



# **The Crucial Role of Cybersecurity in the - "War on Terror" -**

**Dr David E. Probert**  
**VAZA International**

Dedicated to Grand-Daughters – Abigail and Alice – *Securing their Future Life!*

**33<sup>rd</sup> International East/West Security Conference**

**The Crucial Role of Cybersecurity  
in the "War on Terrorism"**

- Prague, Czech Republic: 6<sup>th</sup>-7<sup>th</sup> June 2016 -  
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# **- Решающая Роль - В Кибербезопасности В "Войне с террором"**

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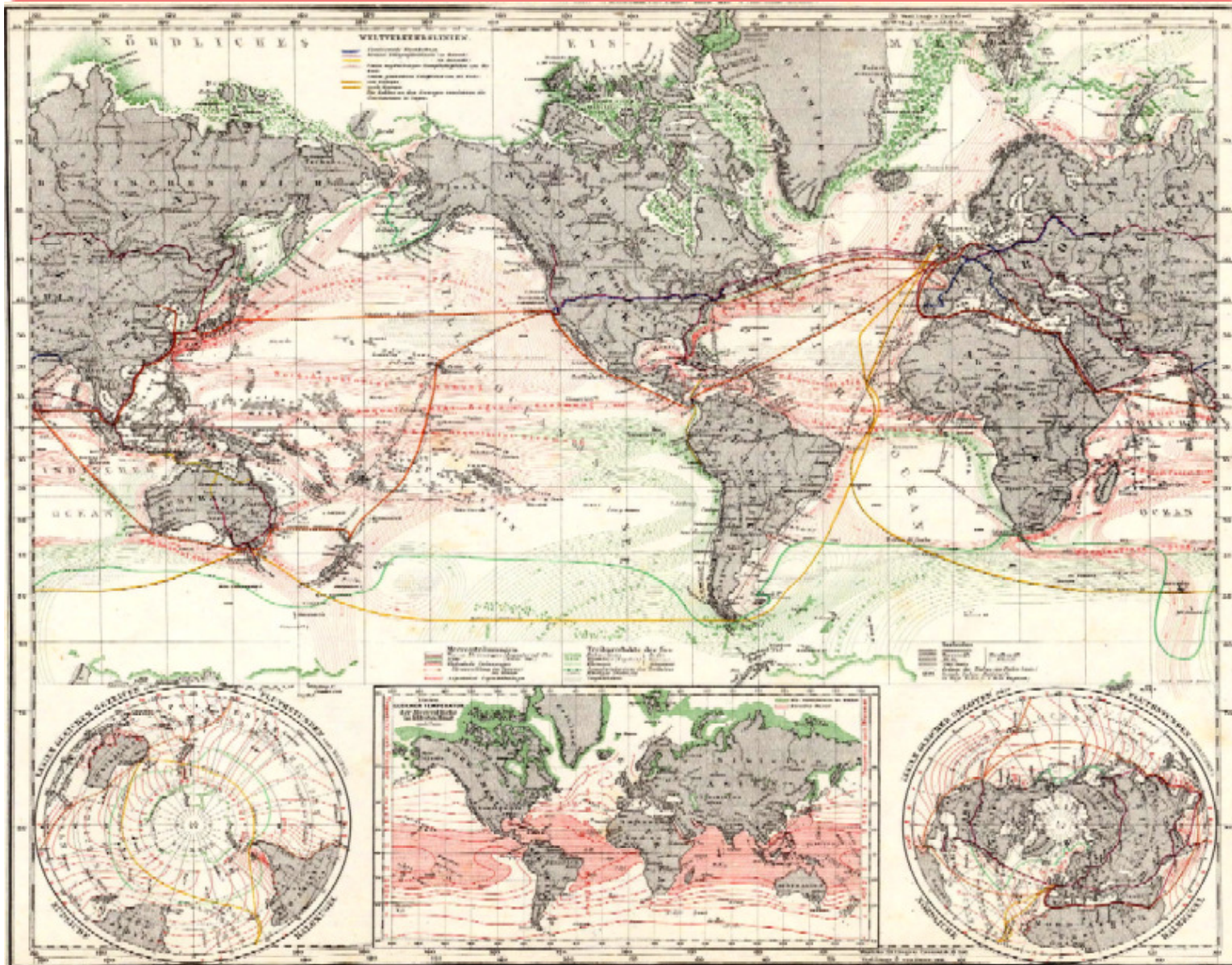
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# “Visualisation of Cyberspace”: *Global IP “WHOIS” Addresses*



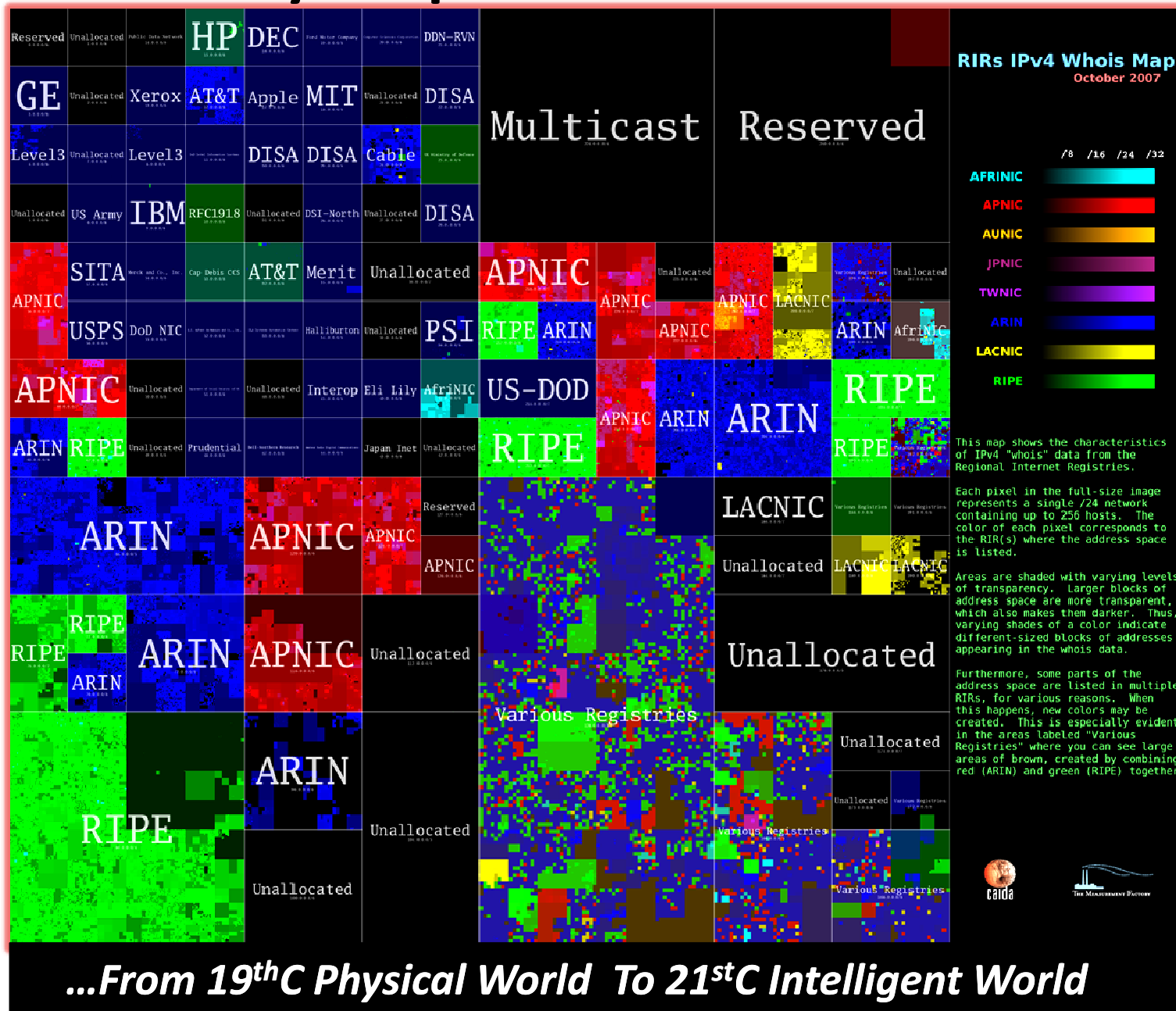
*...From 19<sup>th</sup>C Physical World To 21<sup>st</sup>C Intelligent World*

# “Visualisation of Cyberspace”: *Global IP “WHOIS” Addresses*





# “Visualisation of Cyberspace”: *Global IP “WHOIS” Addresses*



# Crucial Cybersecurity – *Dual Themes*

## Theme (1) – ...**The Crucial Role of Cybersecurity in the “War on Terror”**

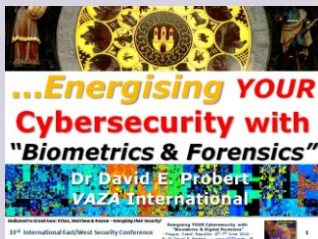


*The Prevention of Terrorism requires Business & Government Security Teams to Integrate their Cybersecurity Operations with Real-Time Surveillance, GPS Tracking & Personal Profiling Tools.*

**“Integration” : “SMART Real-Time Security & Surveillance**

**11:45 6<sup>th</sup> June 2016**

## Theme (2) – ...**Energising YOUR Cybersecurity with “Biometrics and Forensics”**



*Secure End-User Authentication for the “Internet of Things (IoT)” will require CSOs & Security Teams to Integrate Biometric & Forensic Tools with their Physical & Cybersecurity Operations.*

**“Intelligence”: “ADAPTIVE Cyber-Biometric Security for the IoT”**

**14:30 6<sup>th</sup> June 2016**

**Download Slides: [www.valentina.net/Prague2016/](http://www.valentina.net/Prague2016/)**



# Prague 1994: *Multi-Media Networking*



**1991–1999 : Networking & Security Projects in Eastern Europe /CIS/ Middle East**

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# Prague: June 1994 : *Internet Conference*



**Networking & Security Projects for Prague Castle & Prague Technical University/CESNET**

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# Protecting Ukraine & Georgian Parliaments

## *- Integrated Cyber and Physical Security -*



Ukraine Parliament : *Kyiv*



Georgian Parliament: *Tbilisi*

*Internet, Web Sites, & IT Security Programmes initiated 1994*

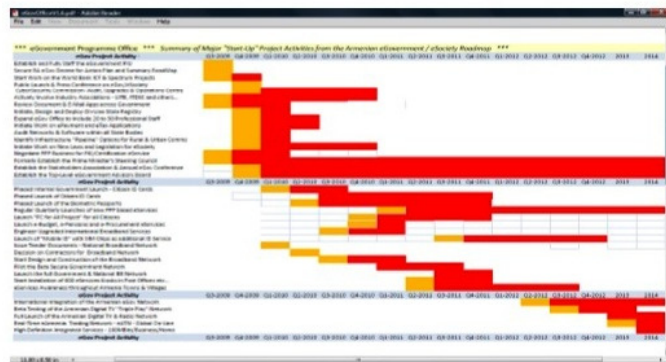
# Cybersecurity for Armenia and Georgia

\*\*\* "Proposals for e-Government, e-Commerce and e-Security Development in Armenia" \*\*\*



## "Roadmap for Real-Time Armenia"

*\*E-Government, E-Commerce and E-Security\**



*"Increasing Business Opportunities for the Armenian ICT Cluster through the development of E-Government, E-Commerce and E-Security"*

\*\*\* Report Prepared by: Dr David E Probert – VAZA International \*\*\*

Author: Dr David E Probert : Final Report to USAID/CAPS : June 2009 : Page 1

Link: [www.valentina.net/vaza/CyberDocs/](http://www.valentina.net/vaza/CyberDocs/)

\*\*\* "Real-Time" Georgia : Securing Government & Enterprise Operations \*\*\*



## "Real-Time Georgia"

*\*Securing Government & Enterprise Operations\**



Dr David E Probert

VAZA International

1<sup>st</sup> Georgian IT Innovation Conference

Tbilisi : 29<sup>th</sup> & 30<sup>th</sup> October 2008

1

Author : Dr David E Probert

Copyright : [www.vaza.com](http://www.vaza.com) – Oct 2008

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# Cybersecurity for the *Georgian Parliament*



## Critical Infrastructure Audit during UN Cybersecurity Mission: Georgian Parliament

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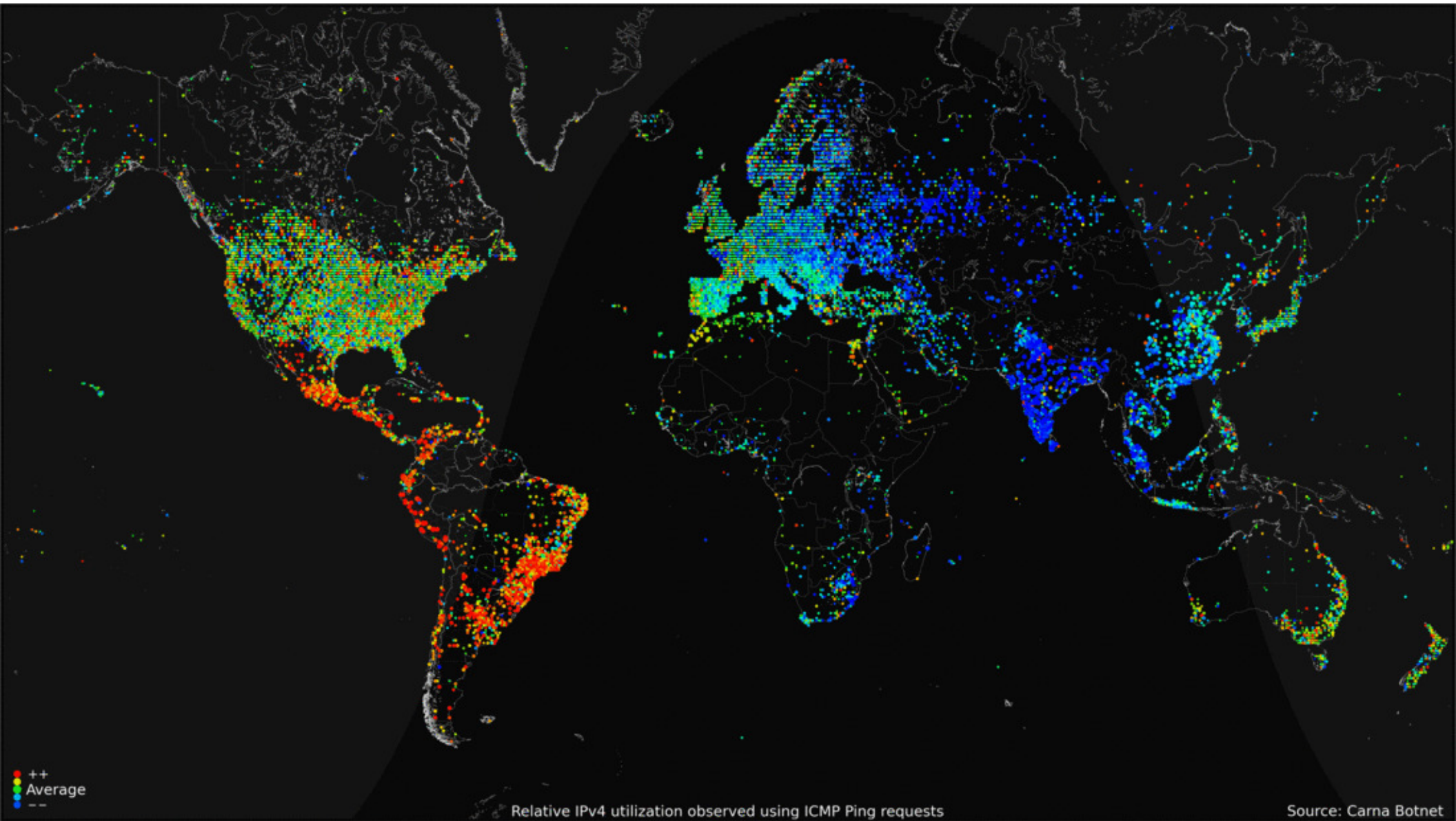
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# ***GeoVision 24/7 Internet Connectivity***

## ***- “Worldwide Internet Census 2012” -***

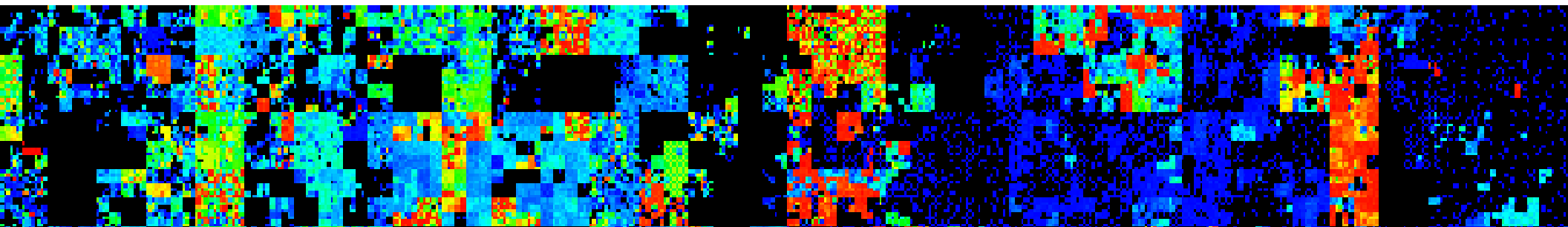




# Crucial Cybersecurity Role in “War on Terror”



1 – Background: “21st Security Landscape”	2 – Recent “Terror” Events: Case Studies	3 – 20th C Physical Security Solutions
4 – 21st C Integrated Cyber Solutions	5 – Intelligent Real-Time Cyber Tools	6 – Security Sectors: Threat Scenarios
7 – “Terror” Defence: Critical Infrastructure	8 – Practical CyberSecurity Strategies	9 – YOUR TOP 3 Actions & RoadMap



# (1) OUR 21<sup>st</sup>C Security Landscape

- **Security Events**, War & Terrorism frequently dominate OUR International Media & News.
- **Legacy 20<sup>th</sup>C** Security Solutions are no longer an effective defence against the “bad guys”.
- **Hybrid War, Terror & Crime**: Effective Defence requires Integrated Cyber & Physical Solutions
- **20<sup>th</sup>C Physical Terror** travelled *@ Sound Speed*
- **21<sup>st</sup>C Cyber Terrorism** travels *@ Light Speed...*

*....In this presentation we provide practical ways to upgrade **YOUR** Security Operations*



# Background: **20<sup>th</sup> to 21<sup>st</sup>C Cybersecurity**

- **20<sup>th</sup>C : 1995 - 2010** : Focus on Firewalls & Antivirus – based upon Physical “Spatial” Security Models (Castles & Moats)

.....Protection @ ***“Speed of Sound” (Space)***

- **21<sup>st</sup>C : 2010 – 2025** : Focus on Adaptive, and Self-Organising “Cyber” Tools – based upon Temporal Models (AI & Machine Learning)

