Cyber War in Perspective:
Analysis from the Crisis in Ukraine

Kenneth Geers / Comodo

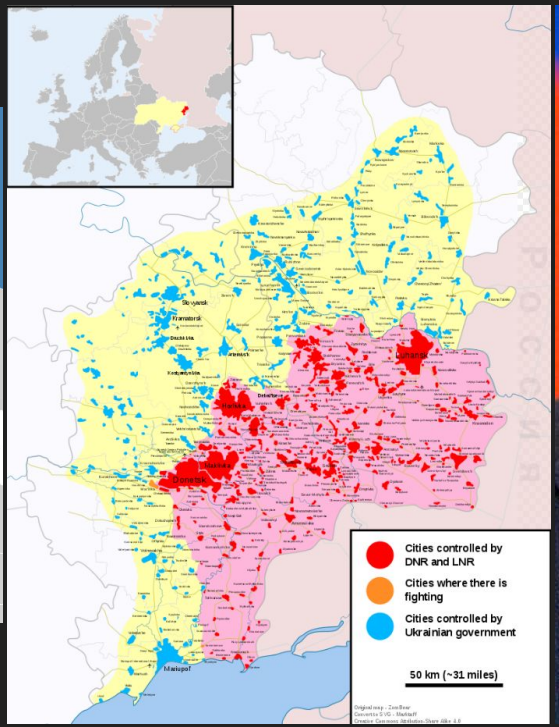
NATO CCD COE / Atlantic Council / DSI-Berlin / TSN Univ Kyiv

Ukraine

Revolution: Humans


Revolution: Machines
NETFLIX

Russian reaction: invasion, annexation



NATO CCD COE research

- Cyber dimension of conflict
- Ukraine / Russia
  - Necessary ingredients
    - Geopolitical stakes
    - IT / hacking expertise
- Malware: espionage / crime
- Skeptics: no cyber war
- International norms
  - Limits to state hacking
  - Tallinn Manual

NATO Warsaw Summit Communiqué - July 2016

- Cyber attacks present a clear challenge to the security of the Alliance.
- Could be as harmful to modern societies as a conventional attack.
- Cyber defence is part of NATO’s core task of collective defence.
- We … recognise cyberspace as a domain of operations in which NATO must defend itself as effectively as it does in the air, on land, and at sea.

US Army FM 3-38: Electromagnetic Cyber Activities

- project power, apply force through cyberspace
- deny, deceive, degrade, destroy, disrupt, [betray]
- enemy / adversary -> activity / capabilities
- may rise to physical damage
- assure access during hostilities
- weapons systems / operator decision-making
- support land objectives (maneuver)
- physical / logical (websites, cyber-persona, IPs)
- within public infrastructure
- comply with the law of war

Context: RU SIGINT

Cyber War in Perspective - authors

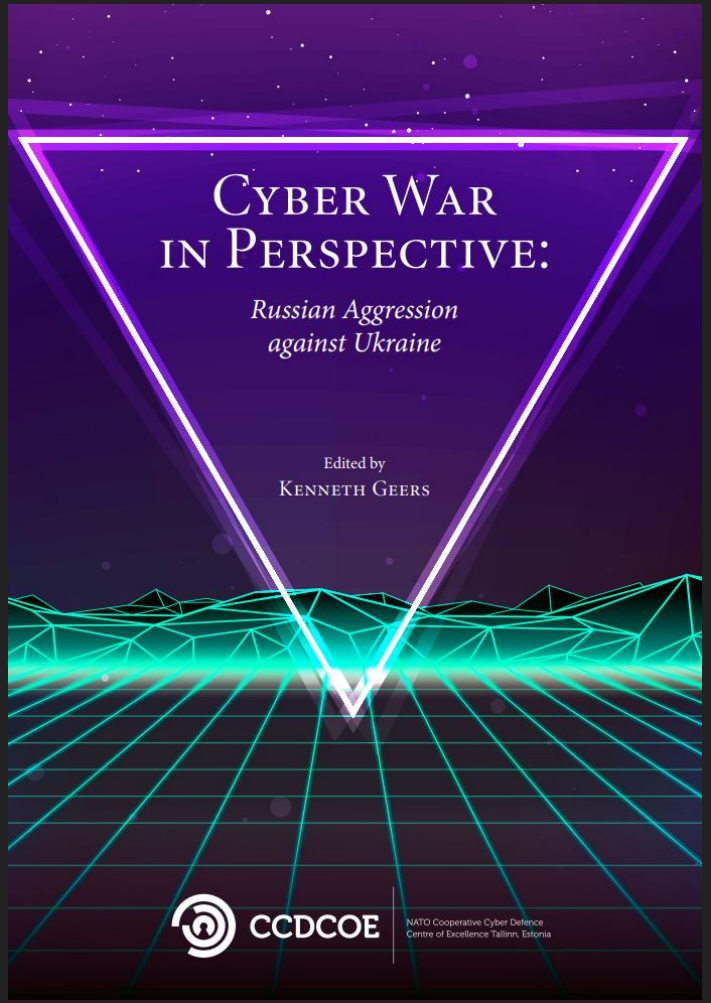
1. Kenneth Geers - CCD COE
2. Keir Giles - CSRC
3. James J. Wirtz - NPS
4. James A. Lewis - CSIS
5. Martin Libicki - RAND
6. Nikolay Koval - CERT UA
7. Glib Pakharenko - ISACA KYIV
8. Jen Weedon - FireEye
9. Tim Maurer - New America
10. Margarita Levin Jaitner - SDU
11. Liisa Past - CCD COE
12. Elina Lange-Ionatamishvili & Sanda Svetoka - STRATCOM COE
13. Nadiya Kostyuk - U Michigan
14. Jan Stinissen - CCD COE
15. Henry Rõigas - CCD COE
16. Jarno Limnéll - Aalto U
17. Jason Healey & Michelle Cantos - Columbia U
18. Richard Bejtlich - Brookings

