Technology and The Future Fight

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All opinions herein are Jon's, not the DODs, Lincoln Laboratory's or MIT's

Discussion Goal

What might the future world-state look like?	How does technology evolve and what could this mean for the future?	What could this mean for you as leaders?

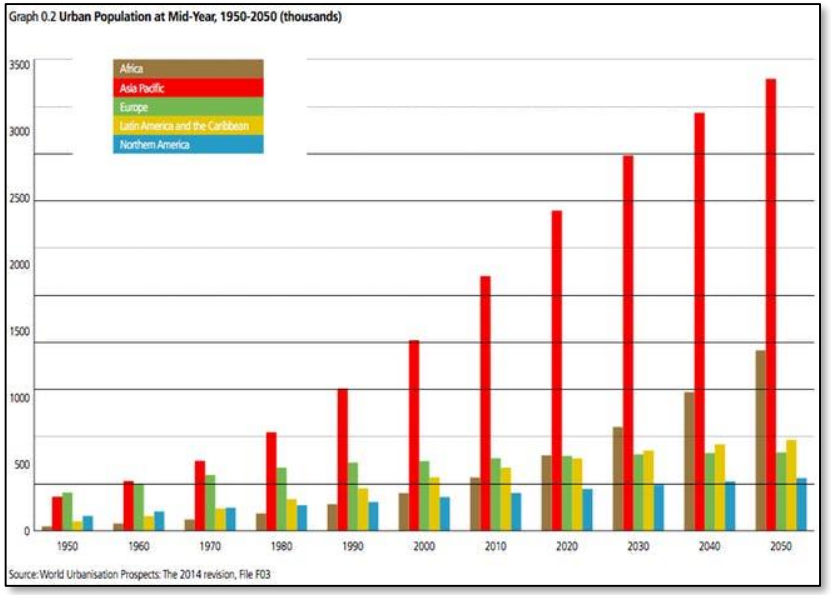
Roughly 2025-2050

The battlefield will evolve and understanding concurrent technology evolution will avoid surprise and enable better planning

World Pressures (1 of 2)

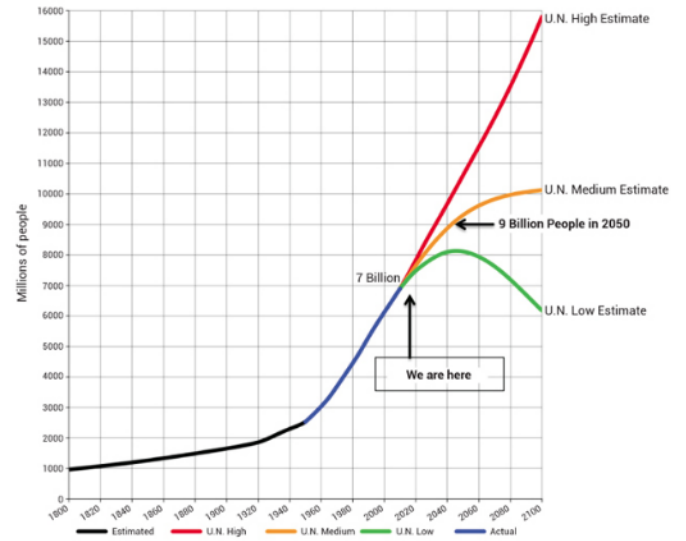
Megacities

- 33 Now
- 39 by 2030



Population growth

- 7 billion now
- 9.5 billion in 2050
- Need twice as much food

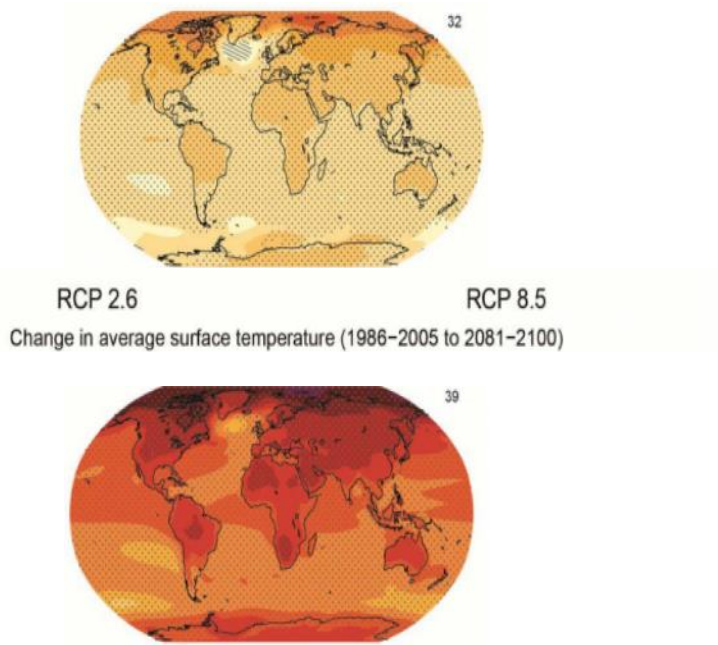


ure 11. U.N. projections of human population growth to 2100.