.....Defending @ ***“Speed of Light” (Time)***

# **21<sup>st</sup>C *CyberSecurity* Landscape**

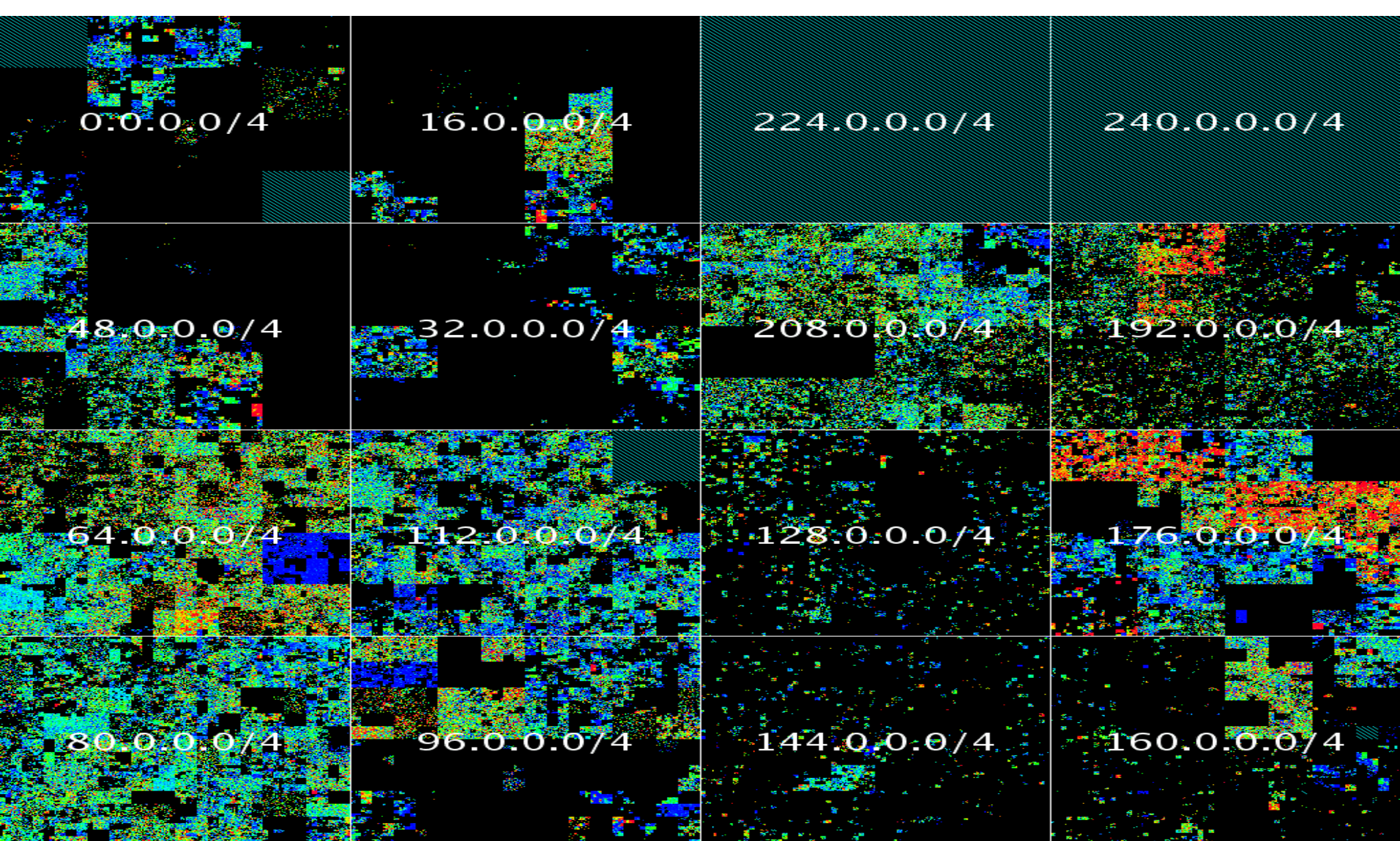
- Convergence of Physical & Cybersecurity Operations
- “Cyber” migrates from IT Dept to Main Board: C-Suite
- Global Real-Time Targeted Cyber Attacks – 24/7
- Transition from 20<sup>th</sup>C Tools (Firewalls & Anti-virus) to “Smart” 21<sup>st</sup>C Tools (AI & Machine Learning)
- Emergence of Enterprise “Internet of Things”
- Evolution of Smart Devices, Cities, Economy & Society
- Dramatic increase in Cyber Crime & Cyber Terrorism



# *Cybersecurity* Market Sectors

- Anti-Virus/Firewall
- ID Authentication
- Encryption/Privacy
- Risk & Compliance
- Mobile Device Security
- Anti-Fraud Monitoring
- Website Protection
- S/W Code Verification
- AI & Machine Learning
- Enterprise IoT Security
- Cloud Security Services
- Big Data Protection
- RT Log/Event Analytics
- Real-Time Threat Maps
- Smart Biometrics
- Training & Certification

Global Trend is towards ***Adaptive & Intelligent Cybersecurity Solutions/Services...***  
....Traditional ***Anti-Virus/Firewall Tools*** no longer fully effective against ***“Bad Guys”!***



++  
 Average  
 --

16:00 Los Angeles

01:00 Amsterdam

08:00 Shanghai

19:00 New York

04:00 Moscow

10:00 Sydney

Relative IPv4 utilization observed using ICMP Ping requests

Source: Carna Botnet

**Global IPv4 Internet Servers: 24/7**

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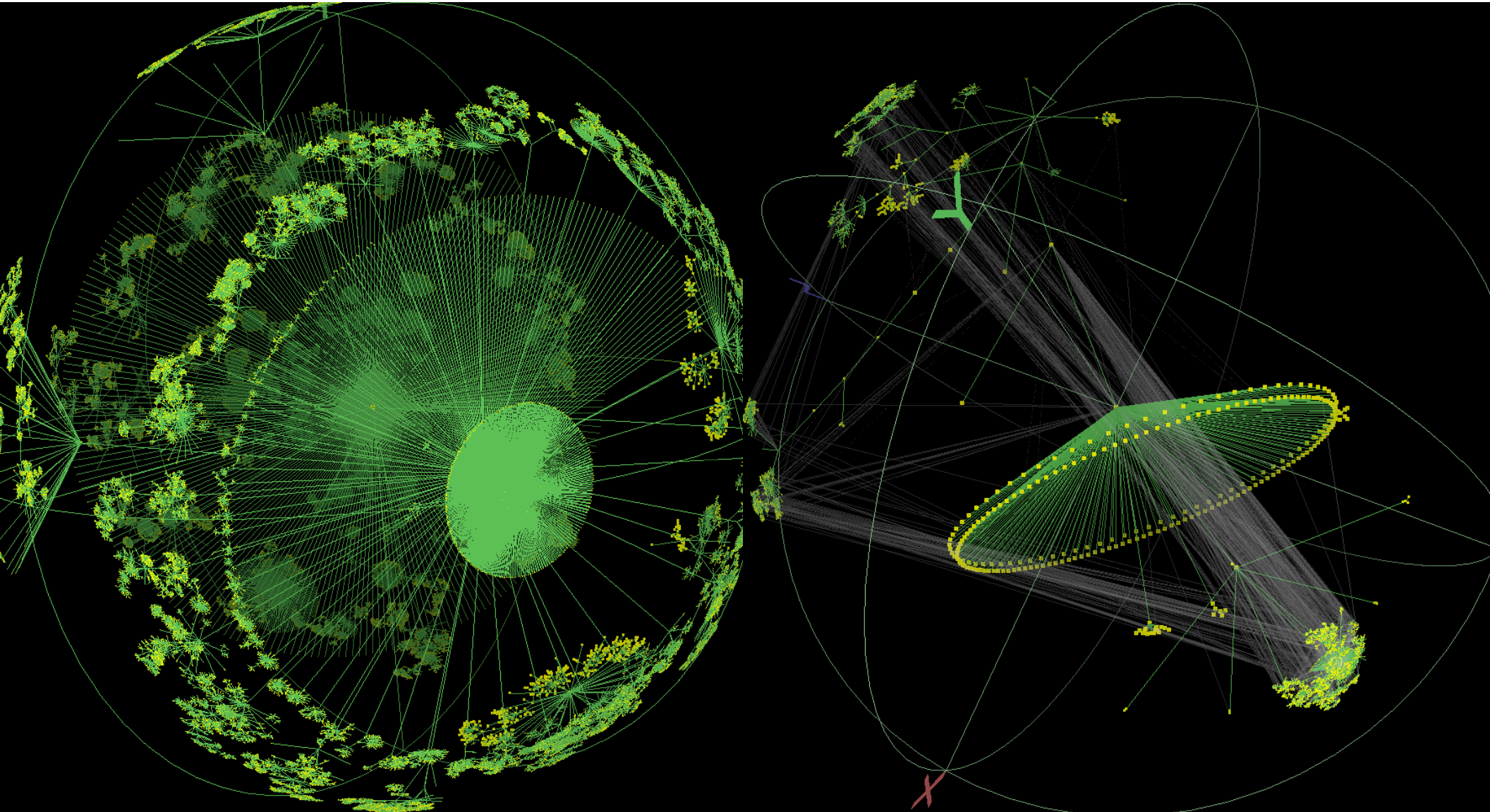
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# Worldwide *Hyperbolic Models* of Internet



Link: [www.CAIDA.org](http://www.CAIDA.org) : *Center for Applied Internet Data Analysis*  
- *University of California - San Diego Supercomputer Center* -

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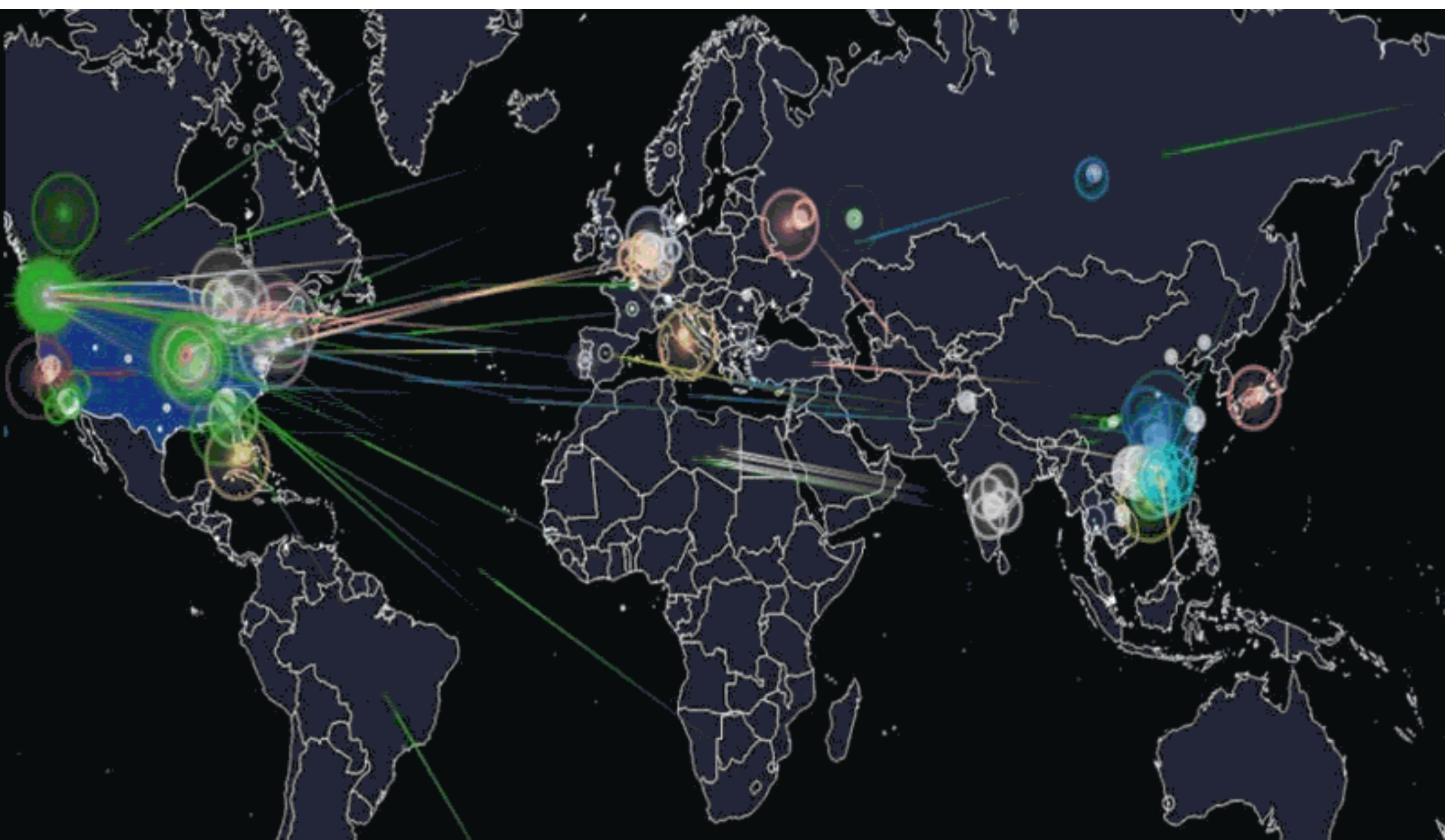


# Typical Global “*Botnet*” Cyber Attack

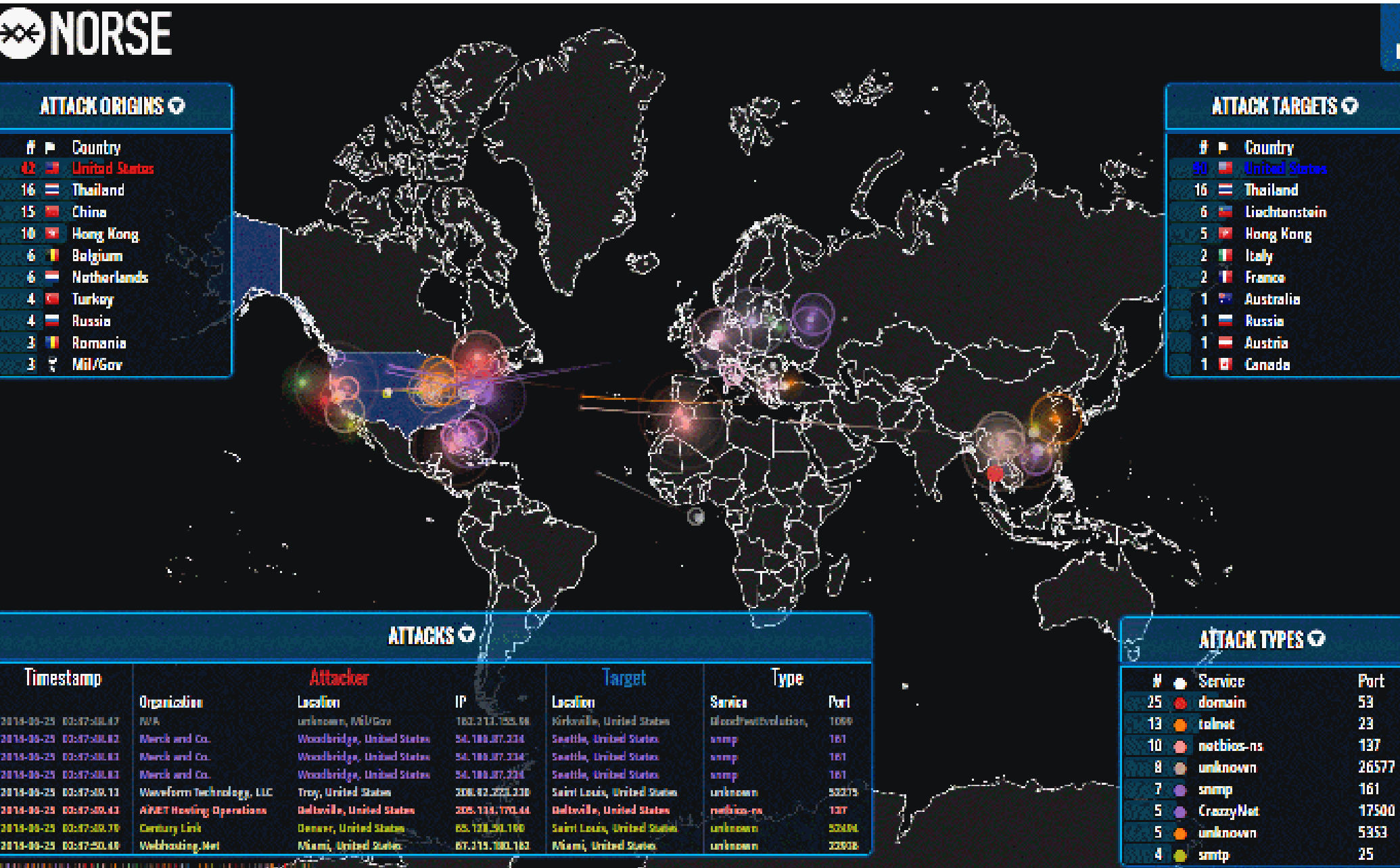




# Real-Time Cyber Threat Map @ *Light Speed*



# Norse CyberMap: *Real-Time Cyber Threats*





# Kaspersky CyberMap: *Real-Time Threats*



Link: <http://Cybermap.kaspersky.com>

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# New Data Generation @ *Light Speed!*

## The Internet in Real-Time

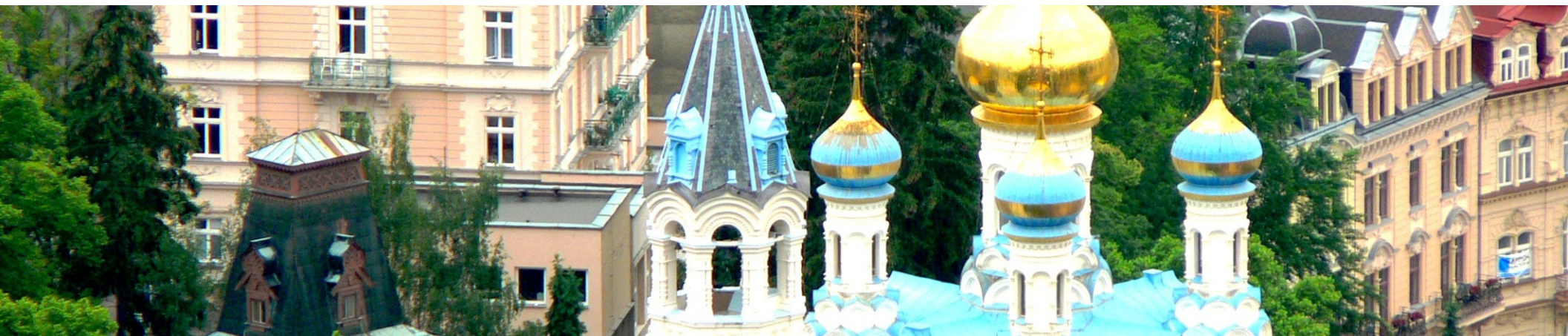
How Quickly Data is Generated



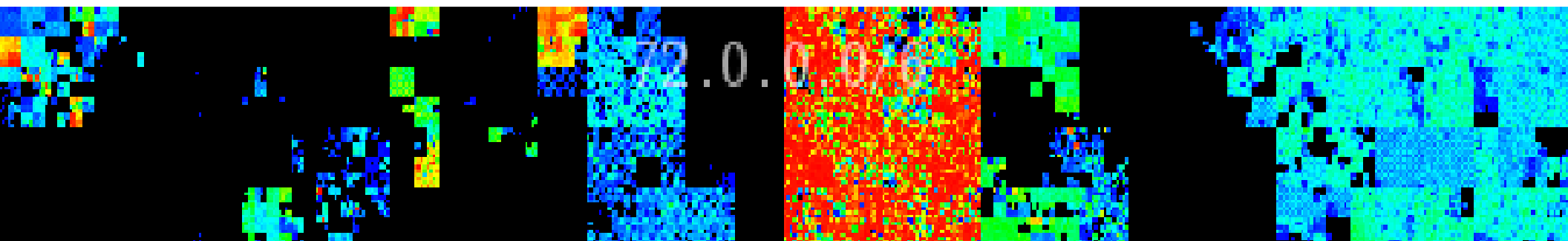
By the way, in the 1 seconds you've been on this page, approximately 22574 GB of data was transferred over the internet.



# Crucial Cybersecurity Role in “War on Terror”



1 – Background: “21 <sup>st</sup> C Security Landscape”	2 – Recent Terror Events: Case Studies	3 – 20 <sup>th</sup> C Physical Security Solutions
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## (2) Recent Terror Events: *Case Studies*

- **Moscow** – Nord-Ost Theatre – October 2002
- **London** – Metro & Bus Attack – July 2005
- **Paris** – Charlie Hebdo Attack – Jan 2015
- **Tunisia** – Marhaba Hotel, Sousse – June 2015
- **Paris** – Bataclan Theatre – Nov 2015
- **Brussels** - Airport Attack – March 2016

....ALL Cultural, Tourist & Transport Facilities are vulnerable to attack in EVERY City & Country!



