



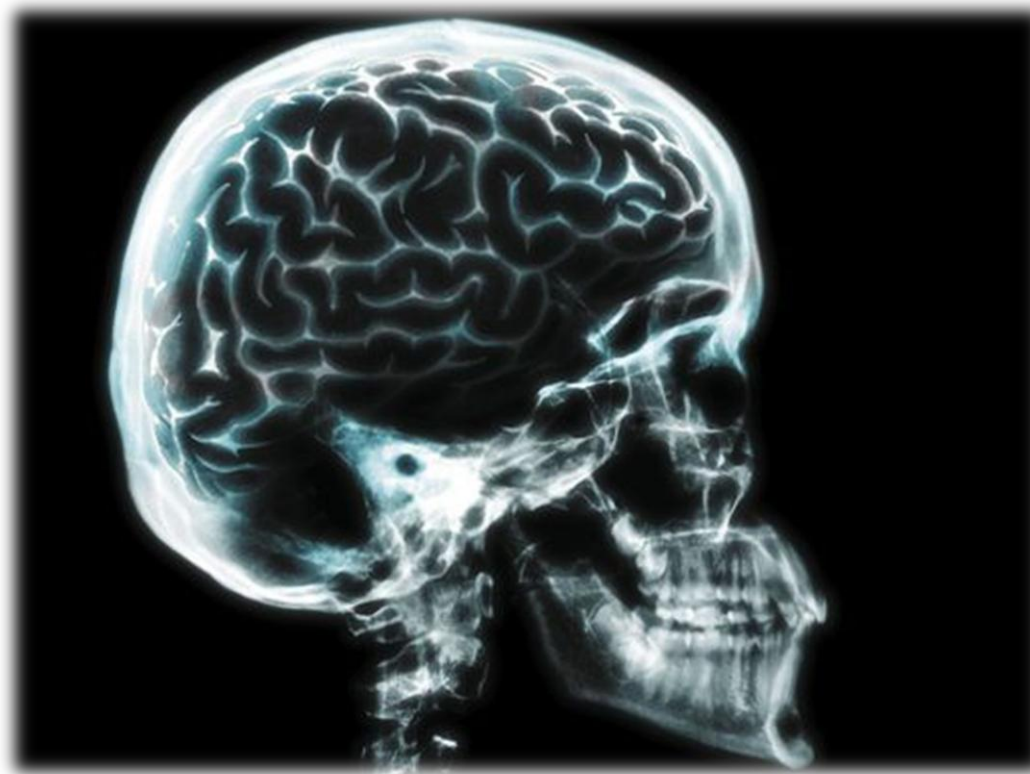
# Science, Technology, and National Security Strategy: The Role of the War Colleges

NDIA – Human Systems Conference, 10 February, 2016

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# DARPA's Neural Engineering System Design (NESD) project – a neural interface between the brain and the digital world.



(Photo: Getty Images/Digital Vision)



## **Our Question:**

What is needed to develop strategic thinkers that understand the impacts that emerging sciences and technologies (S&T) will have, not only on national security strategy, but also on the construction of the Future Force?

Some thoughts from senior Defense leaders...



*“...learning machines, human-machine collaboration, assisted human operations, human-machine combat teaming, and autonomous weapons. Those are the five components [of the Third Offset], and they're going to ride on the back of a learning network.”* – Bob Work, Deputy Secretary of Defense



*“There are significant technologies...that are clearly going to change not the nature of war, but they’re probably going to deeply change the character of war.”* – General Mark Milley,  
Chief of Staff of the U.S. Army

*“The environment of the future is going to be more networked in the way we approach the future of joint warfare and how we fit into the joint team.”* – General David Goldfein, Vice Chief of  
Staff of the U.S. Air Force



*“... do the technologies that are being developed in the commercial sector principally provide the kind of force multiplier that we had when we combined tactical nuclear weapons with fielded formations or precision and stealth with fielded formations?”* – General Paul Selva, Vice Chairman of the Joint Chiefs of Staff



*“We need chess players who can operate in a multi-dimensional environment with multiple activities taking place simultaneously, on a board where they may not fully understand the rules by which our adversaries are playing.”* – Admiral Cecil Haney, Commander of U.S. Strategic Command



# Emerging sciences and technologies that may shape strategic thinking in...

- 2016-2020: Swarm robotics, nano-satellites, virtual reality, 3D printing, advanced navigation in GPS-denied settings;
- 2021-2025: Human-machine combat teaming, directed energy weapons, hypervelocity projectiles, medical advances;
- 2026-2050: Neural interfaces, regenerative materials, alternative power sources, autonomous decision-making.





## **Recommendations Involving New Resource Arrangements:**

1. Using existing complementary organizations or research centers within the war colleges as an S&T resource;
2. Encouraging regional partnerships between war colleges and centers of research in both the public and private sector;
3. Creating a “chief innovator” position within a war college president’s office.



## **Recommendations Involving Methods of Instruction:**

1. Annual series of lectures from nationally recognized technology leaders;
2. Offering strategic S&T electives, and student-faculty projects;
3. Including strategic innovation during war-gaming exercises;
4. Creating a self-selected, post-graduate program that focuses specifically on strategic thinking for innovation.



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