World Pressures (2 of 2)

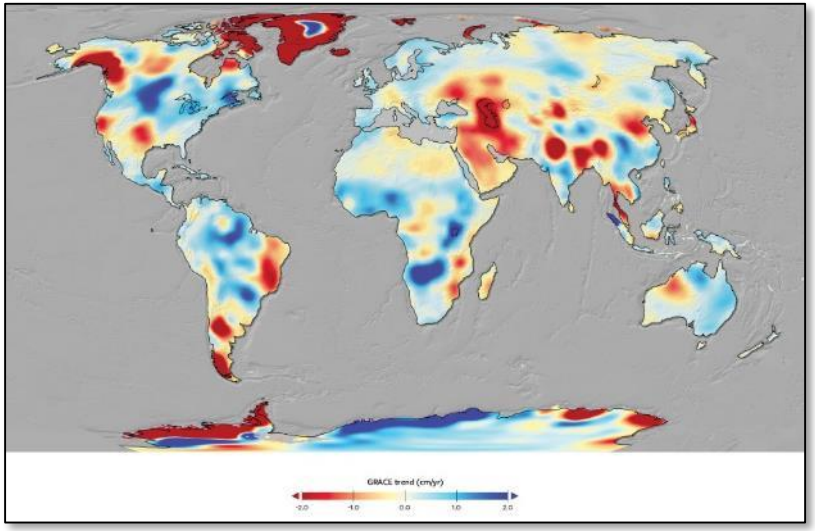
Climate change

- Some parts of the inhabited world dangerous to human life



Resource scarcity

- 2 billion lack safe water now
- 2025 up to half the world population



Battlefields of the Future

Information

Cyber (of course)

Economic

Automated Kinetic

Human Kinetic

Non-kinetic warfare enduring and pervasive

Future Operational Environment

Always a multi-domain fight

Enormous amounts of data

Even more connectivity

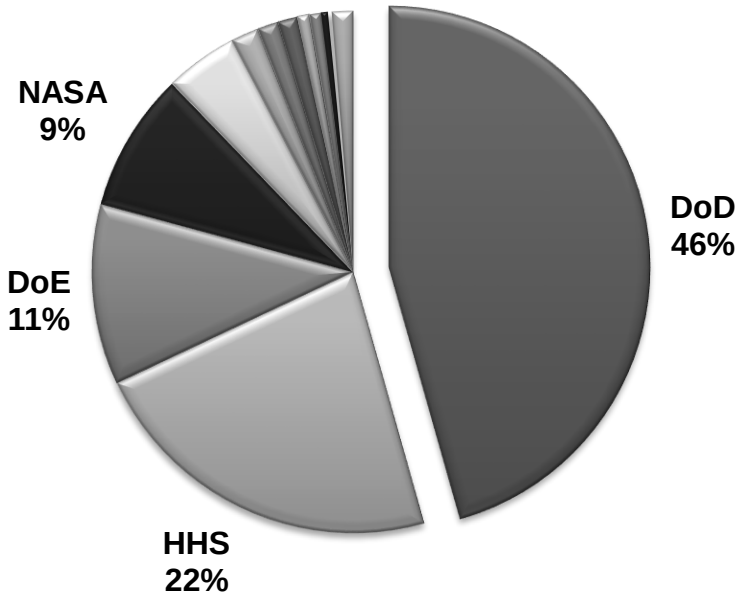
Hybrid systems

Rise of peers: continued radicalism

Degraded trust

Defense Technology Optimist

FY2018 Federal R&D Funding ($117B)



https://fas.org/sgp/crs/misc/R44888.pdf

World University Rankings
(number of schools)