# Paris Terror Attack: *Charlie Hebdo*-Nov2011

## Deadly attack on satirical French magazine

At least 11 people were killed and 10 injured in a shooting at the Paris offices of Charlie Hebdo, a magazine fire-bombed in November 2011 a day after it carried a caricature of the Prophet Muhammad



Source: Wire agencies

© GRAPHIC NEWS



# Brussels Airport: *Terror Attack–March 2016*






# Terror Events: *1<sup>st</sup> May 2016 - Wiki*

May [edit]

Total Incidents: 128

Date ↕	Type ↕	Dead ↕	Injured ↕	Location ↕	Details	Perpetrator ↕	Part of ↕
1	Car bomb	2	23	 <a href="#">Gaziantep, Turkey</a>	<b>2016 Gaziantep bombing</b> : Two policeman was killed and twenty-two others (four being civilians) were wounded after a car bomb exploded out a police headquarters in <a href="#">Gaziantep</a> . <sup>[434]</sup>	<a href="#">Islamic State</a>	
1	Rocket attack	0	7	 <a href="#">Kilis, Turkey</a>	Seven people were wounded when three rockets fired from an area in <a href="#">Syria</a> controlled by Islamic State jihadists crashed into the centre of <a href="#">Kilis</a> . <sup>[435]</sup>	<a href="#">Islamic State</a>	<a href="#">Syrian Civil War</a>
1	Suicide bombing	5	Unknown	 <a href="#">Aden, Yemen</a>	A suicide bomber attacked the security chief's motorcade in the southern port city, killing five of his bodyguards. <sup>[436]</sup>	<a href="#">Islamic State</a> (suspected)	<a href="#">Yemeni Civil War</a>
1	Attack, suicide car bombing	<b>22</b> (+12)	Unknown	 <a href="#">Runirgod, Somalia</a>	Militant group <a href="#">Al-Shabaab</a> attacked and recaptured a town in <a href="#">Somalia's Middle Shebelle</a> region killing 22 Somali soldiers. The militants used a suicide car bomb in the assault and seized at least three military vehicles. <sup>[437]</sup>	<a href="#">Al-Shabaab</a>	<a href="#">War in Somalia</a>
1	Suicide bombing	<b>33+</b> (+2)	75	 <a href="#">Samawa, Iraq</a>	<b>2016 Samawa bombing</b> : In Iraq's deep Shiite south on Sunday, twin suicide car bomb blasts in the city of Samawa killing at least 33 people. At least 50 people were also wounded in the blasts, 230 kilometres (145 miles) south of Baghdad. The Islamic State group claimed responsibility for the rare attacks. <sup>[438]</sup>	<a href="#">Islamic State</a>	<a href="#">Iraqi Civil War</a>
2	Bombing	1	8	 <a href="#">Baghdad, Iraq</a>	A bomb exploded near a popular market in Tarmiya District in northern <a href="#">Baghdad</a> , killing one person and injuring eight others. <sup>[439]</sup>	<a href="#">Islamic State</a>	<a href="#">Iraqi Civil War</a>
2	Suicide car bombing	18+ (+1) <sup>[440]</sup>	45	 <a href="#">Baghdad, Iraq</a>	Sixteen <a href="#">Shiite</a> pilgrims were killed and 43 others wounded in a suicide car bomb explosion in the southern Iraqi capital of <a href="#">Baghdad</a> . <sup>[441]</sup>	<a href="#">Islamic State</a>	<a href="#">Iraqi Civil War</a>
2	Suicide car bombing	1	23	 <a href="#">Diyarbakır, Turkey</a>	One soldier was killed and 23 people were injured in a suicide car bomb against the security forces in <a href="#">Diyarbakır</a> . <sup>[442]</sup>	<a href="#">PKK</a>	<a href="#">PKK rebellion</a>

**Terror Incidents: 1<sup>st</sup> to 21<sup>st</sup> May 2016 = 128**  
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# Terror Events: *Mid-May 2016 - Wiki*

14	Attack	20 (+6)	Unknown	 Deir ez-Zor, Syria	ISIL militants attacked a hospital in the eastern Syrian city of Deir ez-Zor Saturday, killing 20 pro-government fighters. <sup>[528]</sup>	Islamic State	Syrian civil war
14	Melee attack	1	0	 Bandarban, Bangladesh	Police in Bangladesh said a 75-year-old Buddhist monk has been hacked to death in the south-eastern district of Bandarban. <sup>[529]</sup>	Islamic State (suspected)	Internal conflict in Bangladesh
14	Suicide bombing	2 (+1)	12	 Helmand Province, Afghanistan	At least two people are killed and 12 injured after a suicide bomb attack on a police training center in Helmand Province. <sup>[530]</sup>	Taliban (suspected)	War in Afghanistan
14	Bombing	2	7	 Baghdad, Iraq	A bomb exploded near shops in Iskan neighborhood in Mansour area in western Baghdad, killing two people and wounding seven others. <sup>[531]</sup>	Islamic State	Iraqi Civil War
15	Shooting	2 (+4)	15	 Derbent, Russia	Militants killed two police in Russia's Dagestan, the Islamic State claimed responsibility. <sup>[532]</sup>	Islamic State	Insurgency in the North Caucasus
15	Suicide bombing	14+ (+9, maybe more)	20+	 Taji, Iraq	<b>2016 Iraq Gas Plant attack:</b> Suicide bomb attacks in a state owned cooking gas plant in Taji north of Baghdad kill at least 14 people. <sup>[533][534]</sup>	Islamic State	Iraqi Civil War
15	Attacks	15+ (attackers maybe killed)	Unknown (over 29)	 Baghdad, Iraq	The total number of fatalities from bomb attacks in or close to the capital not including the one in Taji is at least 15. <sup>[535]</sup>	Islamic State	Iraqi Civil War
15	Suicide bombing	47+ (+1)	60+	 Mukalla, Yemen	<b>2016 Yemen Police bombings:</b> A suicide bombing killed at least 47 and injured at least 60 in the southern city of Mukalla. Some sources say 40 were killed. <sup>[536][537]</sup>	Islamic State	Yemeni Civil War
15	Car bombing	2	9	 Latifiya, Iraq	At least 15 people, including Iraqi army members, had been either killed or wounded in a bomb blast that targeted a military convoy south of Baghdad. <sup>[538]</sup>	Islamic State	Iraqi Civil War

**Terror Incidents: 1<sup>st</sup> to 21<sup>st</sup> May 2016 = 128**

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# 17<sup>th</sup> Nov 2015: “Islamic State is Plotting Deadly Cyber-Attacks”: *George Osborne*



**£1.9bn Cybercrime Budget**  
**UK National Cyber Centre**  
**National Cyber Crime Unit**

# 21<sup>st</sup>C Cybersecurity *“Threats & Trends”*

- *20 Year* Evolution of CyberCrime & CyberTerror: *1995-2015*



*.....and the “Bad Guys” are currently winning!*

Image: David Shankbone: Occupy Wall Street – Sept 2011

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# 21<sup>st</sup>C Cybersecurity *“Threats & Trends”*

- *20 Year* Evolution of CyberCrime & CyberTerror: *1995-2015*
- *“21<sup>st</sup> Century Colonisation”* of Worldwide Internet by eCriminals, Hacktivists and CyberTerrorist Organisations
- *Global Connectivity* of Critical National Infrastructure (CNI) significantly increases CyberTerror Risks for ALL Nations!
- *High Security Risks:* Most Governments & Businesses are currently not well secured against Cyber Attacks & eCrime

***.....and the “Bad Guys” are currently winning!***

# Cyber-Physical Threat Scenarios

- **Physical “Penetration”**: Operations Perimeter penetrated to allow theft or corruption of Cyber Information / IT DataBases and Confidential Plans
- **Cyber “Hack”**: Malicious changes to Cyber Access Controls & IT Databases to allow Criminals/Terrorists to enter Target Facilities (such as Military Bases, Banking HQ, Telco/Mobile Network Operations)
- **Convergent Threats** – Criminals/Terrorists will attack at the weakest links which in the 21<sup>st</sup>C will be BOTH Cyber Network Operations and Physical Security Ops

.....**Cyber Attacks** are now fully industrialised with Malicious Code “Kits” & Botnets for sale *“by the hour”* on the **DARKNET**



# CyberCaliphate: *Middle East and Africa(1)*



**Multiple *CyberAttacks* of US Central Command (CENTCOM) & *NewsWeek* - 2015**



# CyberEspionage: *Middle East and Africa* (2)

## Desert Falcons. Victims of advanced targeted attack.

Activist Education Financial Government Industrial Energy Media Political Trade and commerce Religious Unknown

### High infection rate (1500+)

Palestine

### Medium infection rate (500+)

Egypt

Israel

### Low infection rate (50+)

Jordan

United Arab Emirates

Saudi Arabia

United States of America

South Korea

Russia Federation

Lebanon

Iraq

Canada

Qatar

Germany

China

Syria

Yemen

Algeria

India

### Lowest infection rate

Kuwait

Norway

Turkey

Sweden

France

Mexico

Morocco

Libya

Albania

Romania

Italy

Hungary

Australia

Japan

Zimbabwe

Uzbekistan

Ukraine

Taiwan

Sudan

Portugal

Mauritania

Mali

Iran

Greece

Cyprus

Belgium

Netherland

Pakistan

Denmark

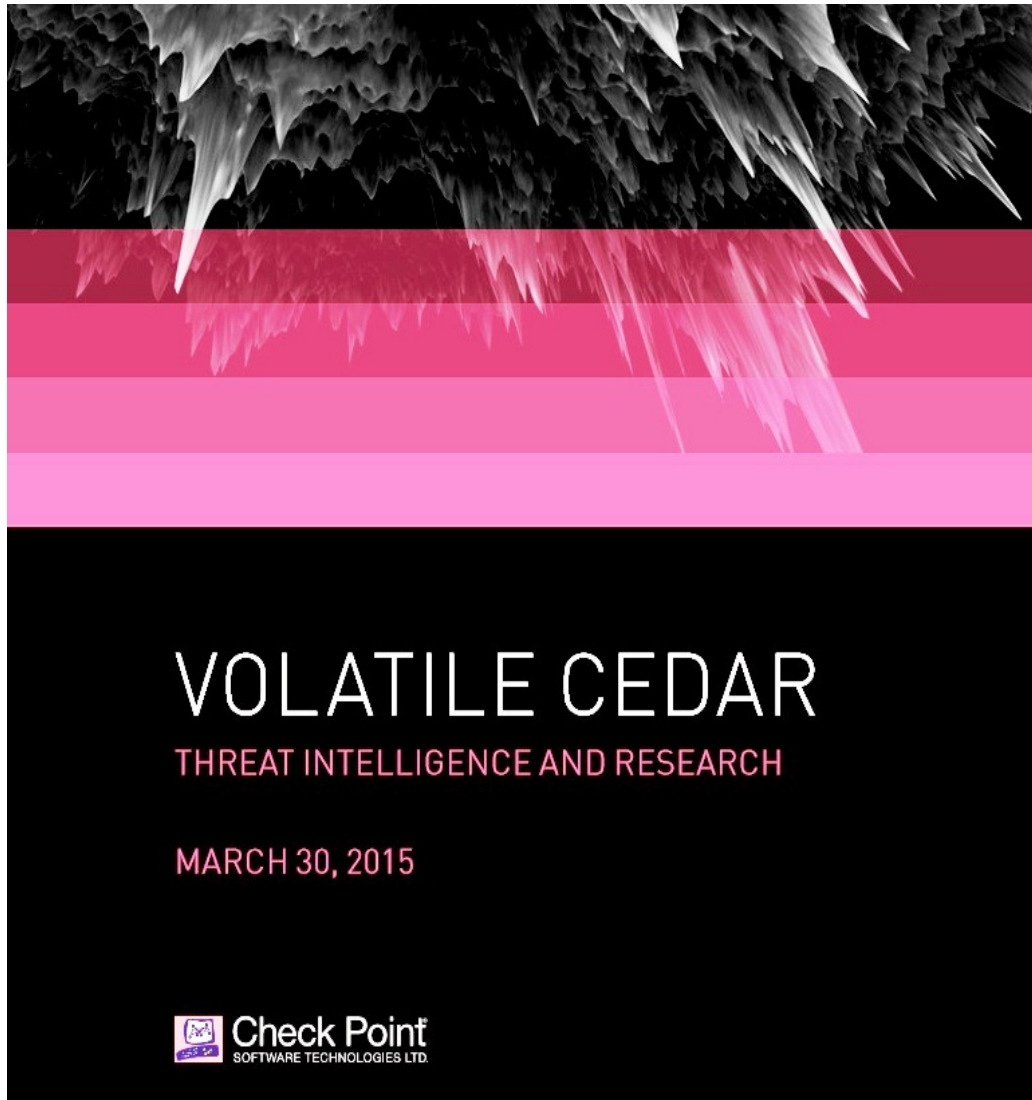
Bosnia and Herzegovina

© 2015 Kaspersky Lab

KASPERSKY



# CyberEspionage Group: *Volatile Cedars*



“*Volatile Cedars*” :  
Cyber Espionage Group  
operating from Lebanon  
since 2012 with in-depth  
research and full report  
by Checkpoint Software  
Technologies Ltd (2015)

