



SMi ISR Conference
7 April 2014 – London

The Human Component of Intelligence Surveillance & Reconnaissance

Andy Fawkes

Sir Jock Stirrup Chief of Defence Staff

2007 RAeS Edwin Link Lecture



- “...the crew of a submarine when it is submerged at least is in many ways already operating in a virtual environment...”
- “...we can see emerging *the fuzing of* synthetic and real world environments *such* that would be it would it make increasingly difficult to distinguish between training carried out in simulation and the real thing.”



all but war is simulation



My Background

Previously

- MoD Simulation Policy
- NATO Modelling & Simulation Group



Now

- Digital Business Development
- Academic Liaison

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Outline

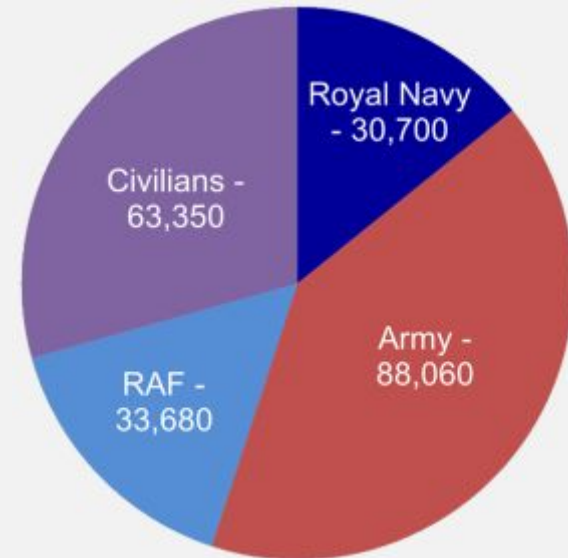
- **Defence Training Overview**
- **Simulation**
- **What is Driving Digital Technology?**
- **Future Role of the Human?**
- **Thoughts on C4ISTAR & Simulation**
Defence Research and Acquisition

UK MoD Defence Lines of Development (DLoDs)

- **Training**
- Equipment
- Personnel
- Information
- Concepts and Doctrine
- Organisation
- Infrastructure
- Logistics
- *Interoperability*

Nature of UK Defence Training and Education

- Scale
 - 215,790 Military/Civilian (2013/14)
- Depth
 - eg. Fighter Pilot, Nuclear Reactor Operator
- Breadth
 - eg. Apache Pilot through to Cook
- High Turnover
 - 83% age 39 years old and younger
- Flexibility
 - Current and Contingency Operations
- Approximately 20% of Defence Budget (£7-8bn)





Simulation

Benefits of Simulation



Improve Training



Reduce Time to Train



Reduce Costs



Reduce Environmental Impact



Improve Safety



NH90 Helicopter (CAE)

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Operational Joint Combat Operations Virtual Environment (Op JCOVE)

- Procured as a Service
- Mobile and deployable capability
- Mission Specific Training
- Game-Based Simulation
- Scenarios including:
 - CIED drills
 - Convoy Training



