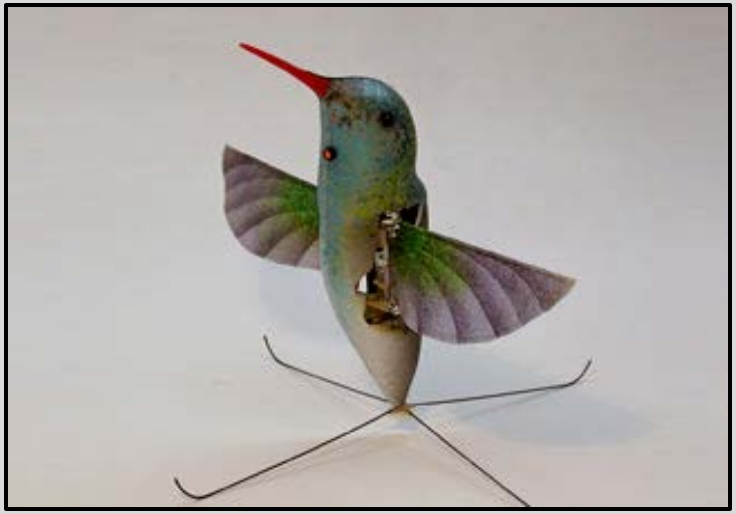
Hands-free technology across the spectrum of mission tasks

Human Body Management: materials & uniforms that can operate in Cold / Hot-Humid / Altitude and transition from water to land unencumbered

Long Range Disruption

- Kinetic / Non-kinetic
- Non-observable and attribution

Innovation Challenges



Self-Aware (AI) Robots

- Item Recognition Capability
- Jam, Track and Locate Signals
- Disruption

Multi-modal sensors

- Detection: EXPL, CHEM/BIO, Unintended Emissions

"The rapid advancements in prosthetics will migrate over to next generation robotic platforms."

– Regina Dugan
former Director of DARPA
TED Talk, March 2012

Regina Dugan: From Mach-20 glider to hummingbird drone – TED.com

Helmet Innovation Challenges

- **Intelligent Optics**
  - Optics that encompass:
    - FLIR, Night Vision, Zoom - IN/OUT
  - Integrated Communications
    - Voice activated
  - Item / Ordnance Recognition
  - Diagnostics
- **Lightweight**
- **Full face and head protection**

Lessons Learned from Traumatic Brain Injuries (TBI)

Suit Innovation Challenges

PRESENT

NEAR-TERM

FUTURE

Protective suit enhancements

- Provide increased user maneuverability
- Modular, multi-equipment compatible
- Armored
- CREW (Jammer) incorporated
- COMM and CREW antennas
- Diagnostics
- Increases human strength

PROTECTION ~ STRENGTH ~ MODULAR

Underwater Innovation Challenges

UUV Technology

- Post Mission Analysis (PMA) takes too long
- Need data analysis during platforms mission
- Need ability to pass pertinent data through water during mission
- Artificial intelligence to make decisions = mine like or not
- Send data, receive new mission guidance.
- Low visibility capability on surface
- Extended range, duration

Underwater Breathing Apparatus

- Extended dive profiles
- Less weight, reduce profile, lower signatures
- Ability to replenish fluids (drink)
- O2 sensors – smaller more reliable
- Digital, low maintenance
- CO2 scrubber technology

EOD Information Innovation

EOD Operator Mobility and Data

- User needs to have ability to move
- Data must be mobile, accessible

Automate EOD publication, information systems

- PUSH data to users in the field
- "You-tube" like videos on procedures
- "Point of Execution" right data to individual and share to other operators – DoD CIO

Voice recognition for searching EOD databases

Ordnance / Item recognition linked to database and hands-free equipment

"Wi-Fi is our biggest growth (area) for the DoD in terms of moving data," –DoD CIO

CITE Designation

1. Center of Industrial and Technical Excellence (CITE) designation grants authority to enter into Public / Private Partnerships in areas of core competencies where capacity exist:

- Title 10, USC, Section 2474
- Designated by SECNAV, 1 May 2014

2. NSWC IHEODTD's Core Competencies

Energetics; Ordnance; Naval gun systems; **Explosive Ordnance Disposal (EOD) technologies**; Ordnance PHS&T [packaging, handling, storage and transportation]; and **the technical expertise required to acquire, maintain and sustain these systems.**

3. Partners can have IHEODTD perform work, team to perform work or arrange to use facilities and equipment under our safety and security protocols.

KEEP THEM OFF THE WALL

"The rapid disposal of unexploded bombs is of the highest importance. The work of the Bomb Disposal Squads must be facilitated by the provision of every kind of up-to-date ***training and equipment****."*

- **Sir Winston Churchill, September 1940**