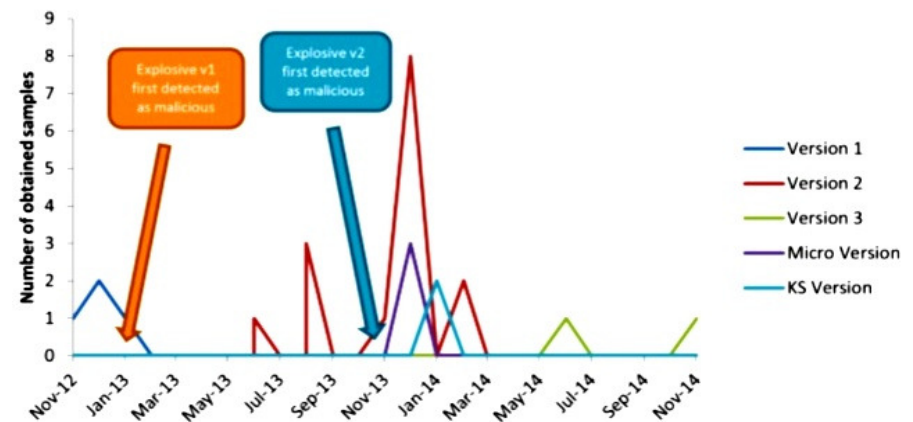


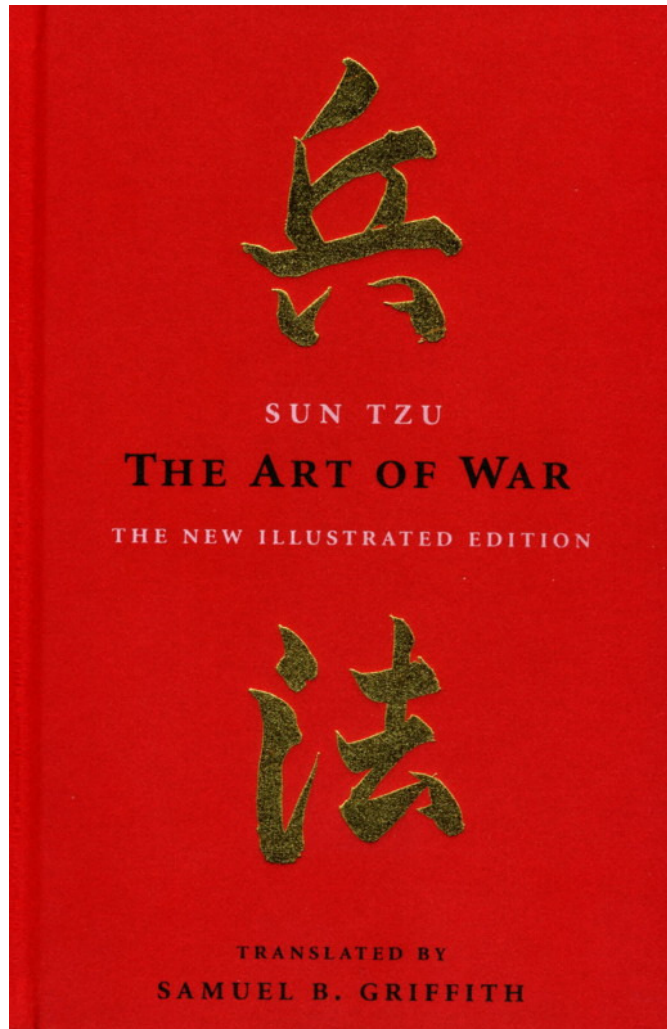
Figure 1 - Explosive version timeline

# Anonymous-Hacktivist declare *“Total War”* on ISIS after Paris Attacks – 16<sup>th</sup> Nov 2015

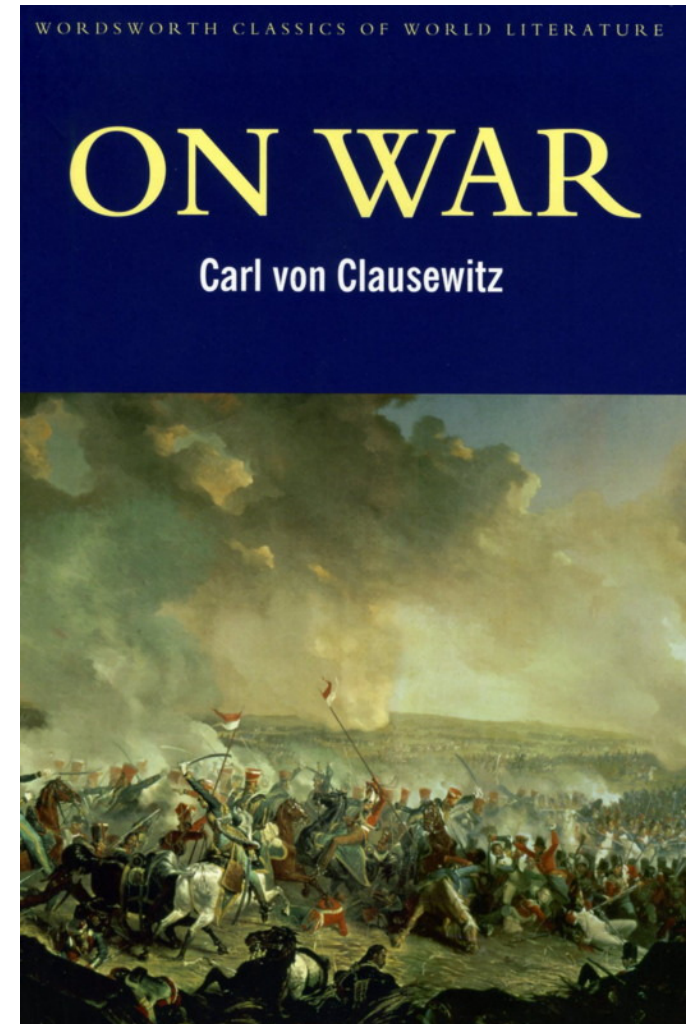




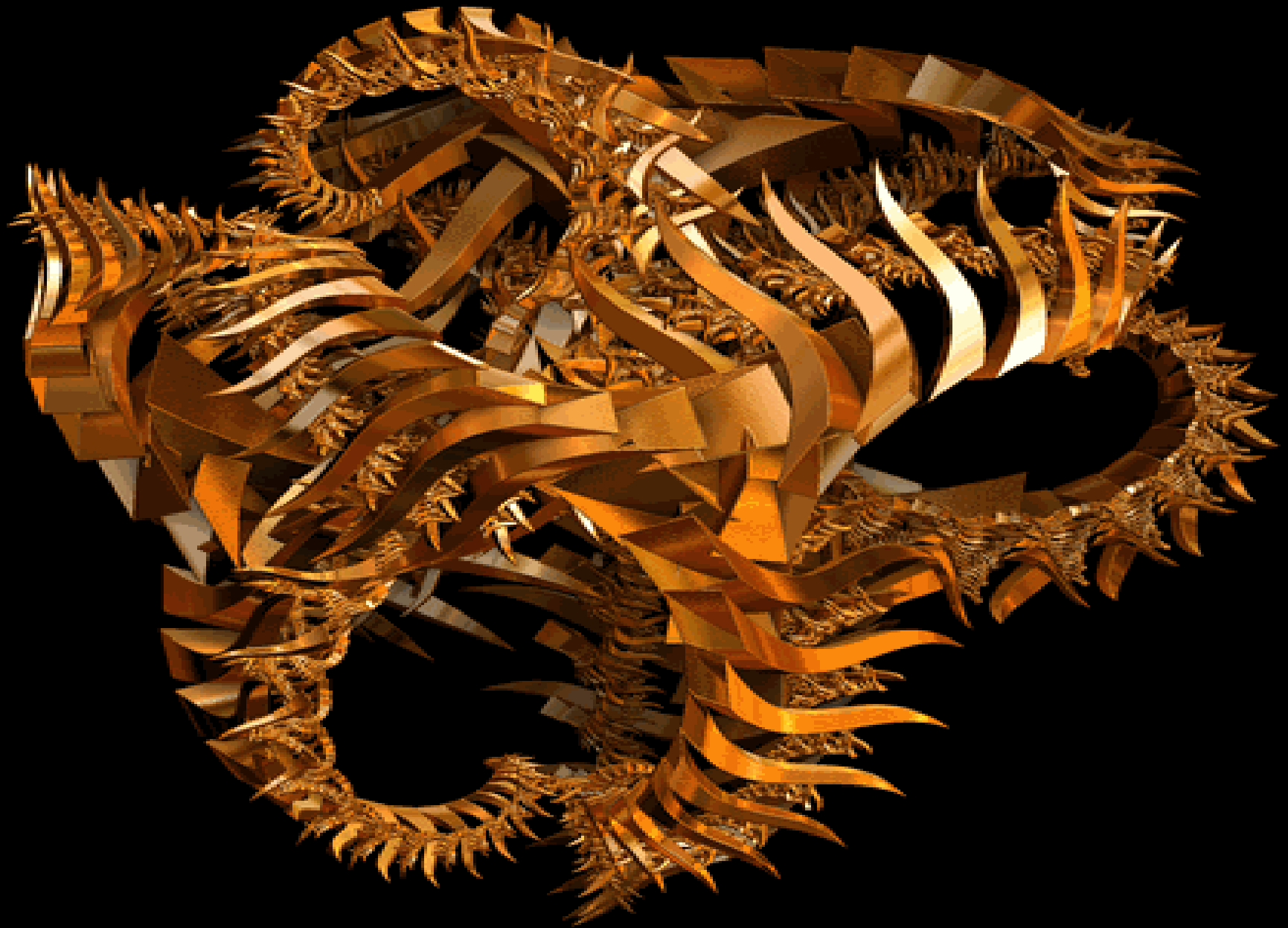
# *“CyberWar”* Strategies *from* Classic Works!



Recommended  
“Bedtime  
Reading”  
*for*  
Cybersecurity  
Specialists!



*...Classic Works on “War” are just as relevant today for Cybersecurity as pre-21<sup>th</sup> C*



**“Alien Cyber-Terrorist!”**



# Command & Control (C2) *Malware* Servers

- “Global 21<sup>st</sup> Century *Cyber-Colonisation*” -



Image: [www.fireeye.com](http://www.fireeye.com) – FireEye Inc (c)

# Typical C2 *Malware* Signatures

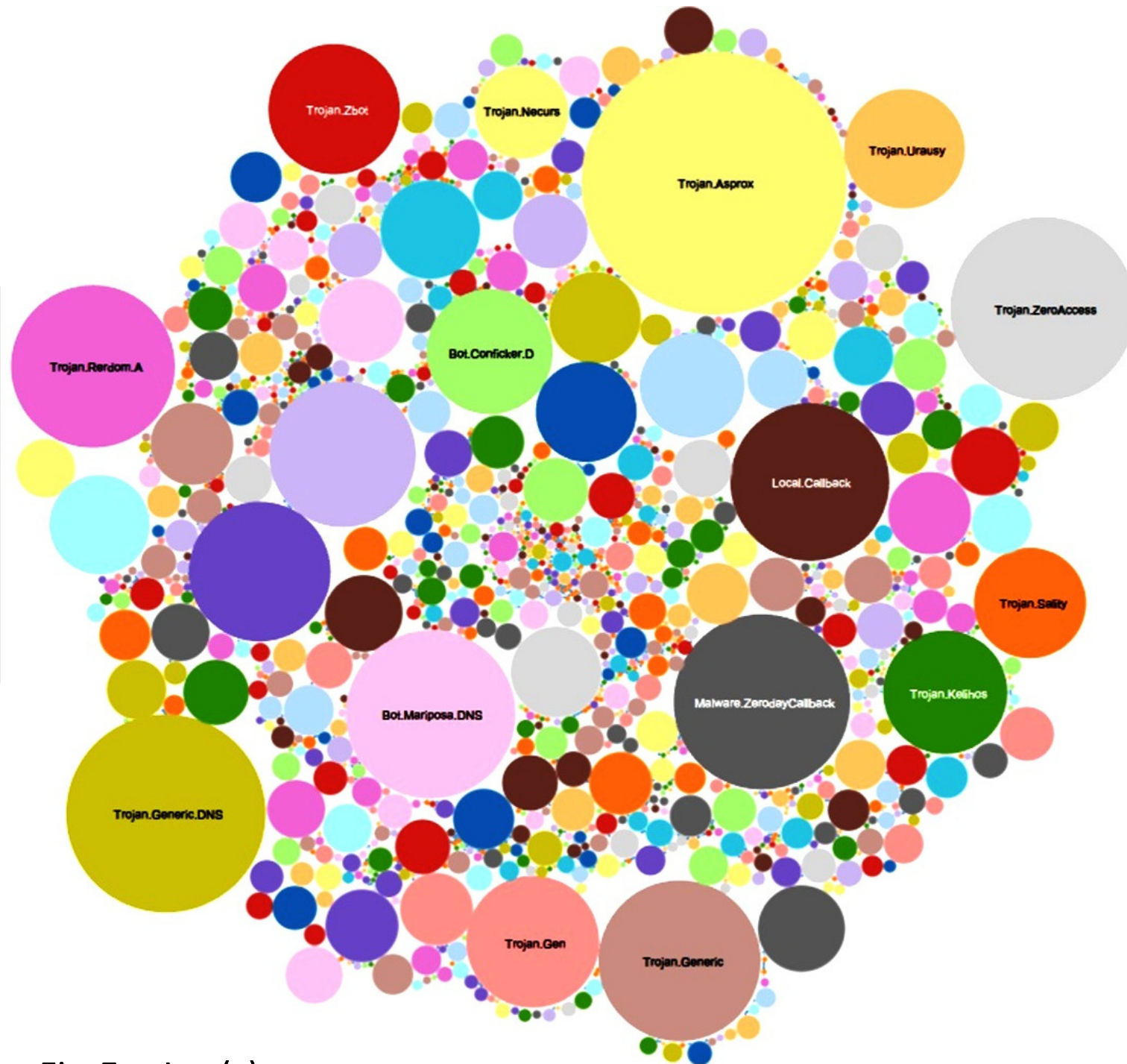


Image: [www.fireeye.com](http://www.fireeye.com) – FireEye Inc (c)

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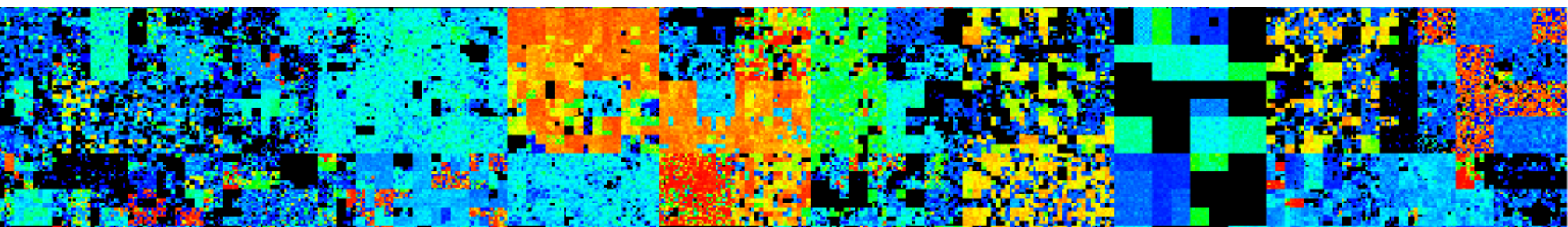




# Crucial Cybersecurity Role in “War on Terror”



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# (3) 20<sup>th</sup>C *Physical Security Solutions*

- **Borders & Barriers:** “Intelligent” Perimeter Fences
- **Riot Control:** Water Cannon, Tear Gas & Rubber Bullets
- **Physical Weapons:** Automatic Guns & Smart Missiles
- **Airborne Security:** Drones, Fighters & Bombers

....The emergence of *CyberCrime & CyberTerror* means that these legacy 20<sup>th</sup>C solutions are no longer effective in the prevention of 21<sup>st</sup>C *Cyber & Physical Terror Attacks*.



# Contrast between our Physical & Cyber Worlds

*Convergence to 21<sup>st</sup>C “Intelligent Worlds” will take time!*

## Physical World = “Space”

- Top-Down
- Dynamic
- Secrecy
- Territorial – “Geographical Space”
- Government Power
- Control
- Direct
- Padlocks & Keys
- Convergent
- Hierarchical
- Carbon Life
- Tanks & Missiles
- Mass Media

## Cyber World = “Time”

- Bottom-Up
- Self-Organising
- Transparency
- Global – “Real-Time”
- Citizen Power
- Freedom
- Proxy
- Passwords & Pins
- Divergent
- Organic
- Silicon Life
- Cyber Weapons & “Botnets”
- Social Media

***“Smart Security” will require Embedded Networked Intelligence in ALL future IoT devices***

# Crucial Cybersecurity Role in “War on Terror”



1 – Background: “21<sup>st</sup>C Security Landscape”

2 – Cybersecurity: Players & Targets

3 – 20<sup>th</sup> C Physical Security Solutions

4 – 21<sup>st</sup> C Integrated Cyber Solutions

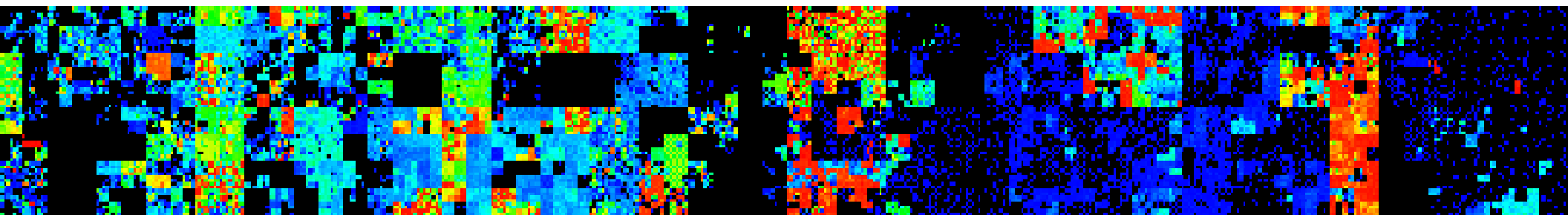
5 – Intelligent Real-Time Cyber Tools

6 – Security Sectors: Threat Scenarios

7 – “Terror” Defence: Critical Infrastructure

8 - Practical CyberSecurity Strategies

9 – YOUR TOP 3 Actions & RoadMap





# (4) 21<sup>st</sup>C Integrated *Cyber* Solutions

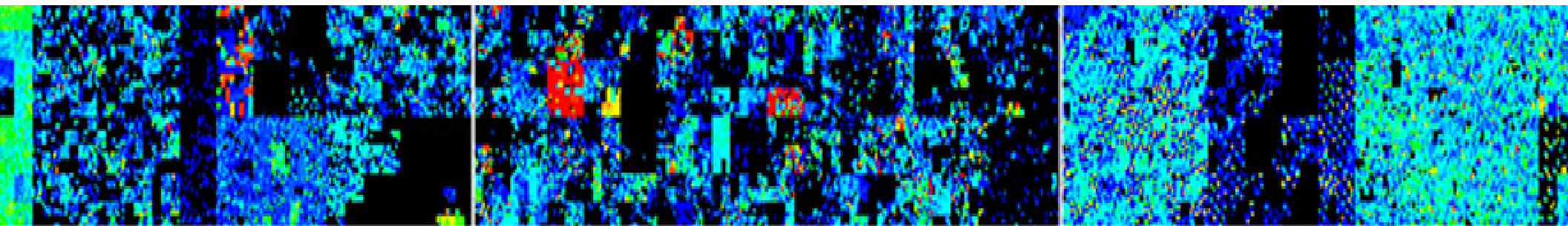
- **ALL Security Tools** will evolve from Physical to Integrated Cyber-Physical during 3 to 5 years.
- **New 21<sup>st</sup> CyberSecurity** Solutions include:
  - Intelligent “Bad Guy” Profiling & Tracking
  - Real-Time Social Media & On-Line Monitoring
  - CCTV, Facial Recognition & Video Analytics
  - Integrated Cyber-Biometrics & Digital Forensics
  - ANPR Vehicle Location and GPS/Aerial Tracking
  - Adaptive Behavioural Modelling of Net Traffic & Users

*....We explore these Integrated **Cyber Solutions** in-depth & their Business Implementation in Sector Scenarios*

# Crucial Cybersecurity Role in “War on Terror”



1 – Background: “21 <sup>st</sup> C Security Landscape”	2 – Recent “Terror” Events: Case Studies	3 – 20 <sup>th</sup> C Physical Security Solutions
4 – 21 <sup>st</sup> C Integrated Cyber Solutions	5 – Intelligent Real-Time Cyber Tools	6 – Security Sectors: Threat Scenarios
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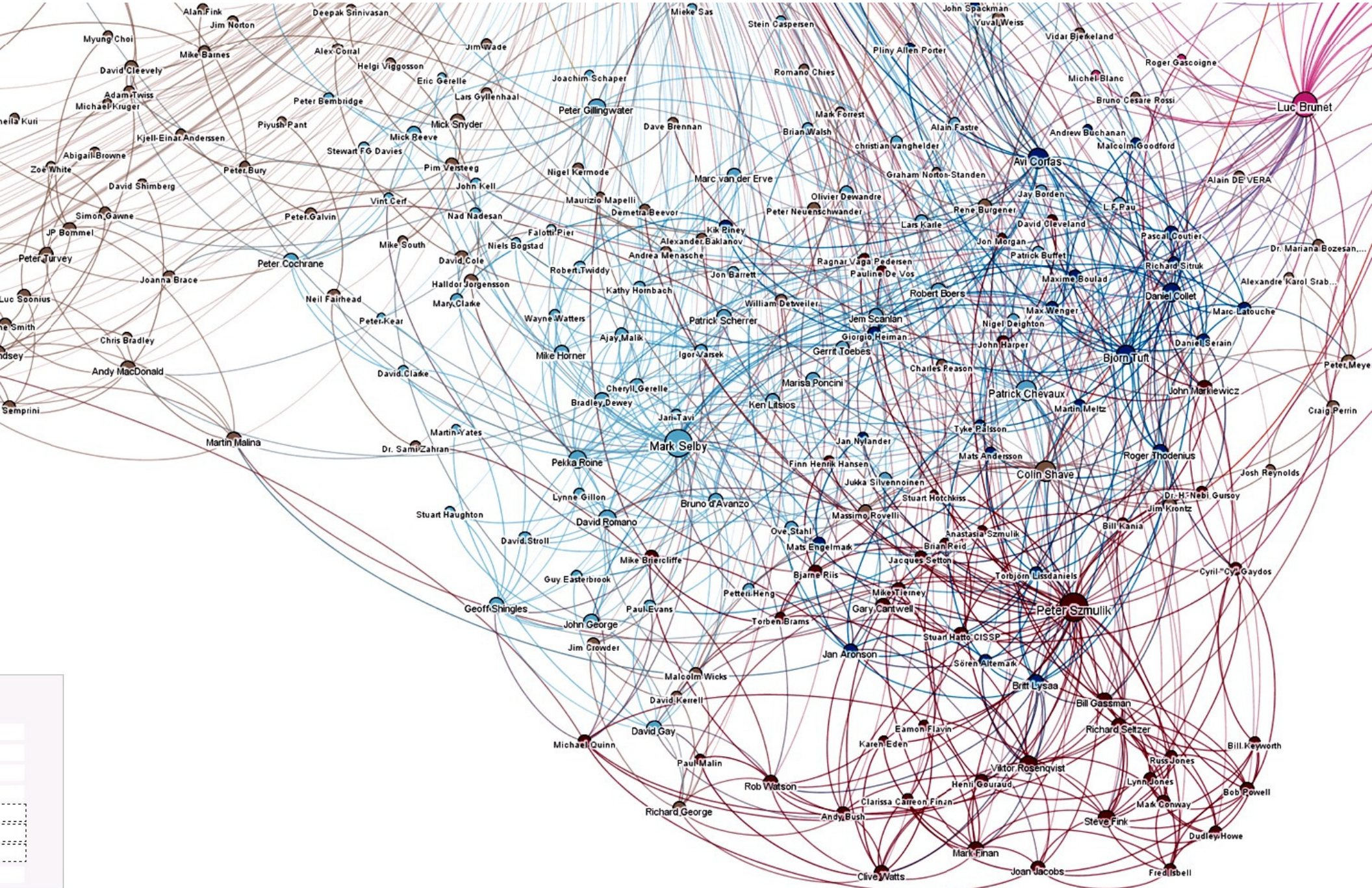
# (5) Intelligent Real-Time *Cyber* Tools

- Defence against 21<sup>st</sup>C Terror Attacks requires Cyber Operations in *Real-Time @ Light Speed!*
  - a) Smart Target *Surveillance*, Profiling & Tracking
  - b) User & Device *Authentication* – “Internet of Things”
  - c) Cyber *Biometrics* & *Forensics* – Pre/Post Attack
  - d) Real-Time Analysis of *Social Media*, Mail & Comms
  - e) *Self-Adaptive* User, IT Asset & Net Traffic *Modelling*

.....*Mitigation of Attacks* requires *Intelligent Cyber Computing Solutions* running *@ Light Speed!*



# Mapping *Social Media* Networks: *LinkedIn*





# *“Real-Time”* CCTV City Surveillance



**Analysing and Tracking Targets requires Intelligent Video Analytics**

# Regional CCTV Control & Surveillance



**CCTV Control Room Operators with Multiple Displays need **Cyber Analysis Tools** Including **High Speed Video Analytics, Facial Recognition and Data Mining Tools****