Versatility of Modern Simulation Software

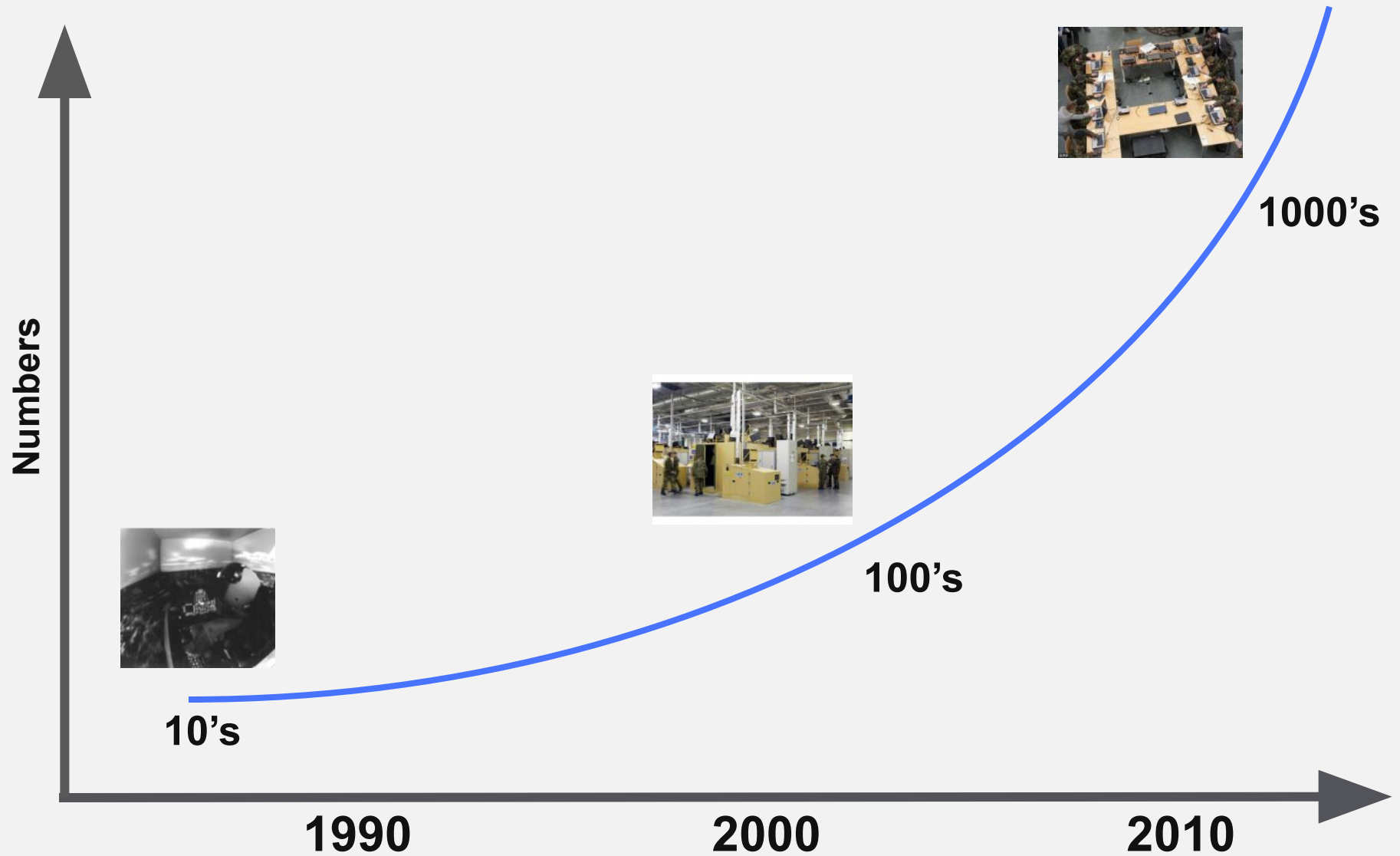


- Joint
 - E-Learning
 - Cultural Awareness & Language Training
 - Engineer Training
- Naval
 - Anti-Piracy & Boarding Operations Training
 - Maritime Submarine Training Capability
- Land
 - IED Training & Situational Awareness
 - Land Convoy Collective Training
 - Gunnery and Crew Training
 - Close Weapon Gunnery Training
 - Army Recruiting
- Air
 - Aviation Tactics Training
 - Fixed Wing Aviation Mission Training



Source - Wisconsin National Guard Public Affairs photo by Vaughn R. Larson

Access to Simulation





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The Rise of the Mobile in Training



Source - iPad in Real Life: Erik Hess, F-5N Tiger II Pilot

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Digital and Online Classrooms

South Korea 2015



Florida 2015

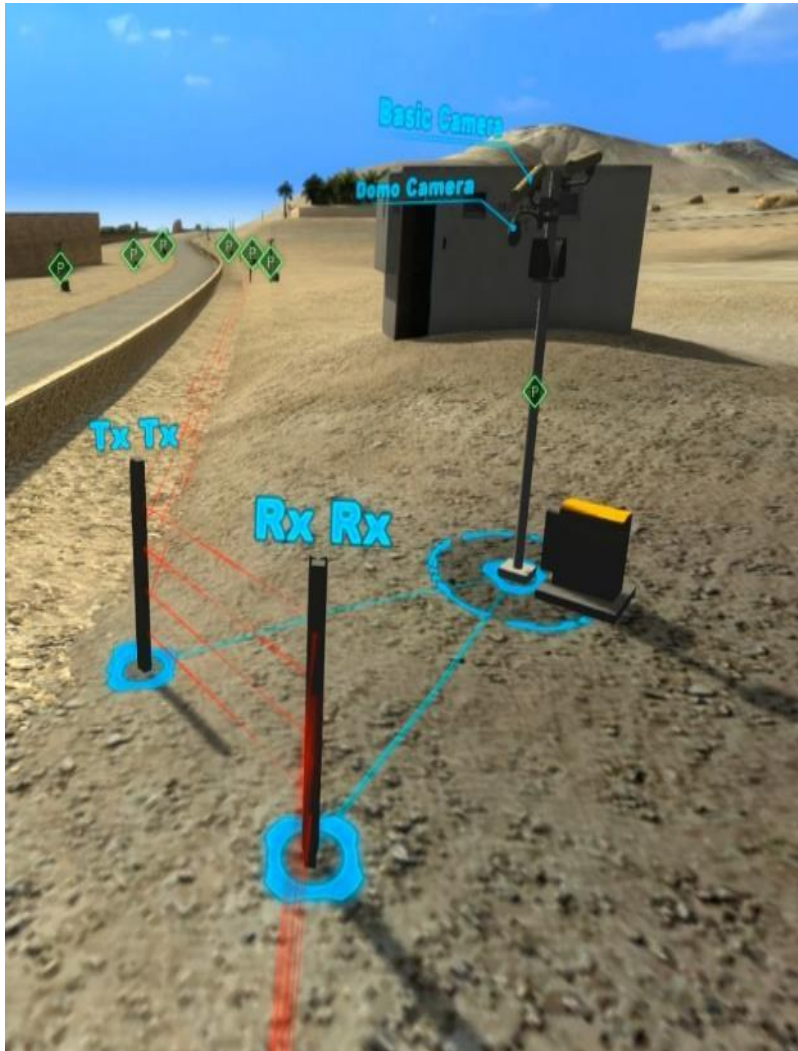
Stanford University



2012 - 23,000 Graduates

Simulation ↔ Command and Control





Configuration of the Control and Security System

Edition Stage

Our solutions offer intuitive **edition systems** which allow the **locating of security elements, assets as well as liabilities, in the field of activity.**

Once located, the elements are linked or mapped with their corresponding physical subsystems, allowing the events and alarms to be represented on a natural and user-friendly interface.

During the operations

The interventions over the virtual world create status changes on the security devices expanded over the field and vice versa. A complex contextual interface but easy-to-use.

As an example, it is possible to detect an intrusion, activate an alarm, activate the closing of an electronic gate, close retaining barriers, etc. by simply clicking on the equivalent elements on the 3D virtual model.

