

# New Trends in Conducting Military Operations and Tasks for the Academia

COL. JAN MAZAL, PH.D.

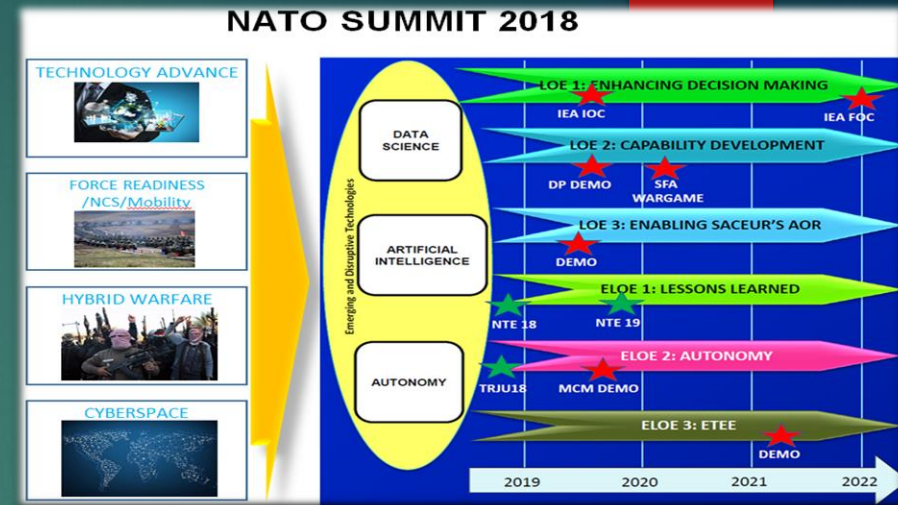
Department of Military Robotics  
Faculty of Military Technologies  
University of Defence



# Introduction

Unpredictable security environment evolvment leads to high demands on Defence efficiency and readiness, it leads to the search for innovative approaches in all dimensions of the operational environment.

Current developments show that the nature of future conflicts will be significantly different from the combats we know today and technology with advanced decision-making approaches will play a crucial role.



**Figure 3. Value of Autonomy to DOD Missions**

		<i>Relative Value of Autonomy</i>	<i>Examples</i>
LOW	Required Decision Speed	HIGH	Cyber Operations Missile Defense
LOW	Heterogeneity & Volume of Data	HIGH	IMINT Data Analysis ISR Data Integration
HIGH	Quality of Data Links	INTERMITTENT	Contested Communication Unmanned Undersea Ops
SIMPLE	Complexity of Action	COMPLEX	Air Operations Center Multi-Mission Operations
LOW	Danger of Mission	HIGH	Contested Operations CBRN Attack Clean-Up
LOW	Persistence and Endurance	HIGH	Unmanned Vehicles Surveillance

**Source:** Defense Science Board, "Summer Study on Autonomy," June 9, 2016, p. 12, <https://www.acq.osd.mil/dsb/reports/2010s/DSBSS15.pdf>.