# Metro Surveillance: *Charing Cross, London*



# *Real-Time* Surveillance: *Transportation*





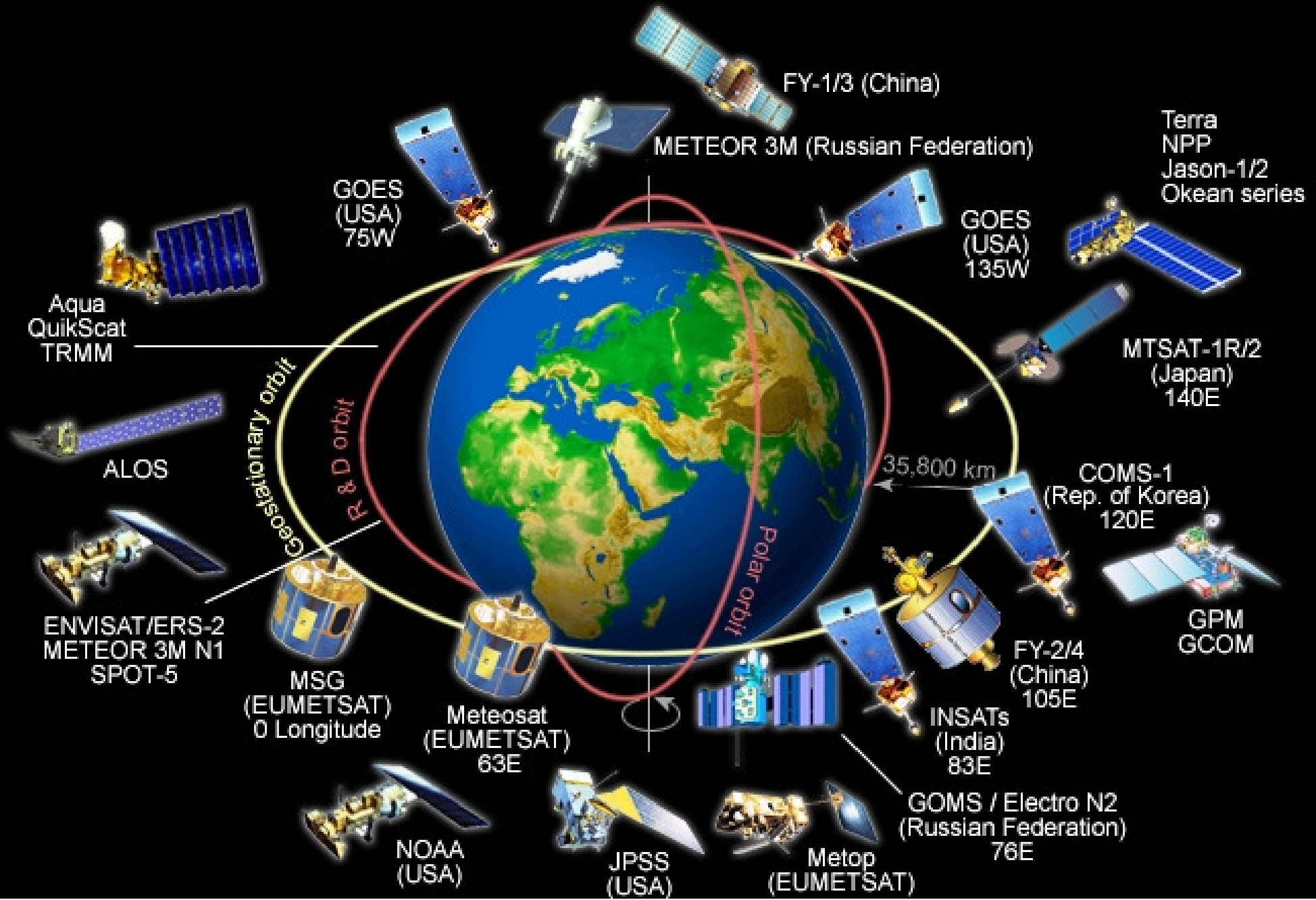
# “Near” Real-Time *Aerial & Satellite* Surveillance



Aerial Image: *Central Prague, Czech Republic*

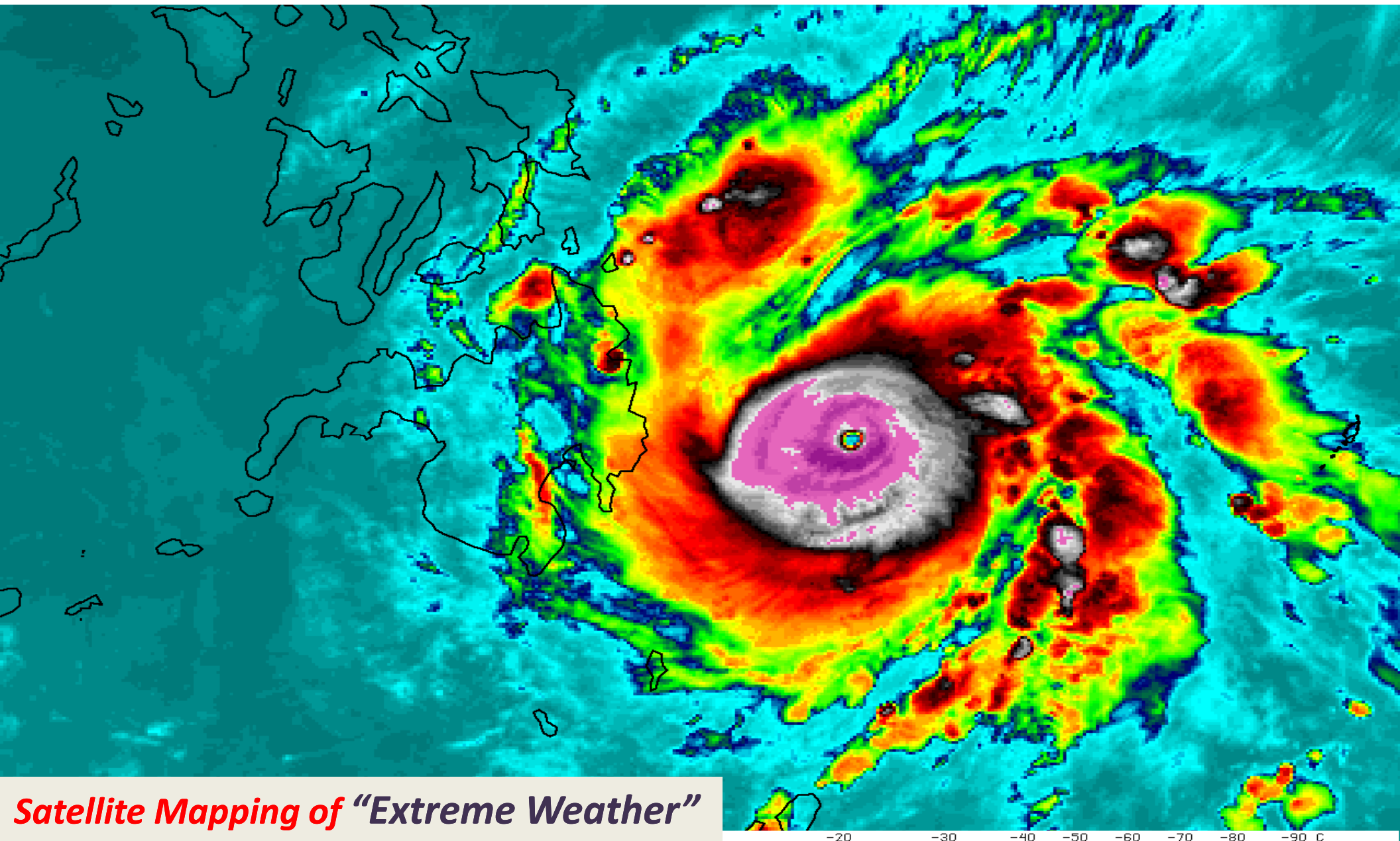


# The Global Satellite Observation System





# ***“Real-Time”*** Meteorological Analysis



***Satellite Mapping of “Extreme Weather”***

MTSAT-1R - IR 10.8 MICROMETERS (CHANNEL 02) - 10:57 UTC 03 DECEMBER 2012 - CIMSS / SSEC / UNIVERSITY OF WISCONSIN - MADISON

**33<sup>rd</sup> International East/West Security Conference**

**The Crucial Role of Cybersecurity  
in the “War on Terrorism”**

- Prague, Czech Republic: 6<sup>th</sup>-7<sup>th</sup> June 2016 -  
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# *“Smart Analysis Tools”*: 3D Simulation Modelling for *Security Crisis* & Disaster Management





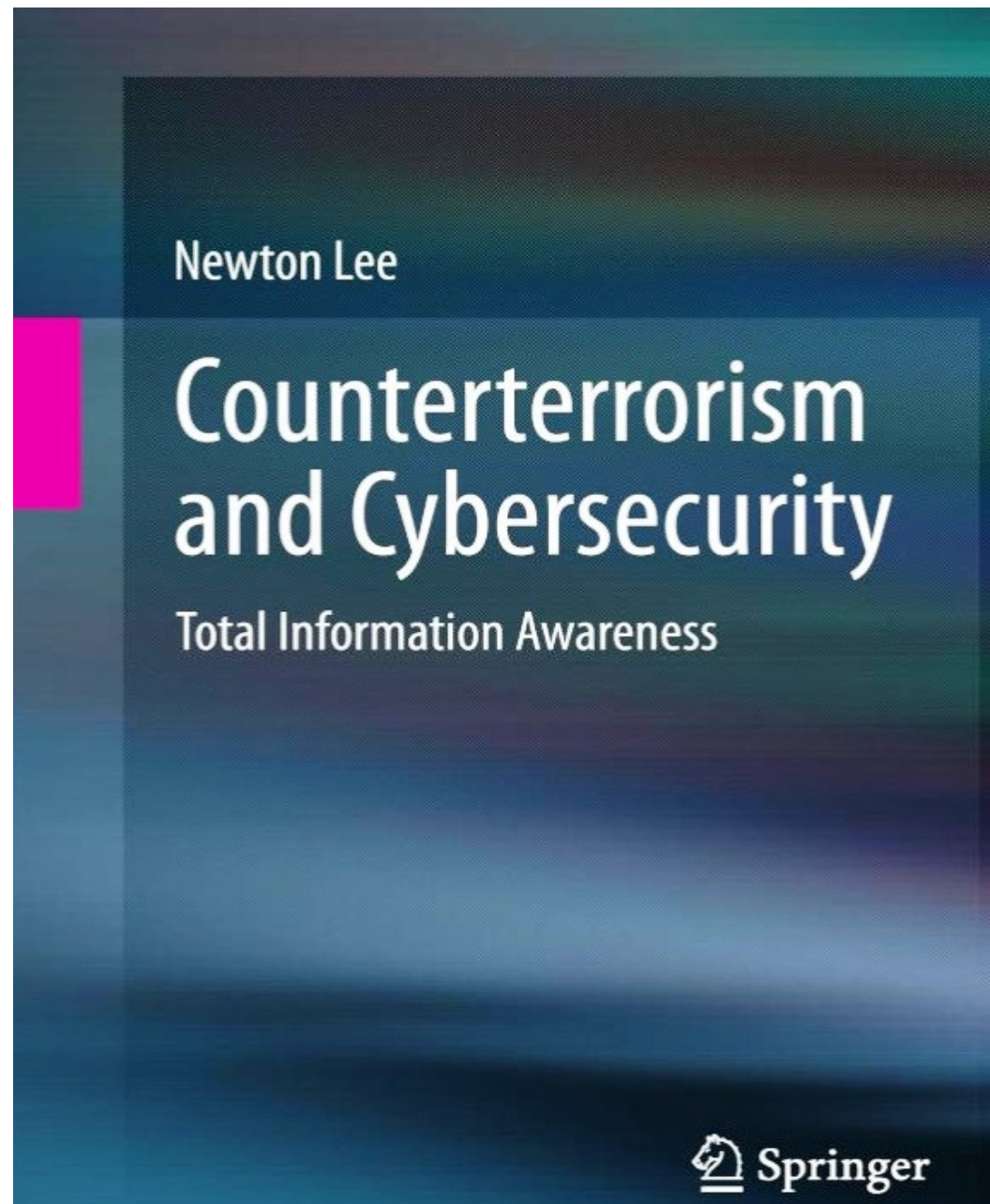
# Counter Terrorism & Cyber Security: *Newton Lee*

## *Total Information Awareness*

<b>5</b>	<b>Artificial Intelligence and Data Mining</b> .....
5.1	Artificial Intelligence: From Hollywood to the Real World. ....
5.2	Intelligent CCTV Cameras. ....
5.3	Data Mining in the Age of Big Data .....
5.4	Knowledge Representation, Acquisition, and Inference .....
5.5	Dynamic Mental Models .....
5.6	Modeling Human Problem Solving .....
5.7	Structural Topology and Behavioral Causality .....
5.8	Component Clustering and Decoupling .....
5.9	Analytical Models and Experiential Knowledge .....
5.10	The DM <sup>2</sup> Algorithm .....
5.11	AI Applications in Counterterrorism .....
5.12	Massively Multi-Participant Intelligence Amplification .....
	References .....

### **Part III Counterterrorism Technologies: Social Media and Cybersecurity**

<b>6</b>	<b>Social Media and Two-Way Street of Total Information Awareness</b> . . .
6.1	It's a Small World, with CCTVs .....
6.2	Facebook Nation: Total Information Awareness .....
6.3	Surveillance Satellites, Tracking Devices, Spy Malware, and Drones .....
6.4	Two-Way Street of Total Information Awareness .....
6.5	No Doomsday for the Internet .....
6.6	Web 2.0 for Intelligence Community: Intellipedia, A-Space, Deepnet. ....
	References .....

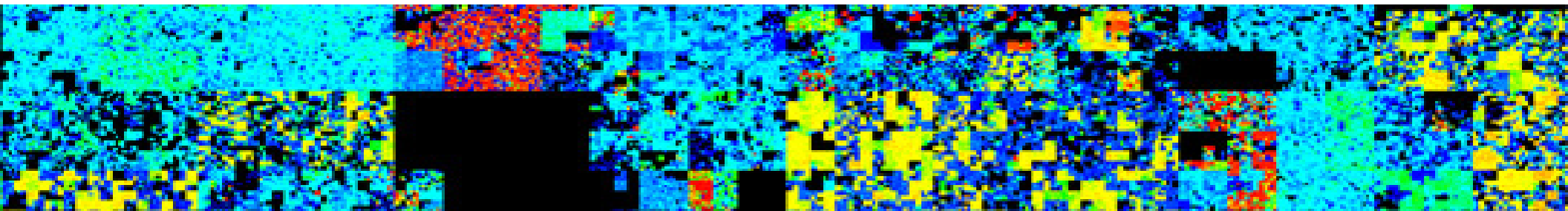




# Crucial Cybersecurity Role in “War on Terror”



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# (6) Security Sectors: *Threat Scenarios*

- **Terrorist Threats** may potentially target **ANY** and **ALL** Business and Government Sectors!....
  - a) Finance & Banking** – ATMs, Fraud, Money Laundering
  - b) Transport & Tourism** – Airports, Metro, Tourist Sights
  - c) Energy & Utilities** – Nuclear, Chemical & Water Resource
  - d) Government & Defence** – Intel Theft, Hacking, Military
  - e) Education & Research** – Campus-Wide Armed Attacks
  - f) Industry & Manufacturing** – Competitive Espionage
  - g) Retail, Sports & Culture** – Shopping Malls, Olympics

...**CSOs** are advised to **URGENTLY** define practical & effective action plans to mitigate attacks!...

# CSO: *Board Level Security Integration*

- **20<sup>th</sup>C Legacy Model:** Physical and IT Security managed with minimal common operations
- **21<sup>st</sup>C CSO Model:** Business & Government urgently need to manage TOTAL Cyber-Physical Operations at C-Suite Board Level
- **Investment Plan:** CSOs need professional team & Investment Budget to manage physical & cyber security risks, threats and attacks!



# Cyber Integration with *Physical Security Operations*

- **Cybersecurity** for Government, Business & Critical Sectors can now be integrated with operational physical security solutions including:
  - 1) **Advanced CCTV** Camera Surveillance of the Secure Government & Critical Facilities
  - 2) **Exterior ANPR** (Automatic Number Plate Recognition) Systems for Traffic & Parking
  - 3) Integration of the Cyber **CERT/CSIRT** with CCTV & Alarm Control Centres
  - 4) **Personnel RFID** and **Biometrics** for Office, Warehouse & Campus Access Controls
  - 5) Professionally trained **Security Personnel & Guards** – 24/7 – for top security facilities
  - 6) Implemented facility **Security Policy** for staff, visitors and contractors
  - 7) **Intelligent Perimeter** security controls for campuses and critical service facilities such as airports, power stations, refineries, hospitals and government institutions
  - 8) **On-Line Audit trails** and Electronic Log-Files for secure Physical Facilities
  - 9) Focus upon in-depth **Access Control** for computer server rooms & data storage

***“Integrated Real-Time Cyber-Physical Security Operations”***  
***“SMART SECURITY”***

# Traditional “*Physical Security*” Defences in the context of “Cybersecurity”

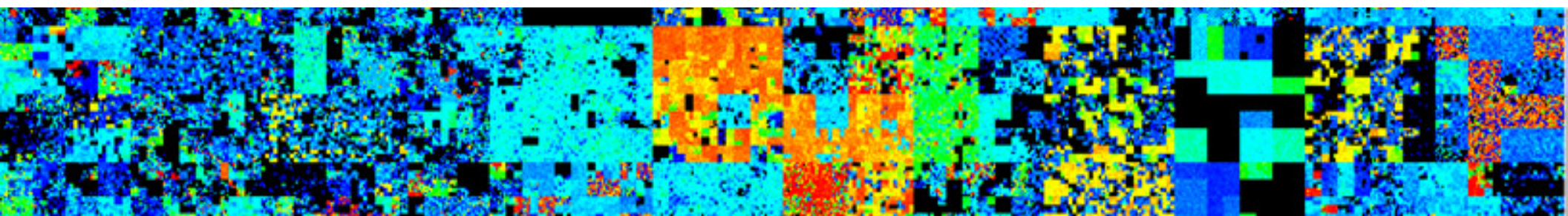
- **Compliance:** Investments in establishing and upgrading cybersecurity defences against cybercrime means that all physical security and associated operational staff should also be reviewed for compliance with policies, and audited to international standards
- **Integration:** Physical and Cybersecurity operations should be linked “step-by-step” at the command and control level in the main government or enterprise operations centre.
- **Physical Security** for critical service sectors such as governments, airports, banks, telecommunications, education, energy, healthcare and national defence should be included within the strategy and policies for Cybersecurity and vice versa
- **Upgrades:** In order to maximise security, Government and Businesses need to upgrade and integrate resources & plans for both physical & cybersecurity during the next years.
- **Roadmap:** I’d recommend developing a focused total security action plan and roadmap (Physical & Cyber) for each critical sector within YOUR National Economy & Enterprises



# Crucial Cybersecurity Role in “War on Terror”



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# (7) “Terror Defence”: *Critical Infrastructure*

- Integrated Cybersecurity Solutions are Crucial to the Defence of Critical National Infrastructure:
  - a) **Power Stations:** Particularly Nuclear Energy Sites
  - b) **Government Offices:** Parliaments & Govt Ministries
  - c) **Oil/Gas/Chemical Facilities:** Risk of Fires/Explosions
  - d) **Airports/Metro/Trains:** ALL Transport Transit Hubs
  - e) **Cultural/Sports :** Theatres, Olympics, World Cup
  - f) **Tourist Resorts & Sights:** High Economic Impact

**...Physical Security is no longer an effective defence!...**  
Now **Crucial** to Deploy & Integrate **Cyber Solutions** that protect User Access, Data Bases & Track **“Bad Guys”!**



# Critical Energy Industry Sector : *“Cybersecurity for Automated Industrial Control & Safety Systems”*



*Protection against “Stuxnet” type designer malware that attacks **SCADA** systems*