INTERACTIVE

Security and Defence Installations

VIRTUALWARE
G R O U P

www.virtualwaregroup.com

Surveillance Control and Risk Management System

3D Models of sites + Geolocation of security assests + Multitouch Screen + Videowall
+ Tablet App for Assets Management with Augmented Reality

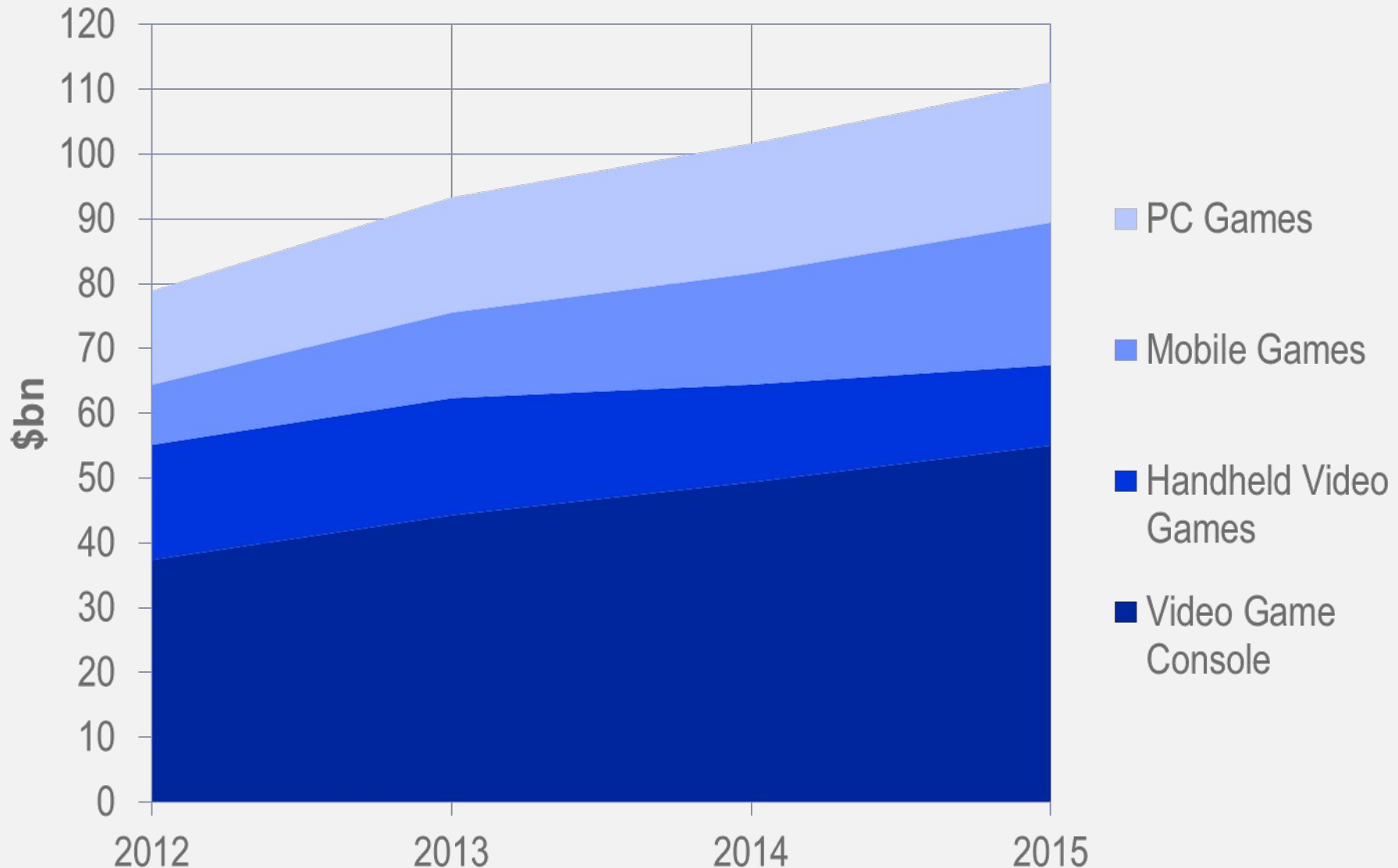


What is Driving Digital Technology?



Worldwide Video Game Market Revenue (\$Bn)

(Gartner Oct 13)



UK is 3rd Largest Market in the World (Wikipedia)

