

Emerging Technologies for National Defense

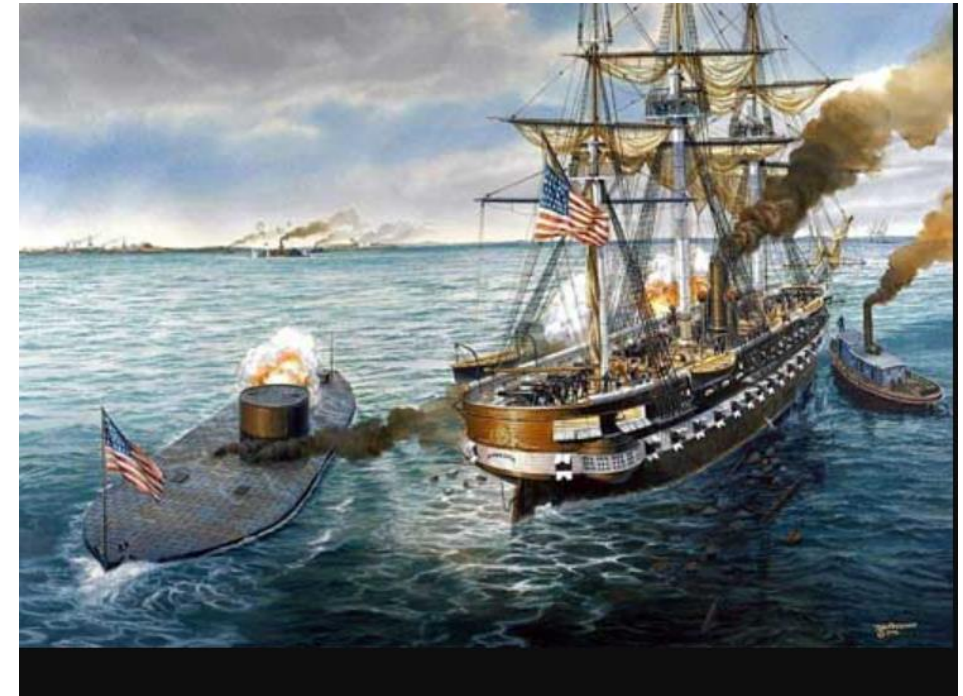
Dr. Mark Lewis

Executive Director

NDIA Emerging Technologies Institute

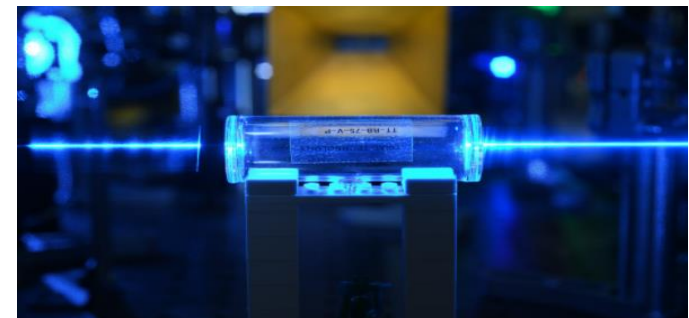
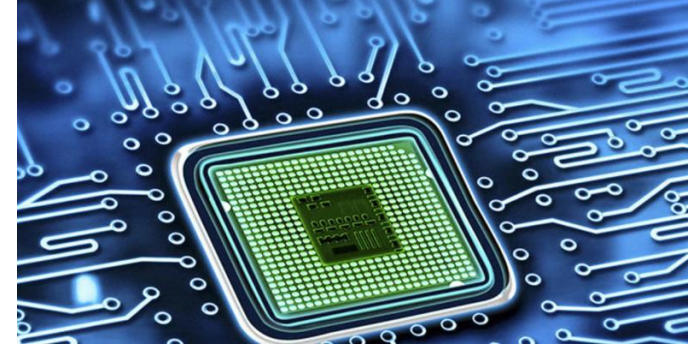
Lessons from History

- ***The American way of war relies on technological superiority***
 - *Early Navy frigates*
 - *Ironclads*
 - *Stealth*
 - *Precision munitions*
 - *Space*
- ***We have missed technological advances***
 - *Pre WWI aviation*
 - *Radar*
 - *Gas turbines*
 - *Rockets*
- ***Success in future warfare will depend on the implementation of a range of technologies***



Modernization Priorities

- ***Underlying capabilities***
 - *Microelectronics*
 - *Autonomy/AI/Cyber*
 - *FNC3*
- ***Delivered Effects***
 - *Space*
 - *Directed Energy*
 - *Hypersonics*
- ***Future Promise***
 - *Quantum*
 - *Biotechnology*



- **NDIA's ETI is a non-partisan institute focused on technologies that are critical to the future of national defense.**
 - **ETI has been established to provide research and analyses, as well as to convene open discussion and engage with national leaders, to inform the development and integration of emerging technologies into the defense industrial base.**
 - **ETI has been created as an entity within the NDIA governance structure. This allows ETI to conduct independent objective research while leveraging the experience and knowledge of NDIA's chapters, divisions, members, and partners.**
- **NDIA it is uniquely positioned to sponsor ETI. With an unparalleled ability to convene stakeholders and partners, ETI will build on NDIA's infrastructure, translating emerging technologies into concrete capabilities.**

ETI Fills a Much-needed Niche for Multiple Constituencies

- **For government decision makers**
 - An unmatched source of objective information on critical defense technologies
 - Connectivity to the defense industrial base through the membership and resources of NDIA
- **For NDIA members and partners**
 - A forum to be heard on key industrial base issues, to influence and set the national agenda
 - Credibility in tackling technology development and acquisition challenges
 - Opportunities to interact with NDIA-driven research teams to build collaborations
 - A window into academic partners working at the cutting edge of critical technology development
- **For the Nation as a whole**
 - A voice addressing fundamental threats to the future of national security, focused on outmatching peer competitors and adversaries
 - Highlighting the defense industrial base as it relates to innovation and technology investment for the country as a whole

- **Establish an in-house research team (full- and part-time) with expertise in select emerging defense technologies and related policy**
 - From the 2018 NDS: AI, autonomy, biotech, cyber, directed energy, FNC3, hypersonics, microelectronics, quantum, space, 5G
 - Other issues: barriers to entry, innovation, bridging the “valley of death,” etc.
- **Build teams of experts from industry and academia to tackle defense technology issues**
- **Produce high-quality reports that will meet the needs of government and industry decision makers**
- **Convene panels, workshops, and other forums for the discussion of emerging technology issues**
- **Meet directly with key stakeholders to present findings and results, as well as use latest tools to engage the broader community**
- **Mentor early career scholars on defense technology issues**

Initial Research Focus Areas

- **Hypersonics**
 - Airbreathing vs. boost-glide
 - Delivery at scale
 - Countering recent (bad) utility studies
- **Microelectronics**
 - Onshoring
 - Getting DOD on the commercial curve
 - Rad-hard
 - Legacy buys and split fab
- **Directed Energy**
 - Delivering from lab to programs of record
 - Remaining technical challenges
 - Industrial base
- **Biotechnology**
 - Role in the industrial base
 - Manufacturing
- **Other Targets of Opportunity**

Challenges

- **Acquisition timelines**
- **The acquisition valley (actually, mountain) of death**
- **Legacy vs new**
- **Industrial Base vulnerabilities**
- **Test and Evaluation**
- **Workforce**
- **Bad ideas**
- **Responding to adversaries without more harm than good**