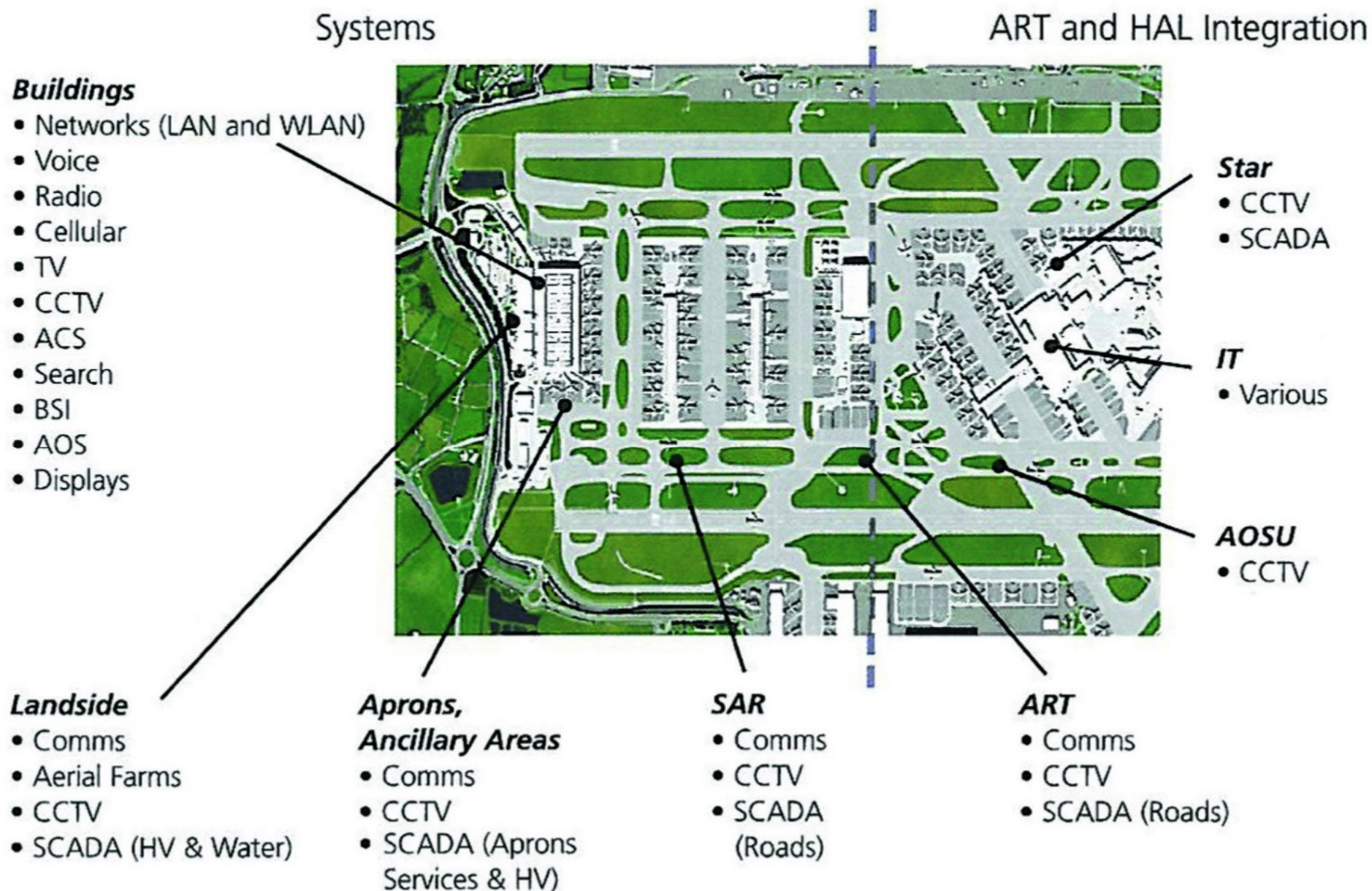


# *Emerging Physical & Cyber:* National Operations Room: - US Transportation Security Administration (TSA) -



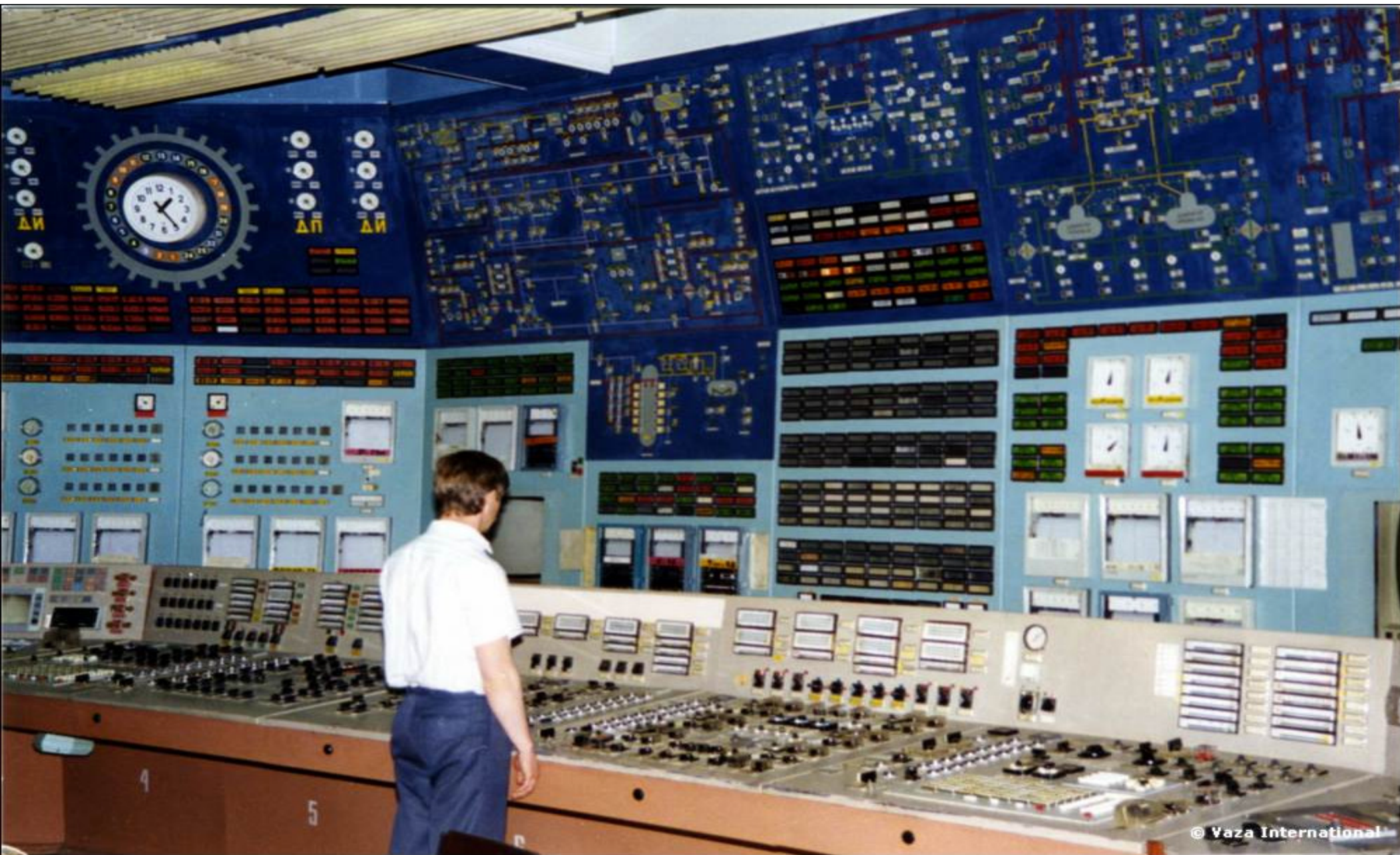


# Cybersecurity: International Airports: LHR-T5





# Control Room - *Kola Nuclear Power Station* - Russia



© Vaza International



# KolaNet Project for *Nuclear Safety & Security* :1990s





# International “KolaNet” Project Team

## - *Regional Nuclear Safety & Security* -

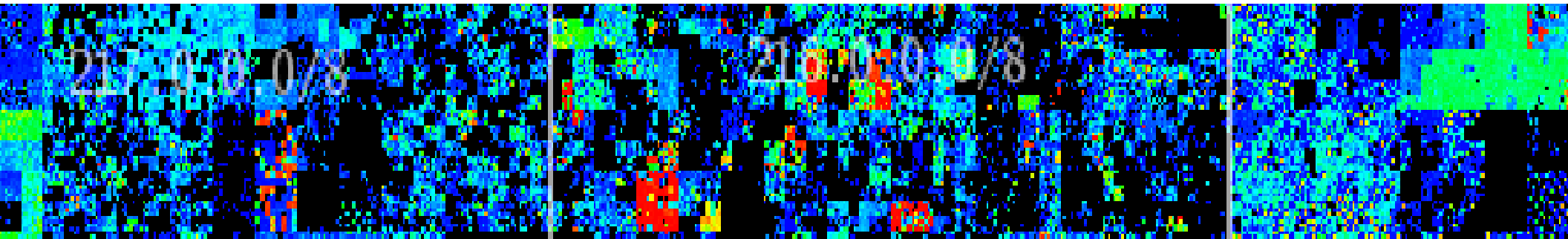




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# (8) Practical CyberSecurity Strategies

- Successful Cyber Strategies are Scaled from:  
**Device->User->Business->City->Country->Global**
  - a) Device:** Secure ALL devices connected to “IoT”
  - b) User:** Bio-ID, Real-Time Behaviour Modelling
  - c) Business:** CSO-Led, Professional Cyber Team
  - d) City:** Secure Transit Hubs, Culture & Sports Sites
  - e) Country:** Secure CNI, Profile & Track “Bad Guys”
  - f) Global:** Deploy UN/ITU CyberSecurity Agenda....Upgrade **ALL** your Legacy Security Tools & Inject **Cyber Solutions** to **YOUR** Business Operations!...

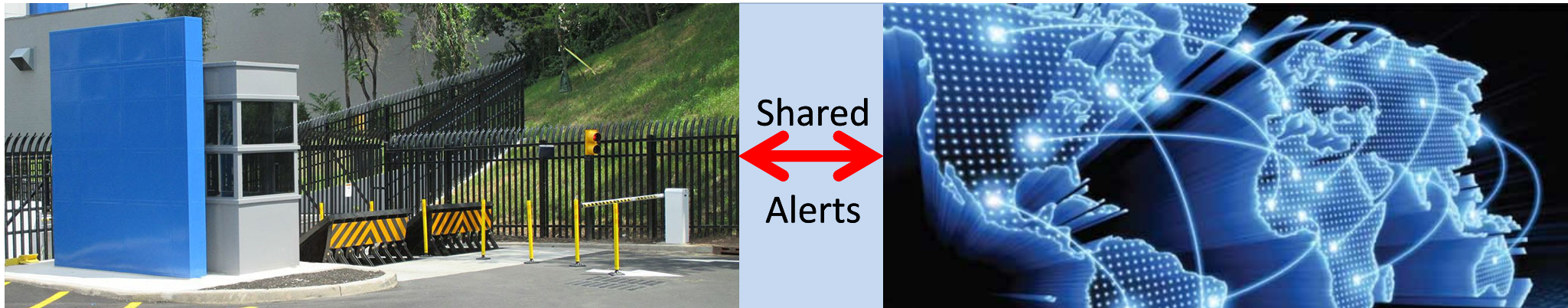


# Integration of Physical and Cyber Security

## Integrated CSO-led Management Team – *Merged HQ Operations*

Physical Security Operations

Cyber Security Operations



**Smart Security = Virtual Integration**

Corporate CSO-led Security Team  
***ONE – Shopping List!***



Integrated Management,  
Training, Standards, Plans  
***ONE – Architecture!***

***Final*** phase of *Cyber-Physical Integration* - Embedded Intelligence in ALL Devices - ***Internet of Things***

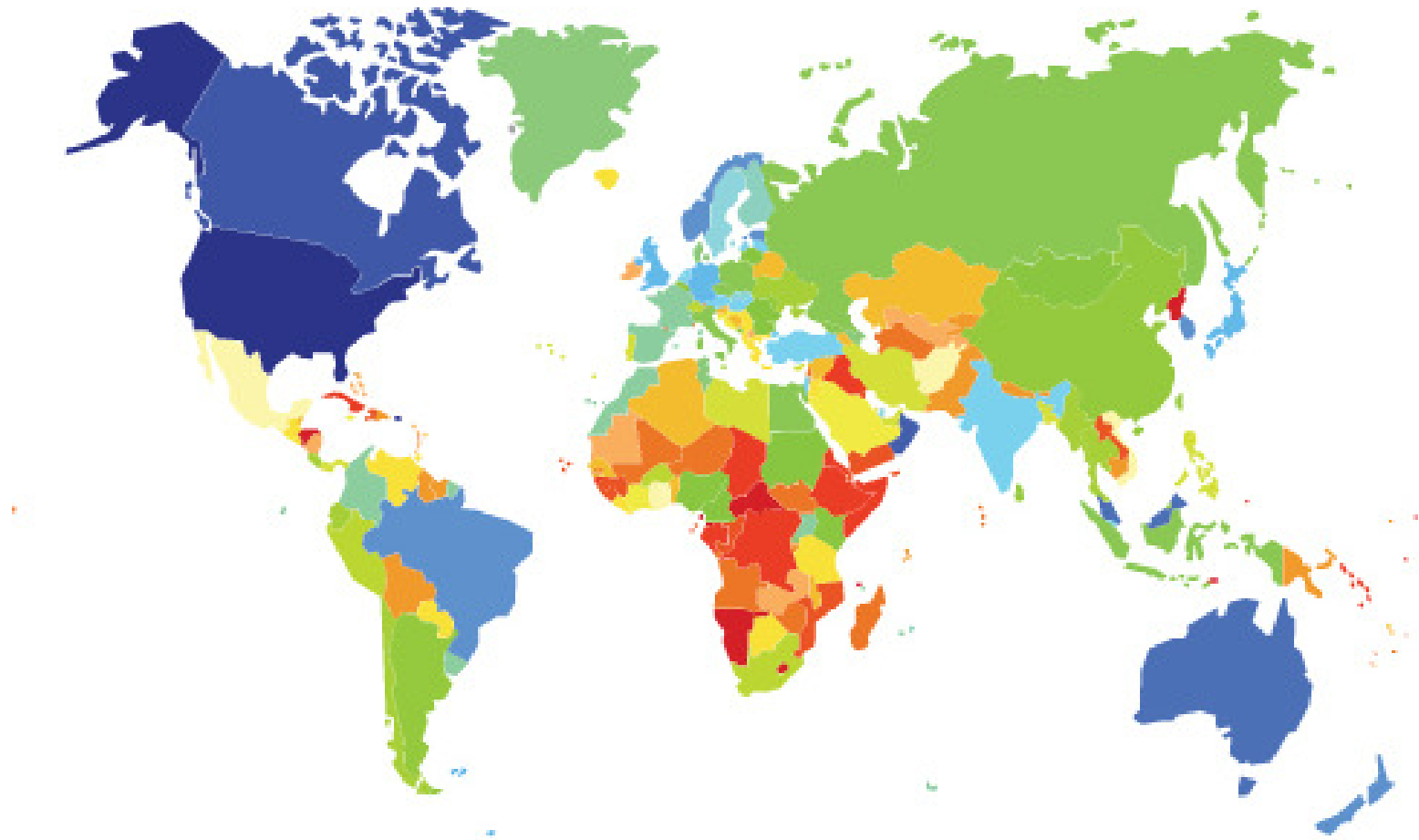
# Hybrid 21<sup>st</sup>C Business Organisation

## - *Hierarchical & Organic* -

- **Transition** from 20<sup>th</sup>C to 21<sup>st</sup>C Business, Governance & Security requires fundamental re-structuring of operations:
  - **20<sup>th</sup>C Industrial Organisations:** Hierarchical Bureaucracies (Pyramids) to manually process data/information.
  - **21<sup>st</sup>C Intelligent Organisations:** Networked Peer-to-Peer Business & Agencies with data processed in “**Cyber Clouds**”
- **Living Systems**, such as Mammals, use Hybrid Organisation of their extended nervous system (**Brain & Body**) to optimise real-time learning and effective environmental adaptation!
- **Smart Security Solutions** will also require **Hybrid** organisation to optimise real-time response to **Cyber & Physical** Attacks.



# UN/ITU – Global Cybersecurity Index (Dec 2014)



ABIresearch<sup>®</sup>

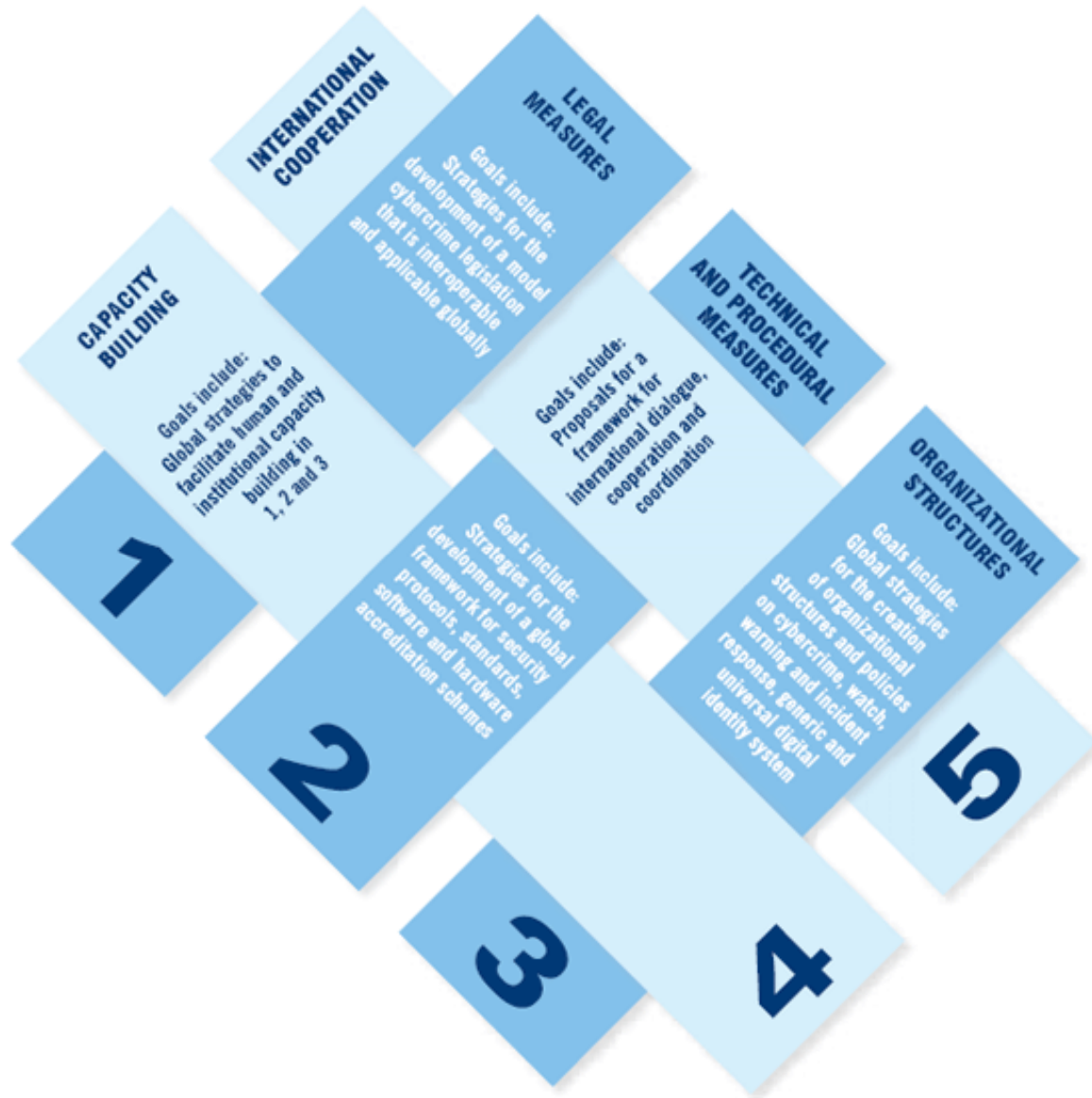


Global  
Cybersecurity  
Index

National Cybersecurity Commitment



# UN/ITU:– *Global Cybersecurity Agenda (GCA)*



## The UN/ITU GCA - Global Cybersecurity Agenda:

- 1 – Legal Measures
- 2 – Technical Measures
- 3 – Organisational Measures
- 4 – Capacity Building
- 5 – International Cooperation

...The **UN/ITU** constitutes a **unique global forum** for partnership and the discussion of **cybersecurity**.