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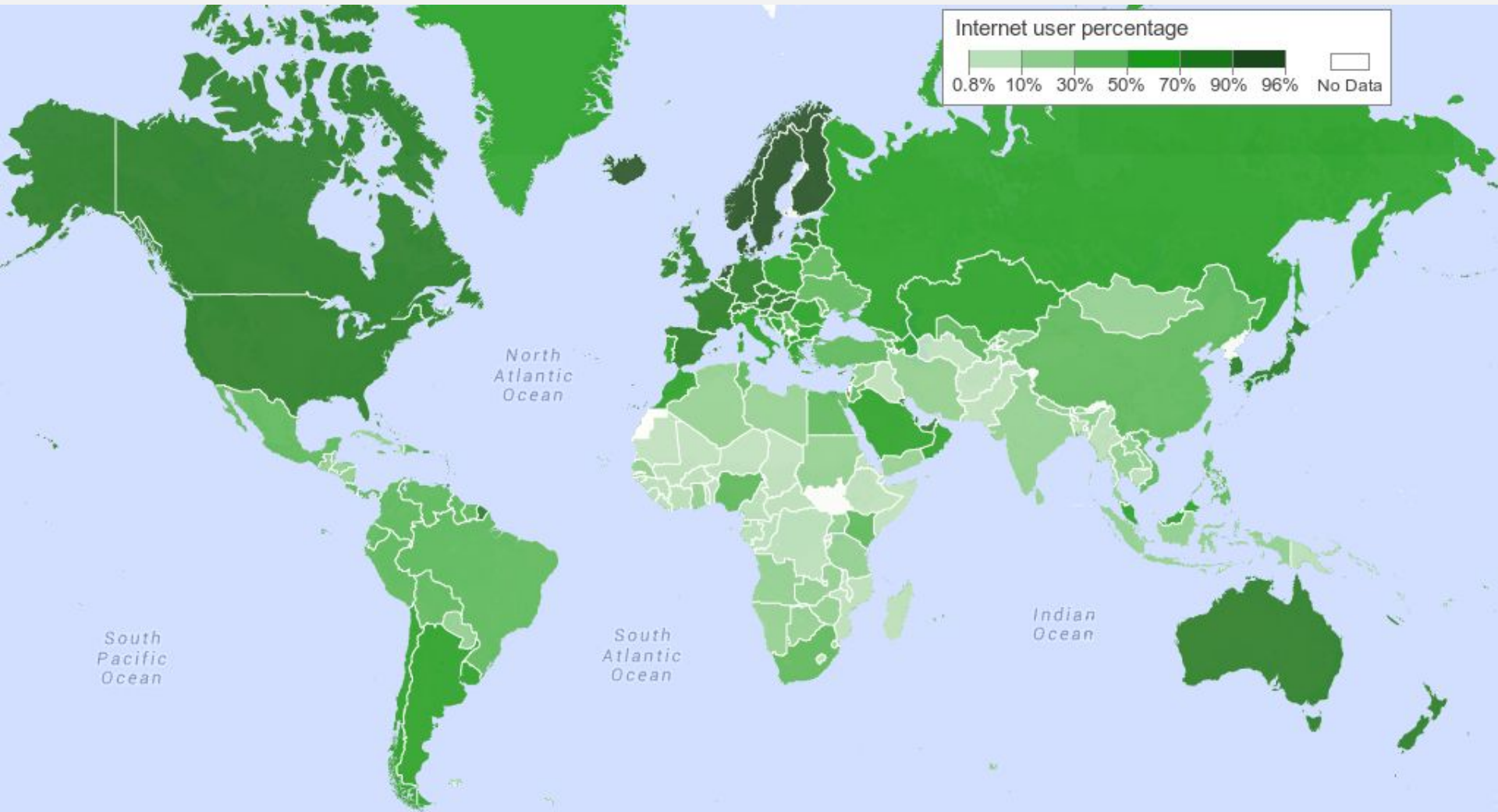
Games are Big Business

- Grand Theft Auto V
 - five years' work by a team of over 1,000 people
 - game's combined development and marketing budget over US\$265m
 - US\$1 billion sales within first 3 days

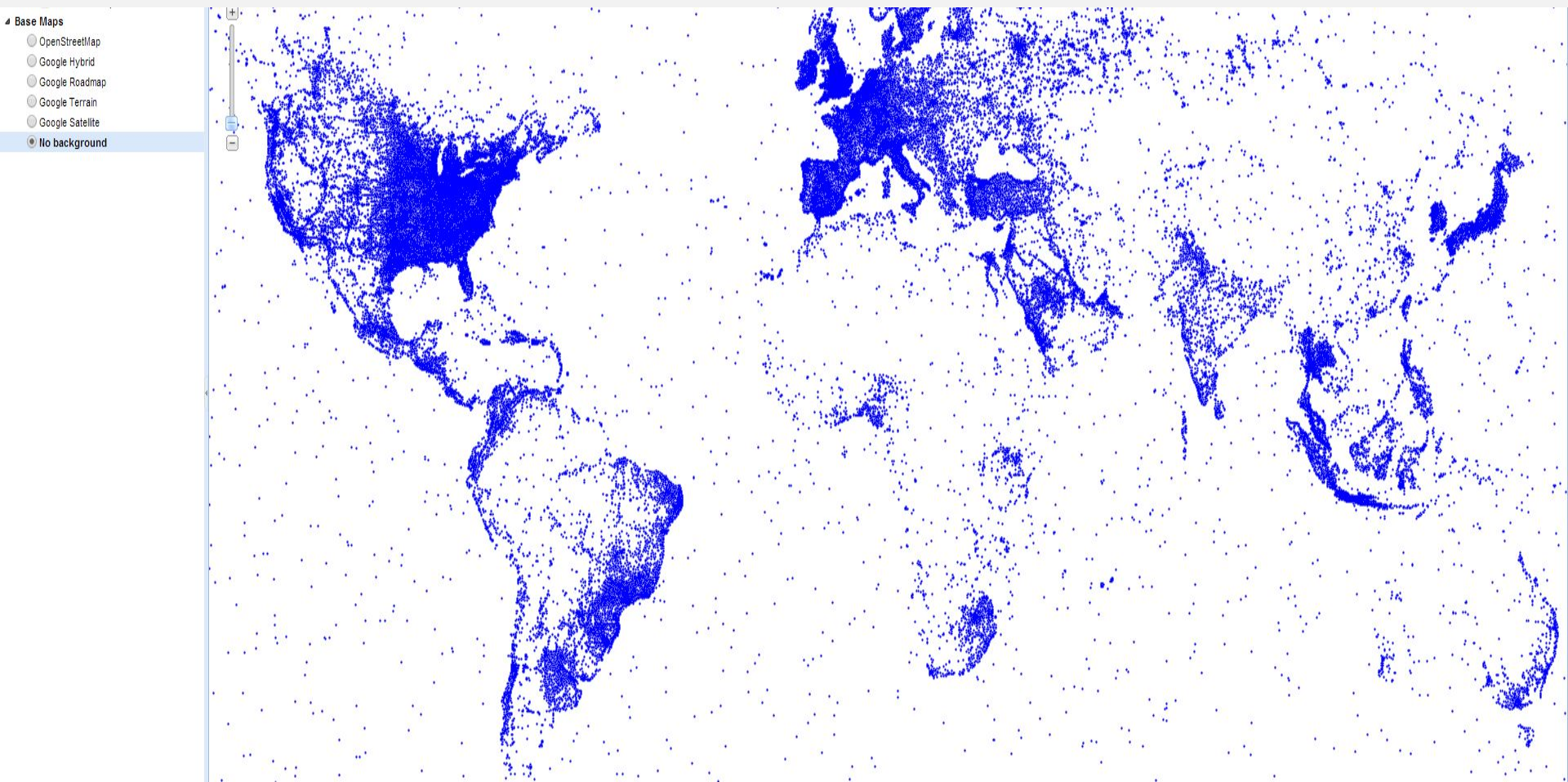


- Candy Crush Saga
 - Daily Revenue est. US\$826k
 - Daily Installs 30,090
 - Daily Active Users 8,031,750
 - On Facebook and Smartphones