# Ray Kurzweil prognosis... path to Singularity

## 1 The accelerating pace of change ...



## 2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

### COMPUTER RANKINGS

By calculations per second per \$1,000



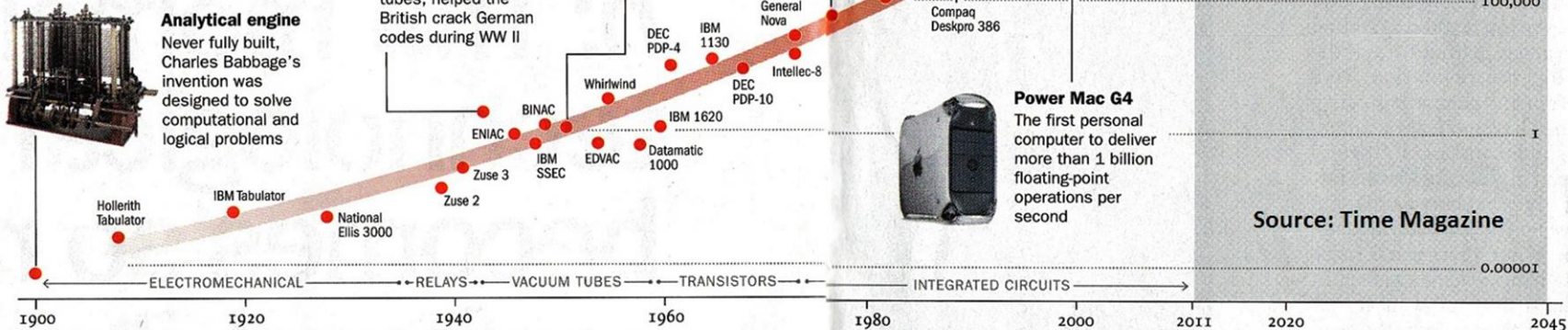
**Analytical engine**  
Never fully built, Charles Babbage's invention was designed to solve computational and logical problems



**Colossus**  
The electronic computer, with 1,500 vacuum tubes, helped the British crack German codes during WW II



**UNIVAC I**  
The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



Zdroj: Time Magazine

## 3 ... will lead to the Singularity



**Apple II**  
At a price of \$1,298, the compact machine was one of the first massively popular personal computers



**Power Mac G4**  
The first personal computer to deliver more than 1 billion floating-point operations per second

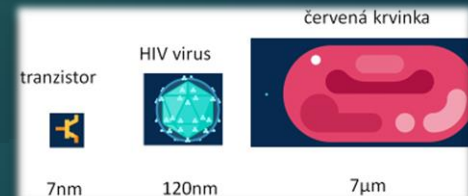
2045  
Surpasses brainpower equivalent to that of all human brains combined