# Worldwide Security in *Cyberspace*!

- (4) – Capacity Building

- (1) –  
Legal Measures

- (2) –  
Technical  
&  
Procedural  
Measures

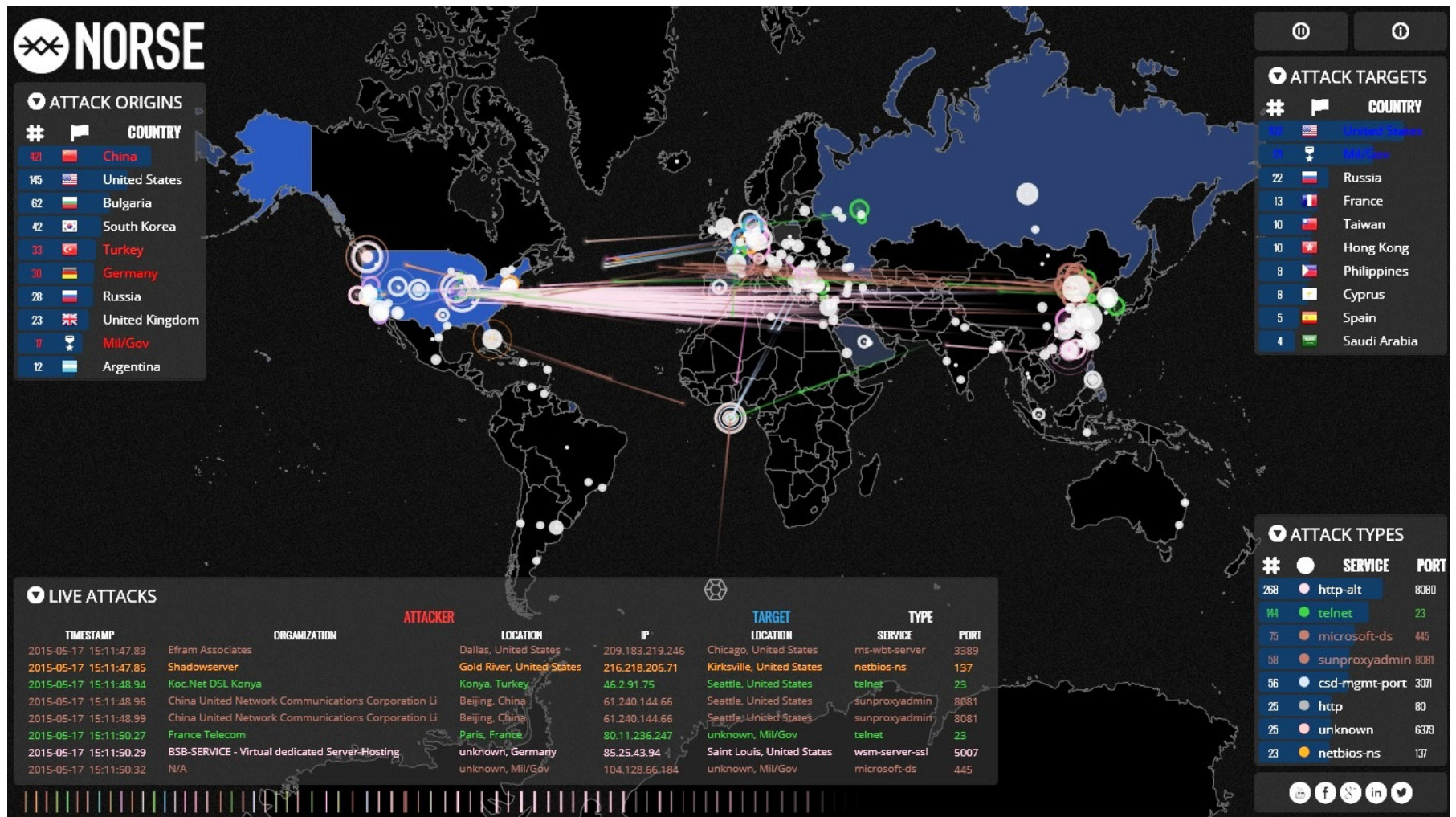
- (3) –  
Organisational  
Structures

- (5) – Regional and International Collaboration



# The Cybersecurity Industry 10 Year Challenge:

## - Apply AI Apps for Real-Time Cyber Defence -



Deploy **Light-Speed "AI-Neural Security"** against the 24/7 Attacks from **"Bad Cyber Guys"**



# The **Cybersecurity** Industry 10 Year Challenge:

## - *Apply AI Apps for Real-Time Cyber Defence* -

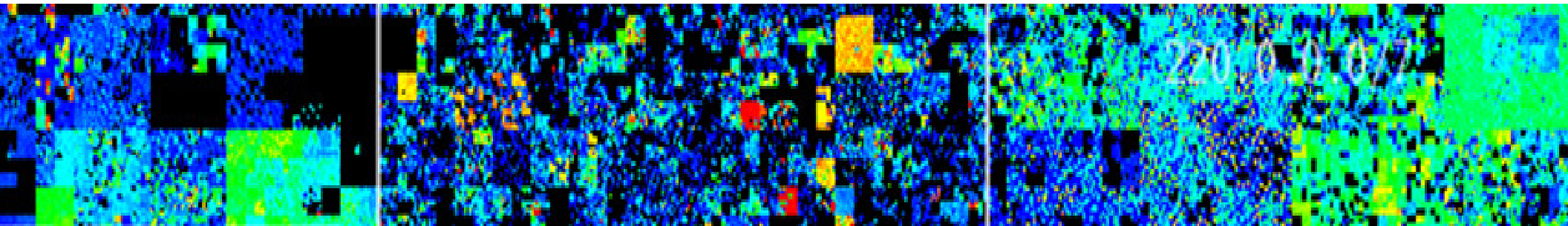


Deploy *Light-Speed "AI-Neural Security"* against the 24/7 Attacks from "*Bad Cyber Guys*"

# Crucial Cybersecurity Role in “War on Terror”



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# (9) YOUR Top 3 Actions & RoadMap

- **Action 1:** CSO-Led Board-Level Review & Audit of current Security Tools & Operations – 60 days
- **Action 2:** Investigate Major CyberSecurity Risks & Potential “Terror Attack” Scenarios - 30 days
- **Action 3:** Develop Multi-Year Plan, Budget & Roadmap to Mitigate Identified Risks to include:
  - a) Business-Wide Cyber-Physical Security Operations
  - b) “IoT” Cyber Security for both Legacy & New Assets
  - c) Professional Cyber Security Training & Development
  - d) Security Staff Scenario Exercises for “*Terror Alerts*”

# Integrated Cyber & Physical Security: ***“The Shopping List”*** ***...Smart Security for Business & Government is a Multi-Year Programme!***

- 1) Cybersecurity Team:** Establishment of a CERT/CSIRT & Professionally Qualified Cybersecurity Team within your Business or Government Organisation
- 2) CNI:** Long Term Critical Infrastructure Protection (CNI) – Protect Critical Info Assets!
- 3) System Upgrades:** Technical Infrastructure Upgrades including Hardware, Software, Databases, Secure Network Links, Biometrics & RFID
- 4) Back-Up:** Disaster Recovery, Business Continuity and Back-Up Systems
- 5) Physical :** Physical Security Applications – CCTV, Alarms, Control Centre
- 6) Awareness Campaign:** Business-Wide Campaign for Cybersecurity Awareness
- 7) Training:** Cybersecurity Skills, Certification & Professional Training Programme
- 8) Encryption:** Implement Data Encryption for Business Critical Info
- 9) Rules & Policies:** Develop and Communicate Cyber & Physical Security Policies for ALL Staff & Contractors to cover topics such as Wi-Fi and “Bring your Own Device (BYOD)”

*.....It is also recommended to develop an economic **“Cost-Benefit”** analysis and detailed Business Case in order to justify **Cybersecurity Investment** for your Board of Directors!*



# “Cyber – Physical Security Operations”

## *Convergence to Smart Resilient Security Solutions*

- **IP Networks:** Physical security and associated Operational Solutions are increasingly based upon sophisticated electronic networked solutions, including biometrics, smart CCTV, intelligent perimeter fences, embedded active & passive RFID Devices and networked real-time sensors
- **Convergence:** CSO-led Management operations for “Physical Security” and “Cybersecurity” will steadily converge & become integrated during the next few years from staff, assets, resources & operational budget perspectives = **“Smart Resilient Security”**
- **Smart Security in 3 Phases:** Cyber-Physical Security Integration will evolve over 5 -10 years
  - 1<sup>st</sup> Phase – *Virtual Operational Integration* - **CSO** managed Security Team
  - 2<sup>nd</sup> Phase – *Integrated Architectures* and Standards – **ONE** Cyber-Physical Model
  - 3<sup>rd</sup> Phase – *Embedded Intelligent Integration of ALL* Devices - Internet of Things
- **Business Benefits:** The benefits of integrating cyber and physical security for both Business and Governments are reduced running costs, reduced penetration risk, and increased early warning of co-ordinated cyber-physical security attacks, whether from criminals, hackers or terrorists.

.....the “*Cyber-Vardzia*” White Paper for Georgia discusses Cybersecurity and Physical security in some depth, as well as their convergence and integration!

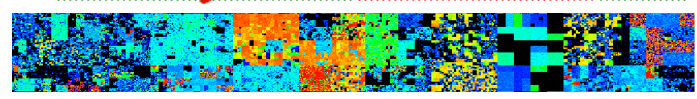
# Case Study: White Paper: 21<sup>st</sup> C Georgia – “Cyber-Vardzia”

\* Cyber-Vardzia: Integrated Cyber & Physical Security Systems for 21<sup>st</sup>C Georgia \*

...“21stC Georgia”...



...“Cyber-Vardzia”...



“Integrated Cyber & Physical Security”

\*\*\* for \*\*\*

... e-Government, e-Society & e-Georgia.

Author: Dr David E Probert – VAZA International

\* Cyber-Vardzia: Integrated Cyber & Physical Security Systems for 21<sup>st</sup>C Georgia \*



\* Integrated Cyber & Physical Security Systems for 21<sup>st</sup>C Georgia \*

Author: Dr David E Probert – VAZA International

## (0) Executive Summary

In this White Paper I argue that for Georgia to secure its national borders and to protect its critical national infrastructure in the 21<sup>st</sup>C, that it should develop its cybersecurity & physical security within the framework of an integrated security organisation with charter from highest levels of Government.

The paper briefly reviews the major cybersecurity and physical security technologies and solutions, and then discusses the more complex security threats that can only be detected through the operational integration of the cyber and physical security organisations.

I then consider examples of ways in which cyber and physical security solutions can be operationally & technologically integrated to provide a more effective response to evolving cybercriminal threats. Following this generic review of integrated security, I move to a more detailed discussion of the security requirements on a sector-by-sector basis, focusing on those sectors that are critical to the national economic & political infrastructure including: government, telecommunications, banking, energy, transportation, education, police and defence.

My personal vision for this project is based upon the Georgian Historical Cave City of Vardzia!

.....Significant investment is being made by international agencies and countries into the Georgian Economy, and already much progress has been achieved during the last 3 to 5 years. However in parallel there needs to be incremental investment to upgrade both Georgian physical and cyber security for its critical national infrastructure. There remains an international perception that Georgia's borders & cyber-networks are still not fully secured....

..... So just as the 12thC Vardzia Cave Complex protected the country for several hundred years during the medieval period, so this new integrated security programme will dramatically increase Georgia's protection against cyber-attacks and potential invasions during our 21st Century!

Finally I summarise some of the major benefits for Georgia to consider cybersecurity and physical security within the same organisational and operational framework, and suggestions for next steps.

Web Link : [www.Valentina.net/vardzia/Georgia2010.pdf](http://www.Valentina.net/vardzia/Georgia2010.pdf)





# Sunset on the Georgian - *Kakhetian Steppes*

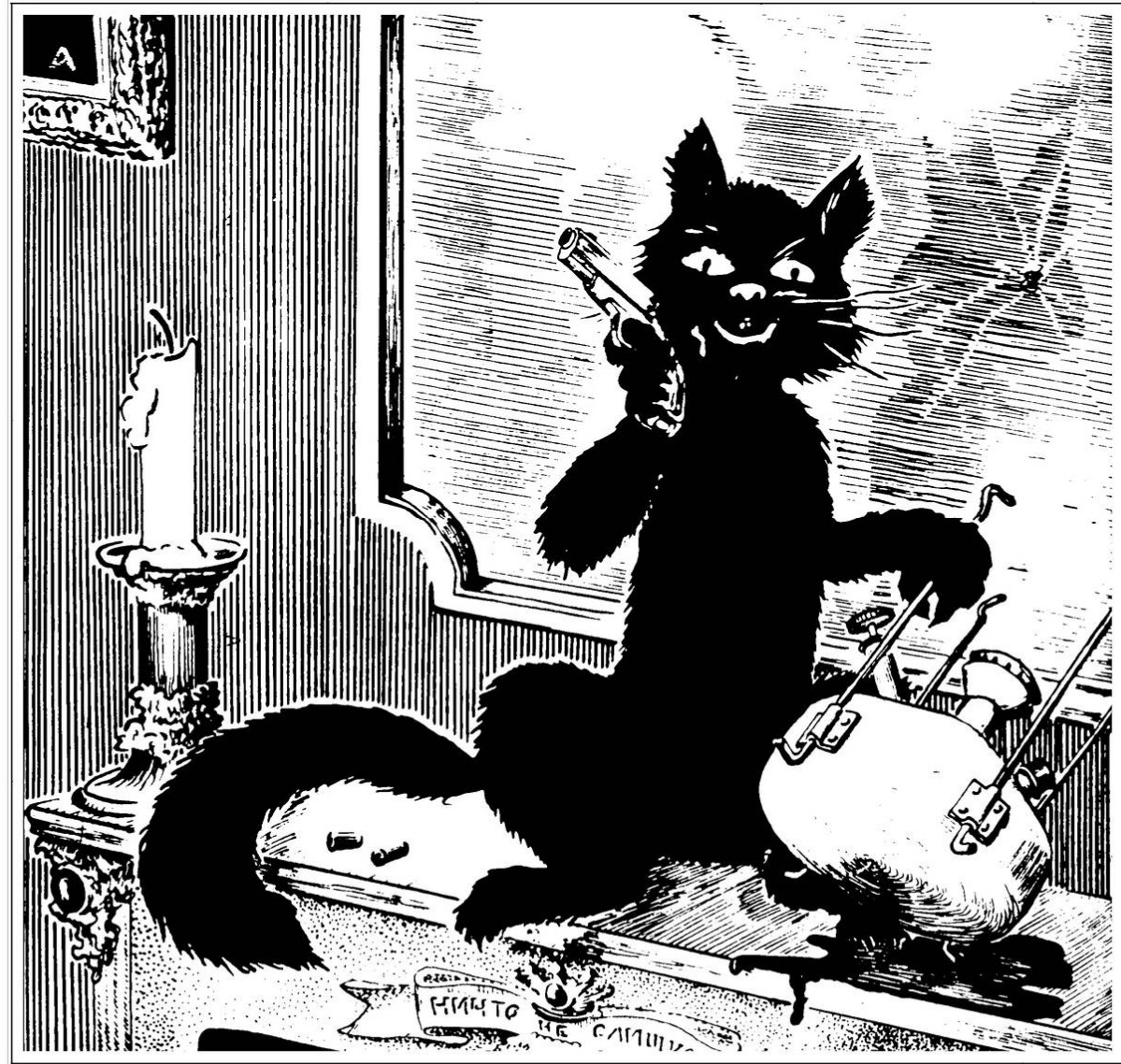


# “CyberTerrorist”: *Woland (Воланд)*

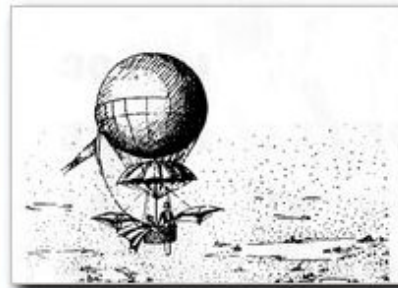
Prepare for Terror Threats & Attacks  
through YOUR ***Integrated Real-Time  
Cyber & Physical Security Operations!***

Don't be taken by surprise by ***Woland***  
- ***The Satanic Terrorist Cat*** - from  
Bulgakov's : “*The Master & Margarita*”

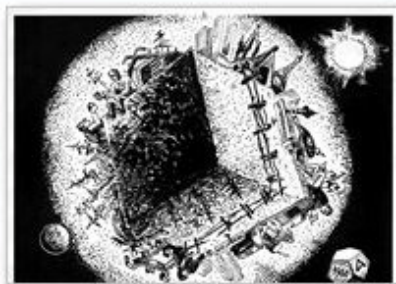
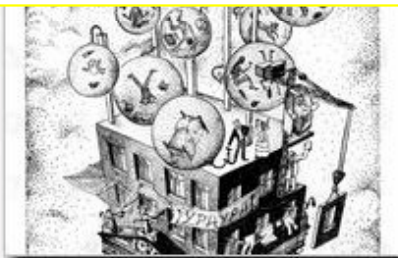
*Graphic Print (1972) courtesy of :  
Dr Alexander Rimski-Korsakov  
Great Grandson of the Composer*







## The Surrealistic Paintings of Dr Alexander Rimsky-Korsakov



**Web Link:** [www.valentina.net/ARK3/ark2.html](http://www.valentina.net/ARK3/ark2.html)

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# ***Crucial Cybersecurity Role in “War on Terror”***

International East-West Security Conference: Prague

**Thank-You!...**

**Download Presentation Slides:  
*[www.Valentina.net/Prague2016/](http://www.Valentina.net/Prague2016/)***



# East-West Security Conference – Prague 2016

## - “Cyber War on Terror” - Slides (PDF) -



### The Crucial Role of Cybersecurity in the - “War on Terror” -

Dr David E. Probert  
VAZA International

Dedicated to Grand-Daughters – Abigail and Alice – Securing their Future Life!

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Theme (1) – “Cyber War on Terror”



### ...Energising YOUR Cybersecurity with “Biometrics & Forensics”

Dr David E. Probert  
VAZA International

Dedicated to Grand-Sons: Ethan, Matthew & Roscoe – Energising their Security!