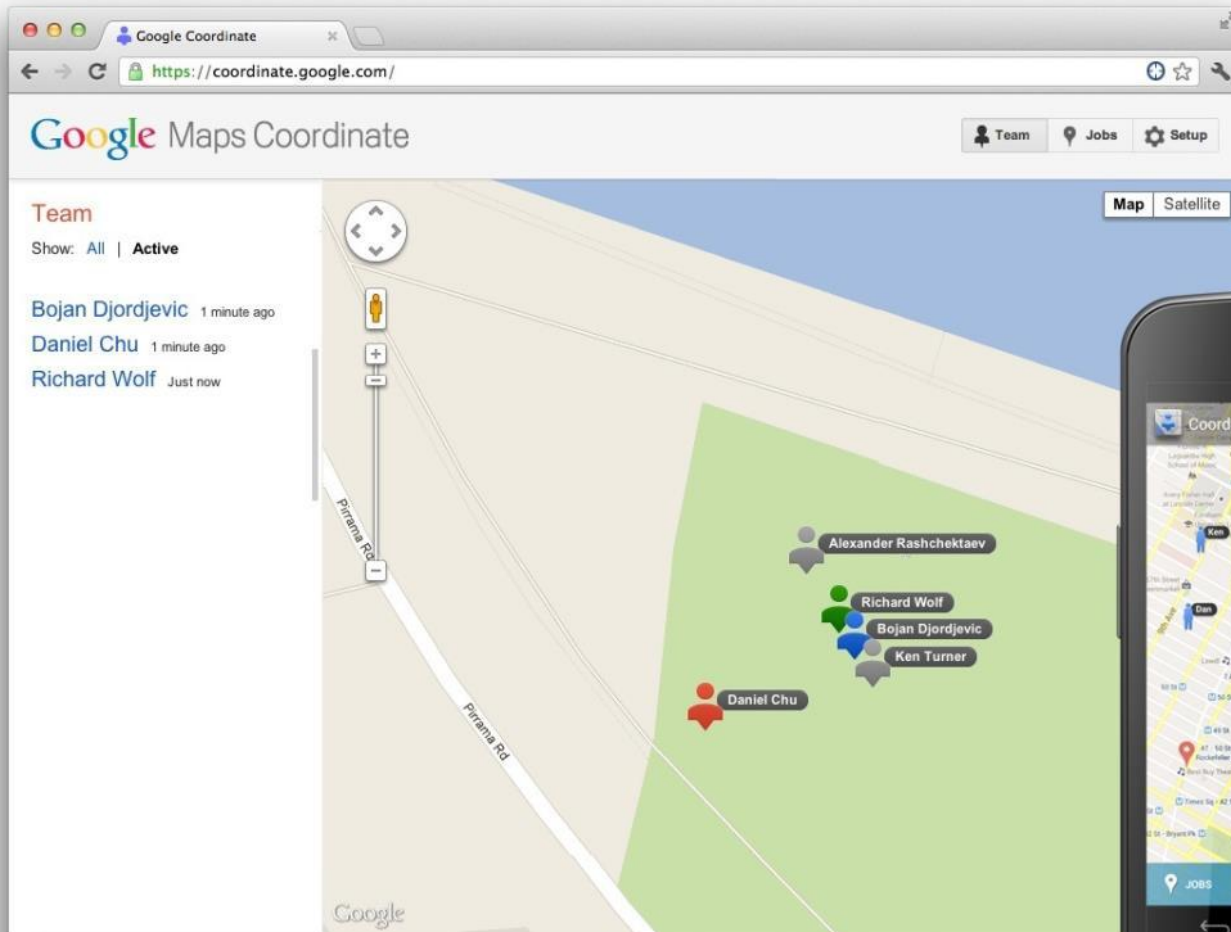
Internet Users (% of the population) 2014



One Day in December 2013



Civilian Command & Control





Telegram

taking back our right to privacy



Telegram for iPhone



Telegram for Android



More Telegram apps



Private

Telegram messages are heavily encrypted and can self-destruct.



Cloud-Based

Telegram lets you access your messages from multiple devices.



Fast

Telegram delivers messages faster than any other application.



Citizens Fighting Back?



GLASS

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World on the brink of 'new industrial revolution' says David Cameron

'Internet of things' will allow everyday objects like fridges to talk to each other and will transform the world, the Prime Minister tells a trade fair



The development of the technologies necessary to support the 'Internet of Things' has come a long way in the past year. Photo: (c) John Rensten

By Holly Watt, Whitehall Editor, Hanover, Germany

5:45PM GMT 09 Mar 2014

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David Cameron has announced that the world is on the brink of "a new industrial revolution," where the internet will allow everyday objects like fridges to "talk to each other."

Speaking at a trade fair in Hanover, Germany, the Prime Minister said that "the internet of things" would transform the world, as he announced a package of measures to promote Britain's position in the global technological race.

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Internet of Things



2014 Audi TT



12.3in Full-screen High Resolution
Google Earth



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Exciting Times!