Surpasses brainpower of human in 2023

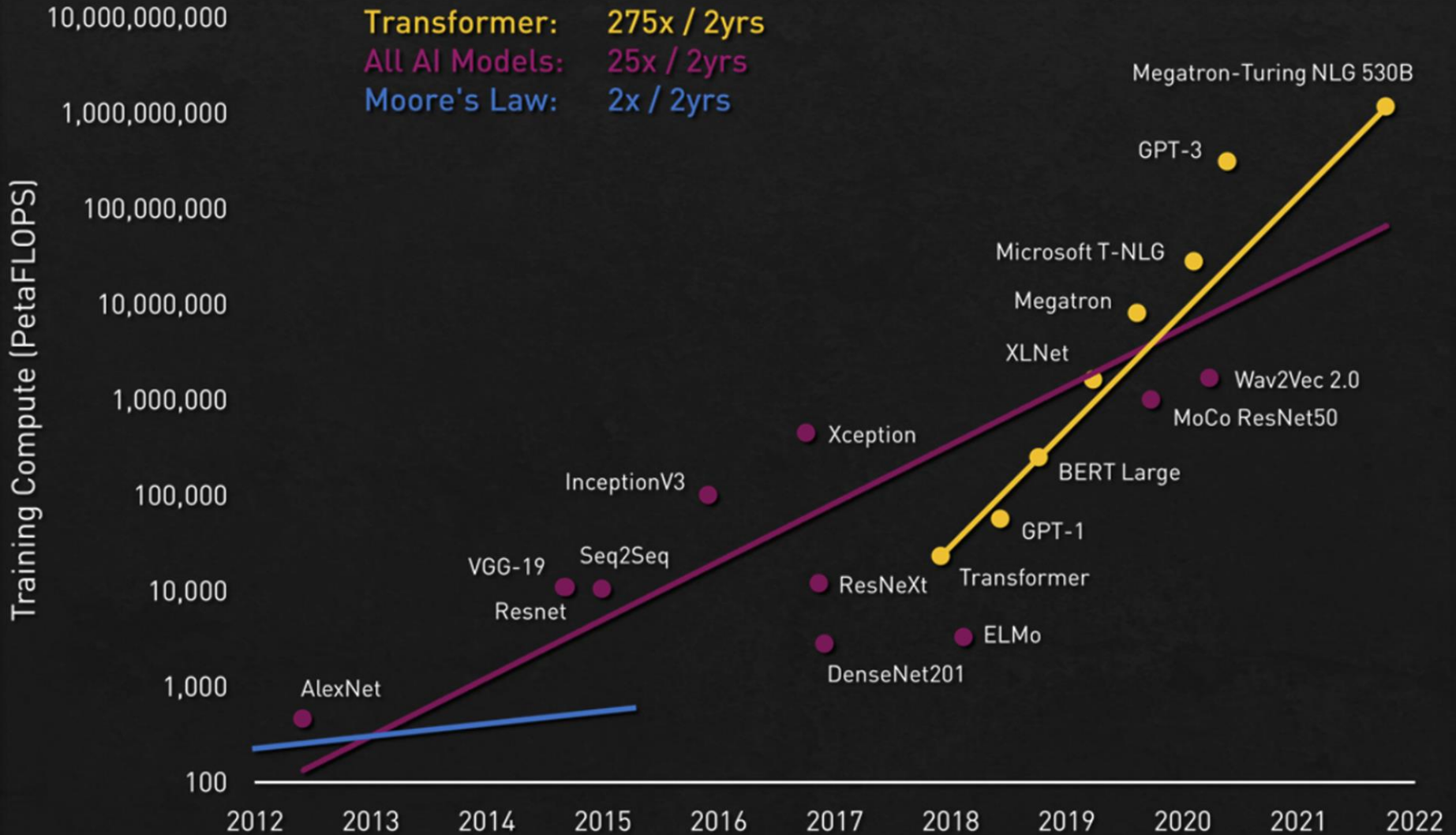


Surpasses brainpower of mouse in 2015

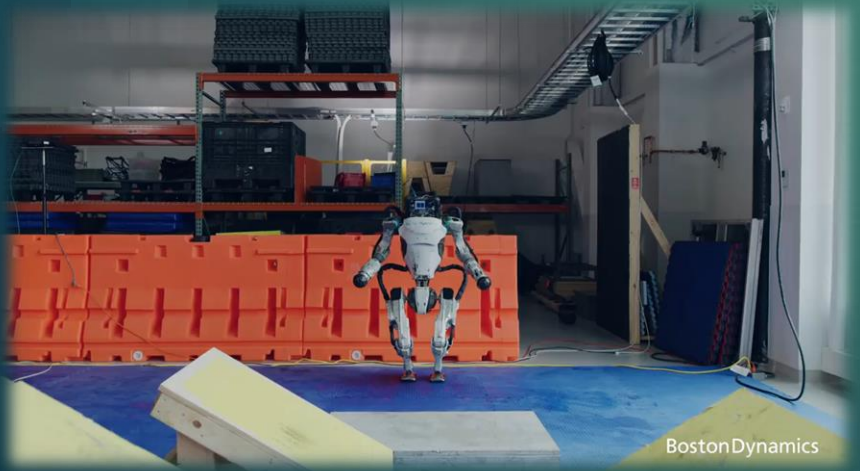
<https://www.medicaldesignandoutsourcing.com/futurist-ray-kurzweil-predicts-printed-organs-nanorobots-connecting-brains-computers-cloud/>



# Trends in artificial intelligence complexity and performance



# Development trends in military robots



# Proposed conclusions

- ▶ Increased dynamics of future conflicts will impact an MDMP, which needs to be modified or enriched with new tools and technology, which could affect military education, training and exercise.
- ▶ The rapid evolvement of AI and other EDTs leads to a need for a deeper understanding of this technology and potential risks or applications in the military. This activates pressure to reconsider the military university study programs to fulfill this requirement.
- ▶ Complexity of the technology evolvement tracking and understanding leads to a trend of internationalization and cooperation within study programs to share or effectively distribute the (SOA) knowledge, experience, and expertise
- ▶ Building trust in technology is important to effectively employ complex military systems in operations
- ▶ Respecting an ethical issue is important to shape the military culture and respect within broader social context.
- ▶ Understanding roles and functions of humans and technological components in future operations will help to select proper competency requirements for military personnel.