8 in top 10

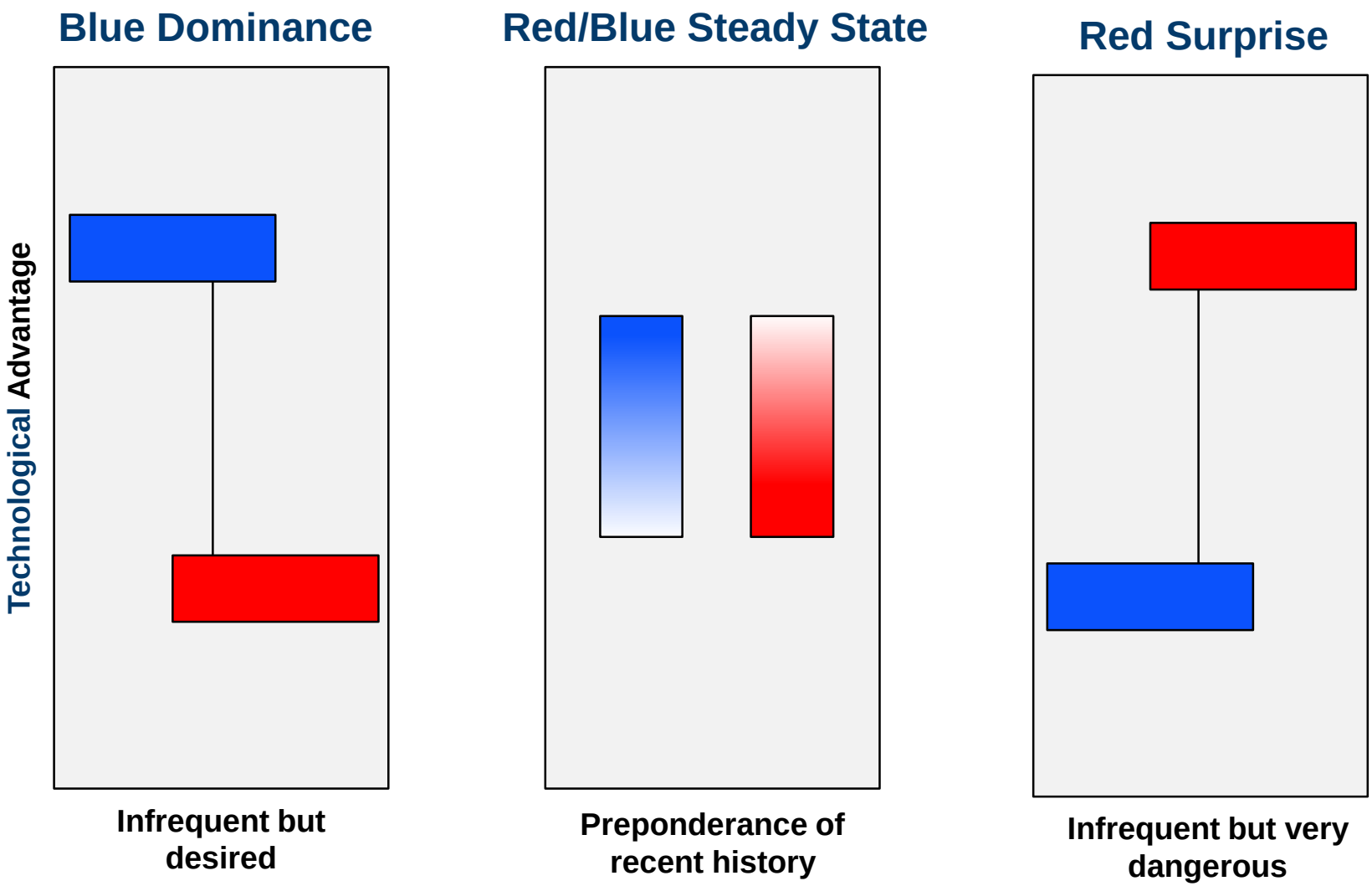
2 in top 10

2 in top 100 (92, 98)

1 in top 150 (126)

https://cwur.org/2018-19.php

Defense Technology Balance Paradigms



Steady State Examples

Improvised Explosive Devices

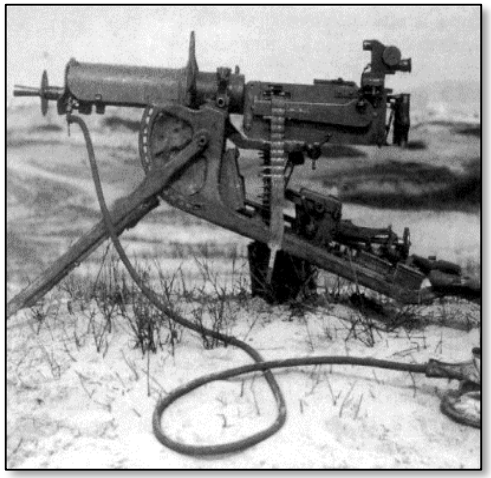
Electronic Warfare

Missiles

Often encountered over and over. Offensive system advancement/potential drives *consistent* defense technology development

Dominance and Surprise Examples

Machine Guns



Mid-19th century

Nuclear Weapons

1930/1940s

Stealth

1970s

Often decades of scientific development and years of engineering

Some Technology Premises

- **Correct future technology forecasting is nearly impossible (but worthwhile)**
  - **Identifies potential threats**
  - **Beware the "Self-licking ice-cream cone"**
- **Surprise (and dominance) is rare in the modern world**
  - **Good intelligence**
  - **Worldwide connectivity**
- **Critical thinking and sustained investment will ensure technological dominance**
- **Technology is not always the answer**

What Should You Do?

- **Always be concerned about the next threat**
  - **Use *quantitative* red teams**
  - **Prioritize your defense investments by risk**
  - **Prove it with prototypes (this helps offense too)**
- **Learn as much as you can about advanced technologies**
  - **They are what you need and what you will encounter in the future**
  - **You don't have to be an expert, but you need awareness**
- **Define the benefit of technologies with quantitative metrics**
  - **Build system architectures not OV1s**
- **Find "Dominance" technologies and advance them**

What Didn't I Bring Up?

- UxVs and swarms
- Artificial intelligence
- IoT
- Quantum computing
- Innovation
- Robots
- Additive manufacturing
- Synthetic biology
- Nanotechnology
- Non-technical solutions