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**Thank you for your time!**



# Additional *Cybersecurity* Resources

"Master Class - Smart Theory & Practice"	"Master Class 2012 - Smart Design"	"21stC Armenia - 2012: Smart Economy"	"21stC Armenia - 2012: Smart Security"	"21stC Armenia: Smart Governance"
"Real-Time Armenia" - White Paper	"Real-Time Armenia" - Slides	Awesome Armenia: In Photos	Roadmap for Real-Time Armenia- Report	RoadMap for Real-Time Armenia- Slides
"Real-Time Georgia" - GITI 2008 Slides	"Real-Time Georgia" - GITI 2008 Paper	Gorgeous Georgia: In Photos	21stC Georgia: "CyberVardzia" - Paper	21stC Georgia - "CyberVardzia" - Slides
Jamaica: Cybersecurity Technology- Slides	Jamaica: Cybersecurity Strategy- Slides	"Short Professional Bio"	ITU/CITEL: Cybersecurity in the Americas	ITU/CITEL: Cybersecurity Skills Building

Link: [www.valentina.net/vaza/CyberDocs](http://www.valentina.net/vaza/CyberDocs)

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- Prague, Czech Republic: 6th-7th June 2016 -  
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# Professional Profile – *Dr David E. Probert*

- **Computer Integrated Telephony (CIT)** – Established and led British Telecom’s £25M EIGER Project during the mid-1980s’ to integrate computers with telephone switches (PABX’s). This resulted in the successful development and launch of CIT software applications for telesales & telemarketing
- **Blueprint for Business Communities** – Visionary Programme for Digital Equipment Corporation during late-1980’s that included the creation of the “knowledge lens” and “community networks”. The Blueprint provided the strategic framework for Digital’s Value-Added Networks Business
- **European Internet Business Group (EIBG)** – Established and led Digital Equipment Corporation’s European Internet Group for 5 years. Projects included support for the national Internet infrastructure for countries across EMEA as well as major enterprise, government & educational Intranet deployments. Dr David Probert was a sponsoring member of the European Board for Academic & Research Networking (EARN/TERENA) for 7 years (1991 → 1998)
- **Supersonic Car (ThrustSSC)** – Worked with Richard Noble OBE, and the Mach One Club to set up and manage the 1<sup>st</sup> Multi-Media and e-Commerce Web-Site for the World’s 1<sup>st</sup> Supersonic Car – ThrustSSC – for the World Speed Record.
- **Secure Wireless Networking** – Business Director & VP for Madge Networks to establish a portfolio of innovative fully secure wireless Wi-Fi IEEE802.11 networking products with technology partners from both UK and Taiwan.
- **Networked Enterprise Security** - Appointed as the New Products Director (CTO) to the Management Team of the Blick Group plc with overall responsibility for 55 professional engineers & a diverse portfolio of hi-tech security products.
- **Republic of Georgia** – Senior Security Adviser – Appointed by the European Union to investigate and then to make recommendations on *all* aspects of IT security, physical security and BCP/DR relating to the Georgian Parliament.
- **UN/ITU** – Senior Adviser – Development of Cybersecurity Infrastructure, Standards, Policies, & Organisations in countries within both Europe & Americas

*Dr David E. Probert is a Fellow of the Royal Statistical Society. He has a 1<sup>st</sup> Class Honours Degree in Mathematics (Bristol University) & PhD from Cambridge University in Self-Organising Systems (Evolution of Stochastic Automata) , and his full professional biography is featured in the Marquis Directory of Who’s Who in the World: 2007-2016 Editions.*





# “Master Class”: Armenia - *DigiTec2012*

## - *Smart Security, Economy & Governance* -

<p>Smart Solutions: “Master Class” – Part 1</p> <p><b>- Defining Smart Solutions &amp; Business Architectures -</b></p> <p>Dr David E. Probert VAZA International</p> <p><i>digitecbusiness12</i> MASTER CLASS: Smart Solutions &amp; Architectures-1 DigiTec Business Forum: Yerevan - June 2012 © Dr David E. Probert : <a href="http://www.vaza.com">www.vaza.com</a> ©</p>	<p>Smart Solutions: “Master Class” – Part 2</p> <p><b>- Smart Solutions in Practice for 21<sup>st</sup>C Armenia -</b></p> <p>Dr David E. Probert VAZA International</p> <p><i>digitecbusiness12</i> MASTER CLASS: Smart Solutions &amp; Architectures-2 DigiTec Business Forum: Yerevan - June 2012 © Dr David E. Probert : <a href="http://www.vaza.com">www.vaza.com</a> ©</p>	<p>Smart Solutions: “Master Class” – Part 3</p> <p><b>- Designing &amp; Engineering Smart Solutions -</b></p> <p>Dr David E. Probert VAZA International</p> <p><i>digitecbusiness12</i> MASTER CLASS: Smart Solutions &amp; Architectures-3 DigiTec Business Forum: Yerevan - June 2012 © Dr David E. Probert : <a href="http://www.vaza.com">www.vaza.com</a> ©</p>
<b>"Master Class - Smart Theory"</b>	<b>"Master Class - Smart Practice"</b>	<b>"Master Class - Smart Design"</b>
<p><b>- Armenia: Smart Economy -</b></p> <p><b>"Smart Business Architectures for Intelligent Economic Development"</b></p> <p>Dr David E. Probert VAZA International</p> <p><i>digitecbusiness12</i> Smart Business Architectures for 21<sup>st</sup>C Armenia DigiTec Business Forum: 13<sup>th</sup>-15<sup>th</sup> June 2012 © Dr David E. Probert : <a href="http://www.vaza.com">www.vaza.com</a> ©</p>	<p><b>- Smart Sustainable Security -</b></p> <p><b>"Integrating Cyber &amp; Physical Operations"</b></p> <p>Dr David E. Probert VAZA International</p> <p><i>digitecbusiness12</i> Smart Sustainable Security for 21<sup>st</sup>C Armenia DigiTec Business Forum: 13<sup>th</sup>-15<sup>th</sup> June 2012 © Dr David E. Probert : <a href="http://www.vaza.com">www.vaza.com</a> ©</p>	<p><b>- Smart Governance -</b></p> <p><b>"Stimulating Innovation &amp; Economic Growth"</b></p> <p>Dr David E. Probert VAZA International</p> <p><i>digitecbusiness12</i> Smart Governance for 21<sup>st</sup>C Armenia DigiTec Business Forum: 13<sup>th</sup>-15<sup>th</sup> June 2012 © Dr David E. Probert : <a href="http://www.vaza.com">www.vaza.com</a> ©</p>
<b>"Armenia: Smart Economy"</b>	<b>"Armenia: Smart Sustainable Security"</b>	<b>"Armenia: Smart Governance"</b>

Download: [www.valentina.net/DigiTec2012/](http://www.valentina.net/DigiTec2012/)

33<sup>rd</sup> International East/West Security Conference

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in the “War on Terrorism”**

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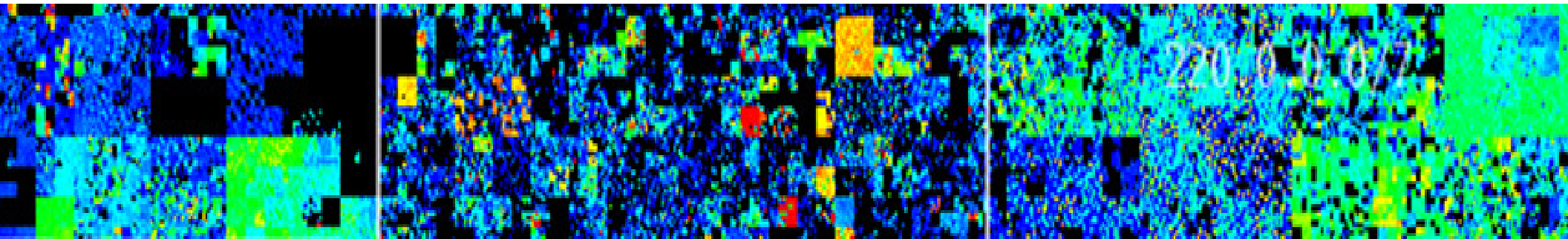


# Crucial Role of Cybersecurity in the “War on Terror”

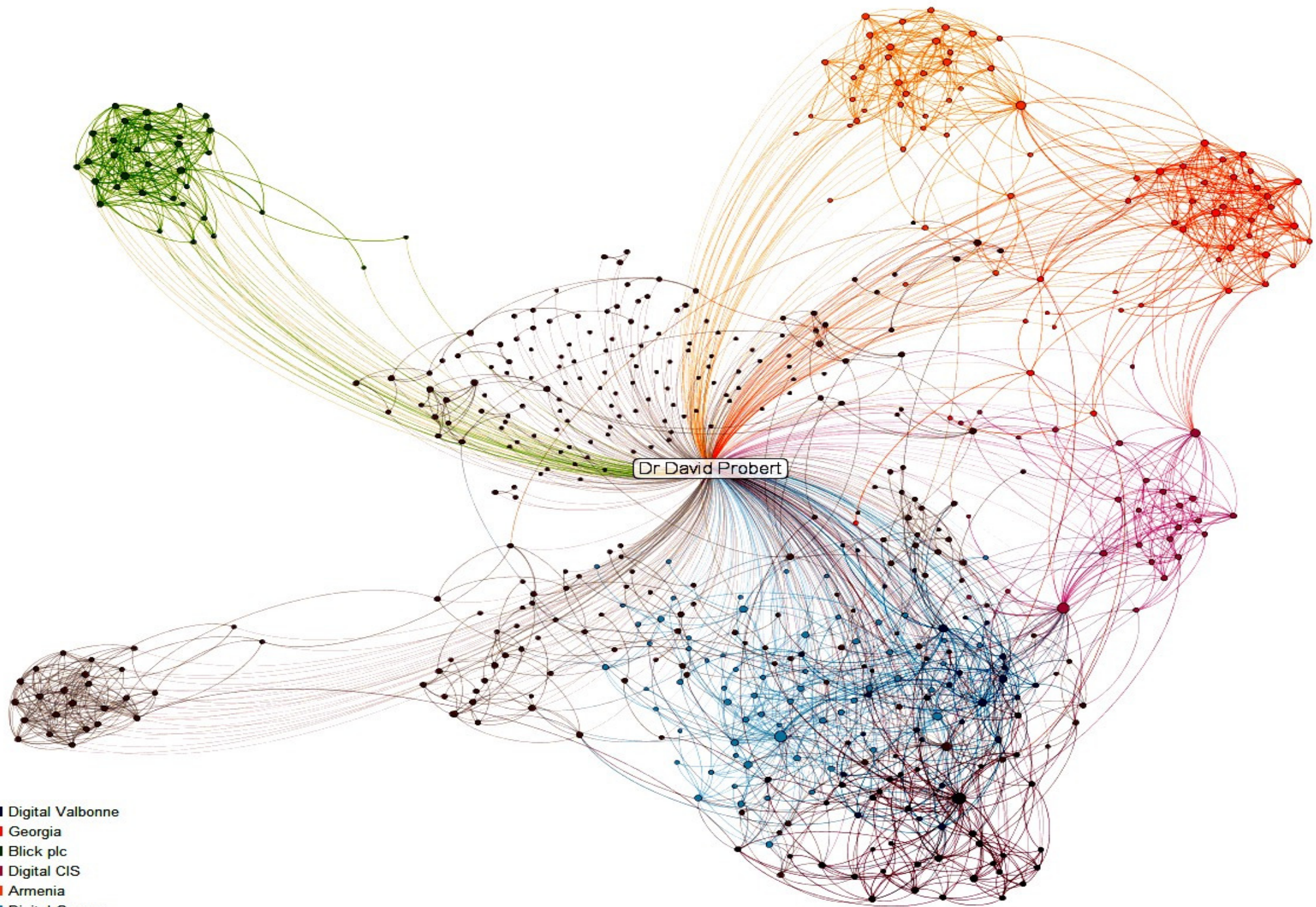
## East-West Security Conference: Prague, Czech Republic



## BACK-UP SLIDES





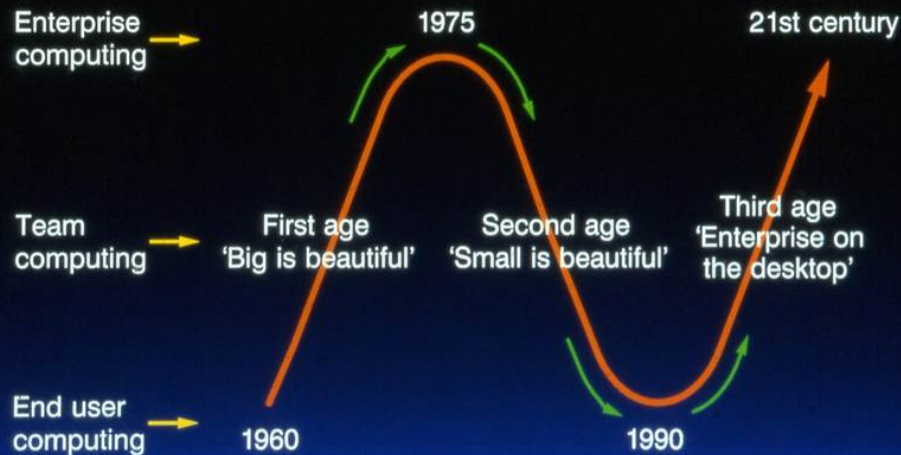


- Digital Valbonne
- Georgia
- Blick plc
- Digital CIS
- Armenia
- Digital Geneva
- Digital Europe
- Madge



# Ages of Computing, Networking & Intelligence: 1960 - 21stC

## Overview: Ages of Computing



## First Age of Computing

1960 → 1975 - *Convergence*

- Physical explosion of size and power - 'Hierarchical Architecture'
- 'Big is BEAUTIFUL'
- Created commodity elements: MIPS and MBITS
- Focus on DATA - a STATIC universe



## Second Age of Computing

1975 → 1990 - *Bridge*

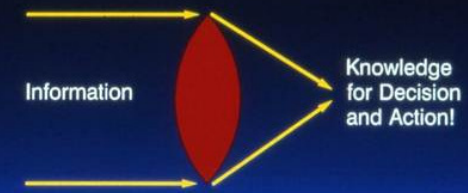
- Emergence of Networking Architecture - 'Distributed Architecture'
- 'Small is BEAUTIFUL'
- Created Open Systems: OSI
- Focus on INFORMATION - a DYNAMIC Universe



## Third Age of Computing

1990 → 2005 - *Focusing Lens*

- Biological Explosion of Intelligence - 'Organic Architecture'
- 'Enterprise on the DESKTOP'
- Focus on KNOWLEDGE - a SELF-ORGANISING Universe

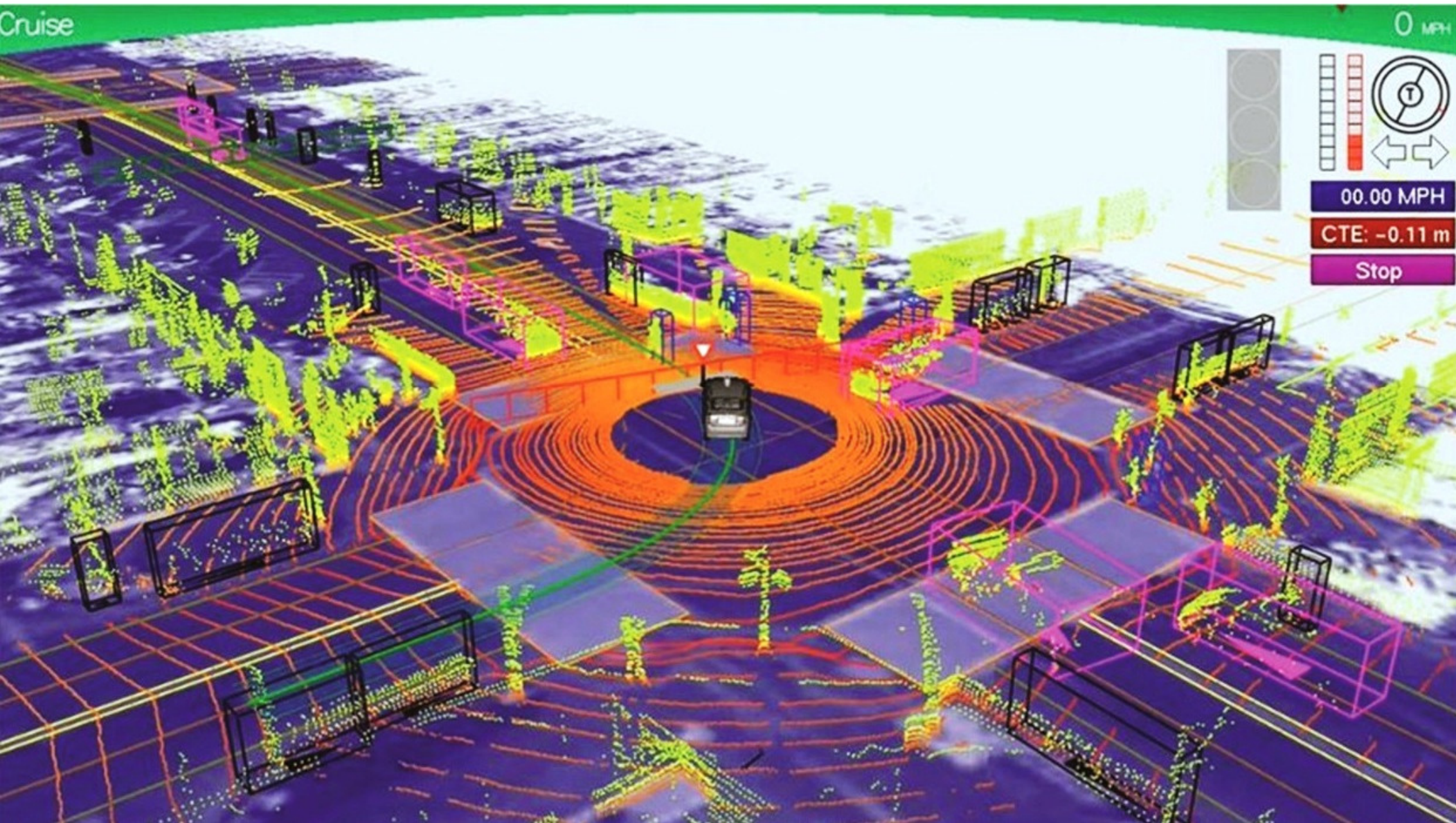




# Ages of Computing, Networking & Intelligence: **1960 – 2020+**

- **1960 to 1980 (Computing Big Bang – Physical Data ):** “Big is Beautiful”  
– Era of Massive Mainframe Computing with Minimal Networking
- **1980 to 2000 (Network Architecture – Fluid Information):** “Small is Beautiful” – Evolution of Networking (Ethernet, Token-Ring, and TCP/IP: ‘75 – Vint Cerf & Robert Kahn ), PCs, Web1.0: ‘92-’94 & Mobile Phones
- **2000 to 2020+ (Intelligent Systems – Cellular Knowledge):** “Smart Solutions”- Web2.0, Social Media, Smart Phones & Intelligent Apps.
- **Summary:** The Evolution of ICT mirrors the Evolution of the Physical Universe, DNA/RNA Bio-Architecture, Intelligent Organisms & Life.

# “Google Car”: *Computer Vision View*





# The UK Cyber Security Strategy

December 2014

## OBJECTIVE 1



**MAKING THE UK ONE OF THE MOST SECURE PLACES IN THE WORLD TO DO BUSINESS ONLINE**



**750 organisations in CiSP:** the Cyber-security Information Sharing Partnership for industry & Government



**Cyber Essentials:** 5 critical controls to protect businesses from common cyber threats



**Cyber security exports** £1.040bn in 2013, 22% increase on 2012 & on track for £2 billion target by 2016



Guidance: **'10 Steps to Cyber Security'** & small business version

### AND TACKLING CYBER CRIME



National Cyber Crime Unit in the National Crime Agency: **30 live domestic & international** operations to disrupt serious cybercrime



**9 cyber units** in each of the Regional Organised Crime Units: over **85 live operations**



HMRC's cyber team: more than **£100m** fraud prevention this year

## OBJECTIVE 2



**A UK THAT IS MORE RESILIENT TO CYBER ATTACK AND BETTER ABLE TO PROTECT OUR INTERESTS IN CYBERSPACE**

**CERT-UK:** new Computer Emergency Response Team for national incidents & international CERT liaison

**GCHQ** working to detect & defend against cyber threats

**All local authorities & councils** on the Public Service Network



## OBJECTIVE 3



**A UK HELPING TO SHAPE AN OPEN, VIBRANT AND STABLE CYBERSPACE THAT SUPPORTS OPEN SOCIETIES**

Ongoing series of **'London Process'** global conferences shaping the debate on cyberspace

**15 international visits** to the UK hosted by FCO

**30 International Cyber Security Capacity Building Fund** projects

## OBJECTIVE 4



**A UK THAT HAS THE CYBER KNOWLEDGE, SKILLS AND CAPABILITY IT NEEDS**

### SCHOOLS

Cyber security in computer science **GCSE**

### APPRENTICESHIPS

**200 Tech Partnership entry-level jobs**, first HMG & industry apprenticeship frameworks

### CAREERS & PROFESSIONALISM

Initiatives for computer science students & graduates:

- Cyber Security Challenge & Cyber Growth Partnership: **mentoring** & **'cyber camps'**
- Campaign via **Graduate Prospects** website
- **Virtual hub** for those joining or in the field

### HIGHER EDUCATION

**4 Higher Education Academies**  
**6 Master's degrees** in General Cyber Security certified by GCHQ

### RESEARCH

**3 Research Institutes**  
**11 Academic Centres of Excellence** in Cyber Security Research  
**2 Centres of Doctoral Training**, **66 PhDs** from 2017

### WIDER EDUCATIONAL SUPPORT

**24,127 sign ups** for first round of Open University's Massive Open Online Course "Introduction to Cyber Security"

### AWARENESS RAISING

**Cyber Streetwise** campaign: Over 2 million more adults use safer online behaviours after phase 1



Cabinet Office

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