Simulation

Computing

Games

Sensors

Robotics

Psychology

Training

Virtual Reality

Performance Arts

Telepresence

Mobile

Education

**Artificial
Intelligence**

Internet



What is the Future Role of the Human?





Mind Over Mechanics



University of Southern California Institute for Creative Technologies - 2013

USC Institute for
Creative Technologies

University of Southern California

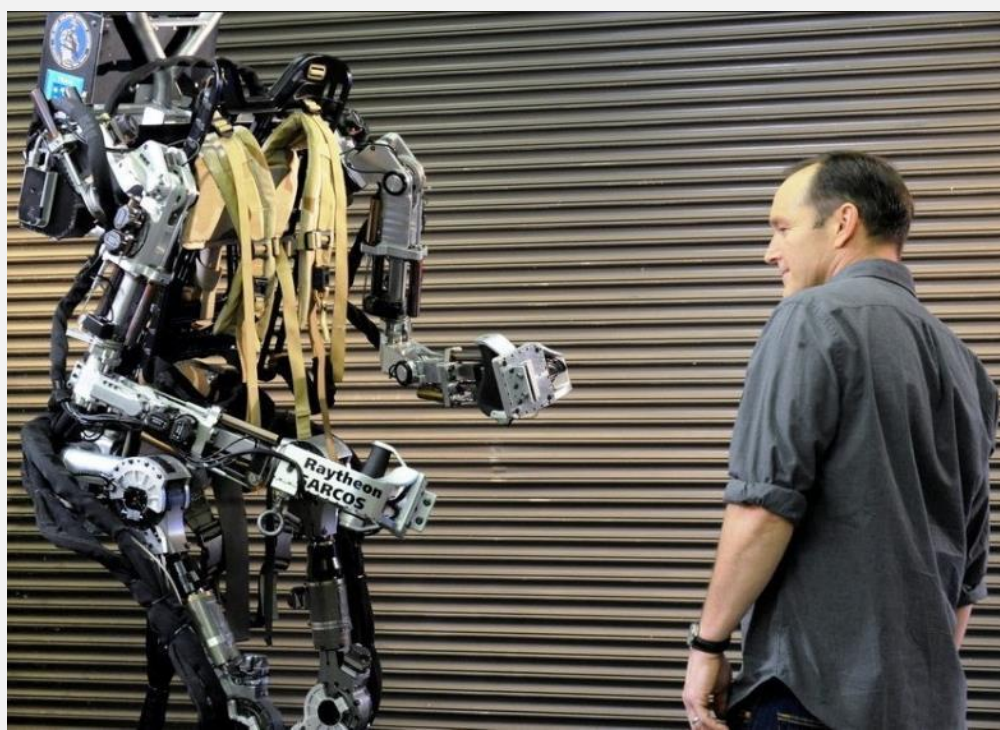
SimSensei: Virtual Human for Healthcare Support & MultiSense: Multimodal Perception and Learning

**Albert (Skip) Rizzo, PI
Louis-Philippe Morency, PI**

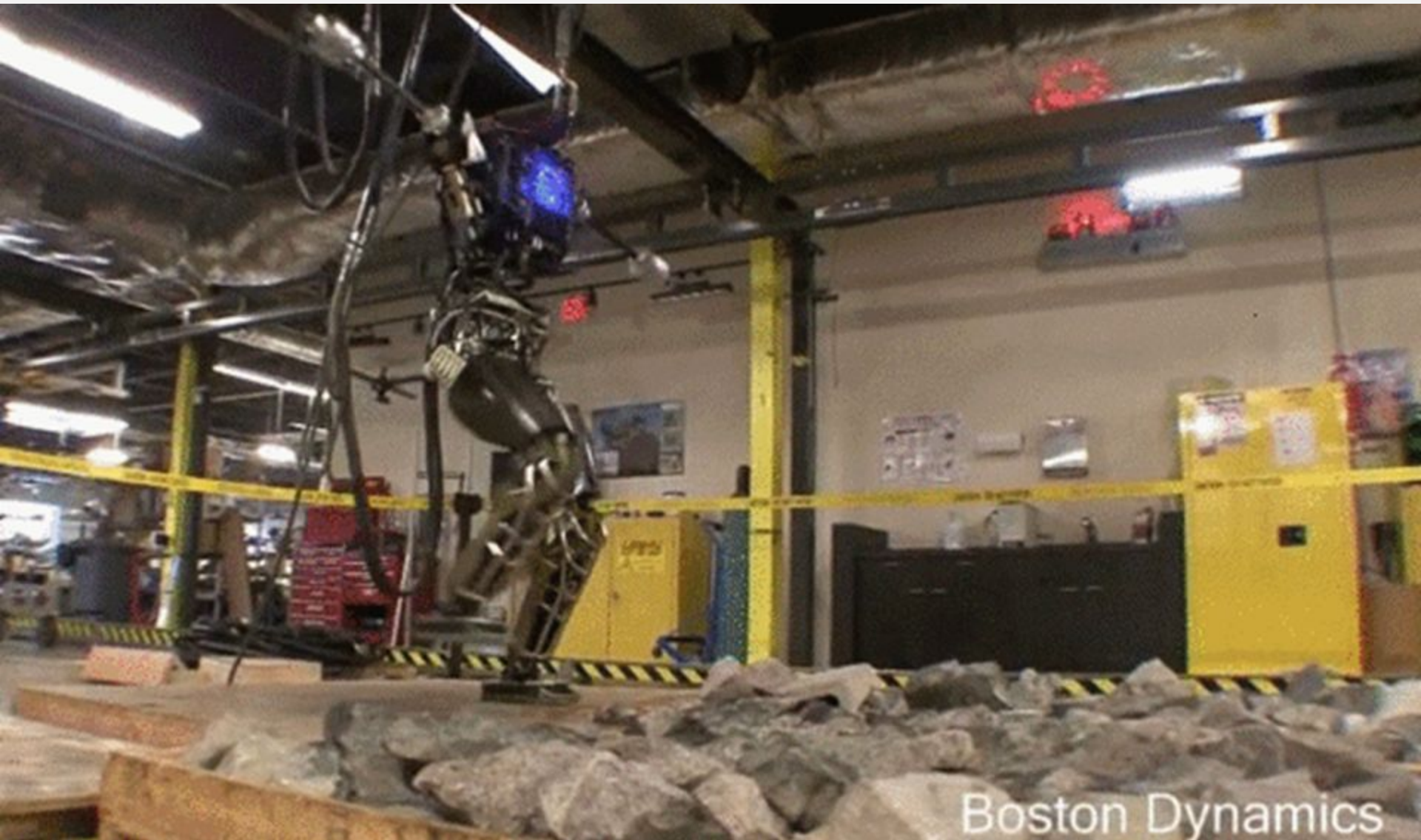
**As part of DCAPS program:
Detection & Computational Analysis of Psychological Signals
(3rd Interim Progress Video)**

The work depicted here was sponsored by the U.S. Defense Advanced Research Projects Agency. Statements and opinions expressed do not necessarily reflect the position or the policy of the United States Government, and no official endorsement should be inferred.

Raytheon's Second-Generation Exoskeleton (XOS 2)



Robotics



<http://youtu.be/w40e1u0T1yg>

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Autonomy ↔ Simulation



<http://youtu.be/bCF44XNwiWE>

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News > Technology > Artificial intelligence (AI)

2029: the year when robots will have the power to outsmart their makers

Ray Kurzweil, Google expert in artificial intelligence, predicts that by 2029 robots will make jokes and flirt

Nadia Khomani
The Observer, Saturday 22 February 2014 21.00 GMT
[Jump to comments \(361\)](#)

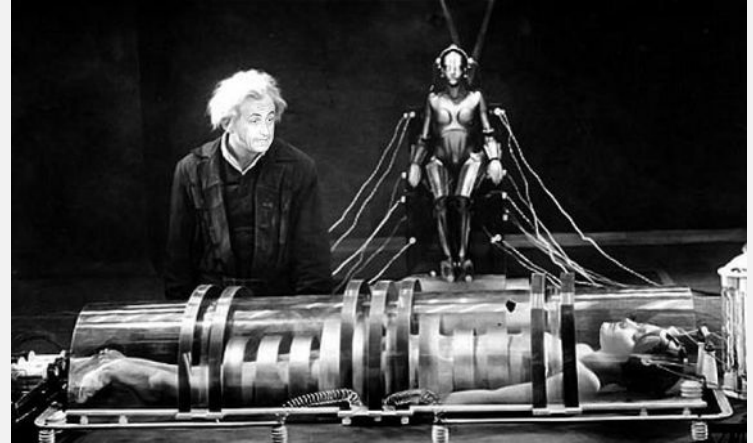


Garry Kasparov versus Deep Blue in 1997. The computer won - as Ray Kurzweil predicted. Photograph: Stan Honda/AFP/Getty Images

Computers will be cleverer than humans by 2029, according to Ray Kurzweil, Google's director of engineering.

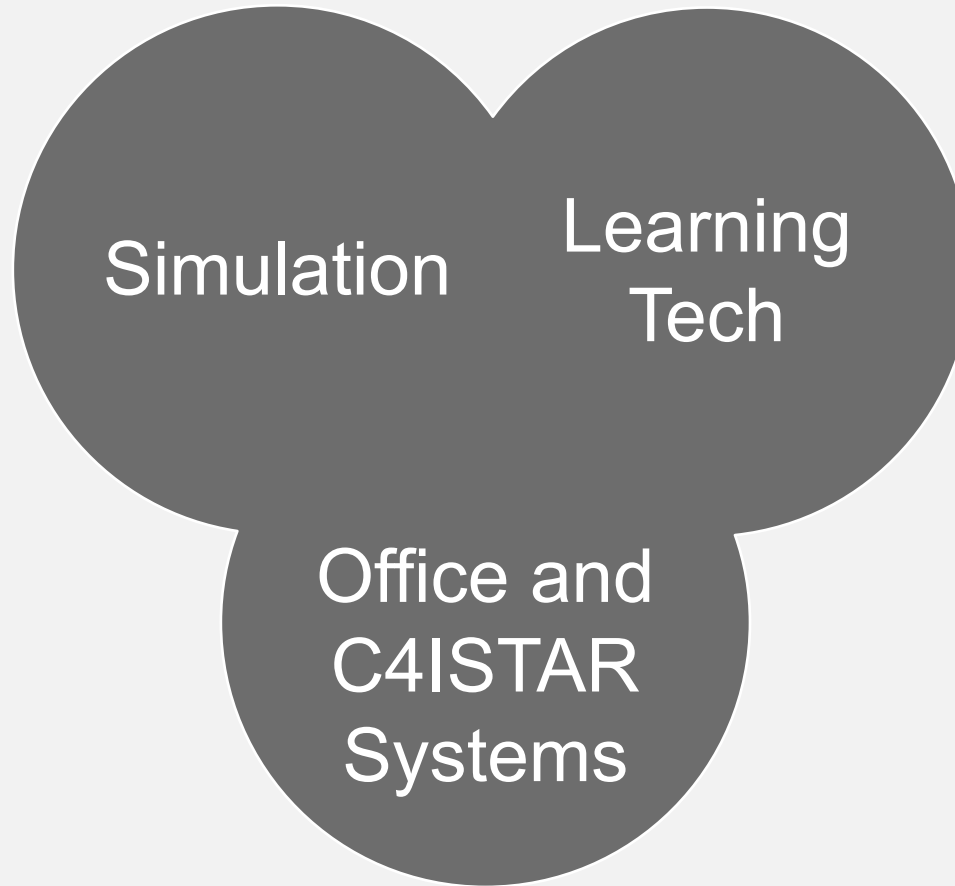


Who will Make the Decisions?



So
WHAT?

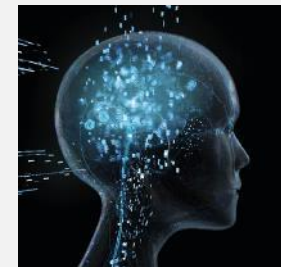
Convergence?



Digital Technology in Perspective

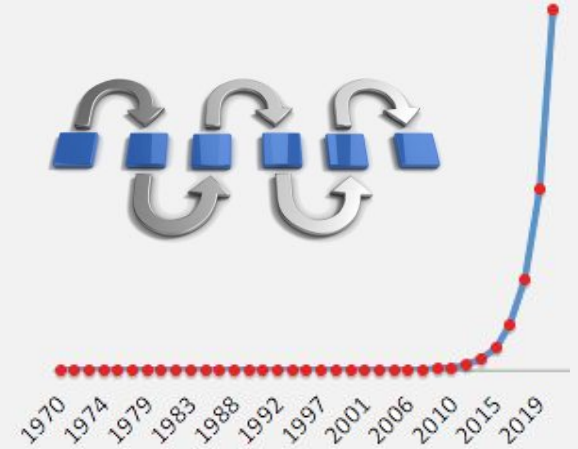
computer technology is now progressing more each hour than it did in it's entire first 90 years

	2000	2014	2028
Processing Speed	1	128	16k
Hard Drive Capacity	1	8k	60m
Optical Fibre Capacity	1	416k	173bn

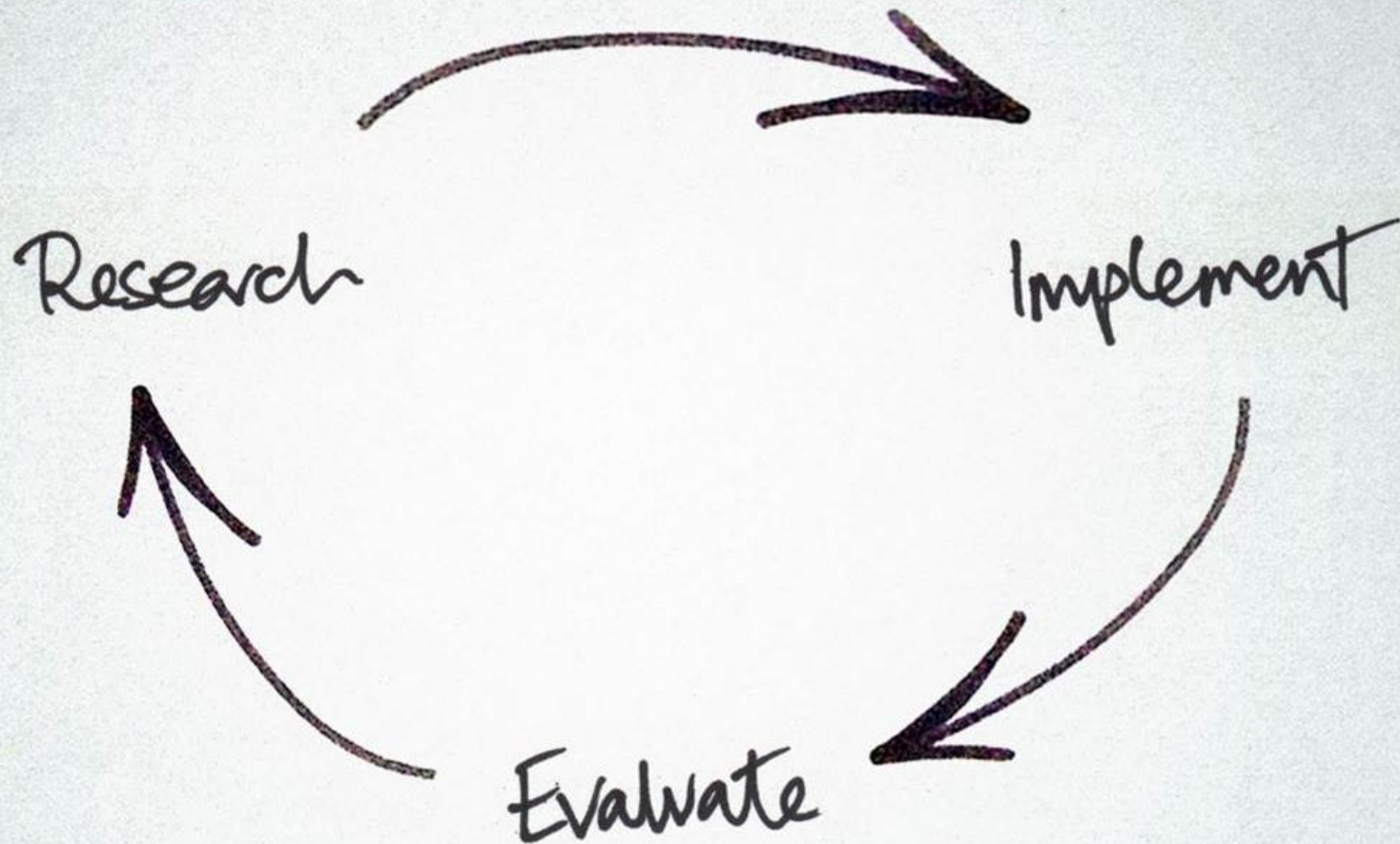


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Process v Moore's Law



- Are Defence Approvals and Acquisition Processes compatible with Digital Technology Advances?
- What about Agile Adversaries?





Questions?