Free download

Complete book:
https://ccdcoe.org/sites/default/files/multimedia/pdf/CyberWarinPerspective_full_book.pdf

Chapters:
https://ccdcoe.org/multimedia/cyber-war-perspective-russian-aggression-against-ukraine.html

NATO Cyber Defence Library:
https://ccdcoe.org/publication-library.html



CERT UA

- Geopolitical correlation
  - Incidents rise w/ tension
- 2012: defacements
  - UA gov
- 2013: advanced malware
  - Red October, MiniDuke, NetTraveler
- 2014: political doxing
  - UA gov
- Most advanced hack
  - Central Election Commission (CEC)

ISACA Kyiv

- EuroMaidan
  - Physical / logical attacks
  - Servers, smartphones, sites, accounts
  - Most serious when shooting started
- Crimea
  - Severed network cables, commandeered satellites, mass changes to *Wikipedia*
- Eastern Ukraine
  - Targeting: mobile phone, Wi-Fi
  - Isolation via censorship, forensics

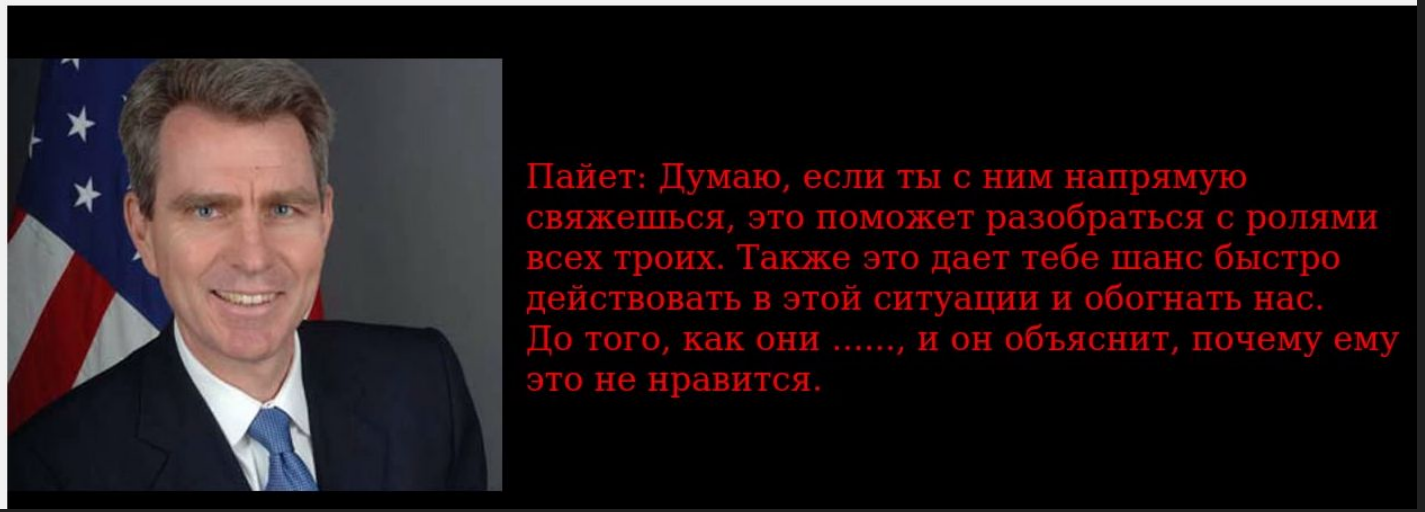
SIGINT + WWW

Ukraine crisis: Transcript of leaked Nuland-Pyatt call

7 February 2014 | Europe

BBC

YouTube UA Search

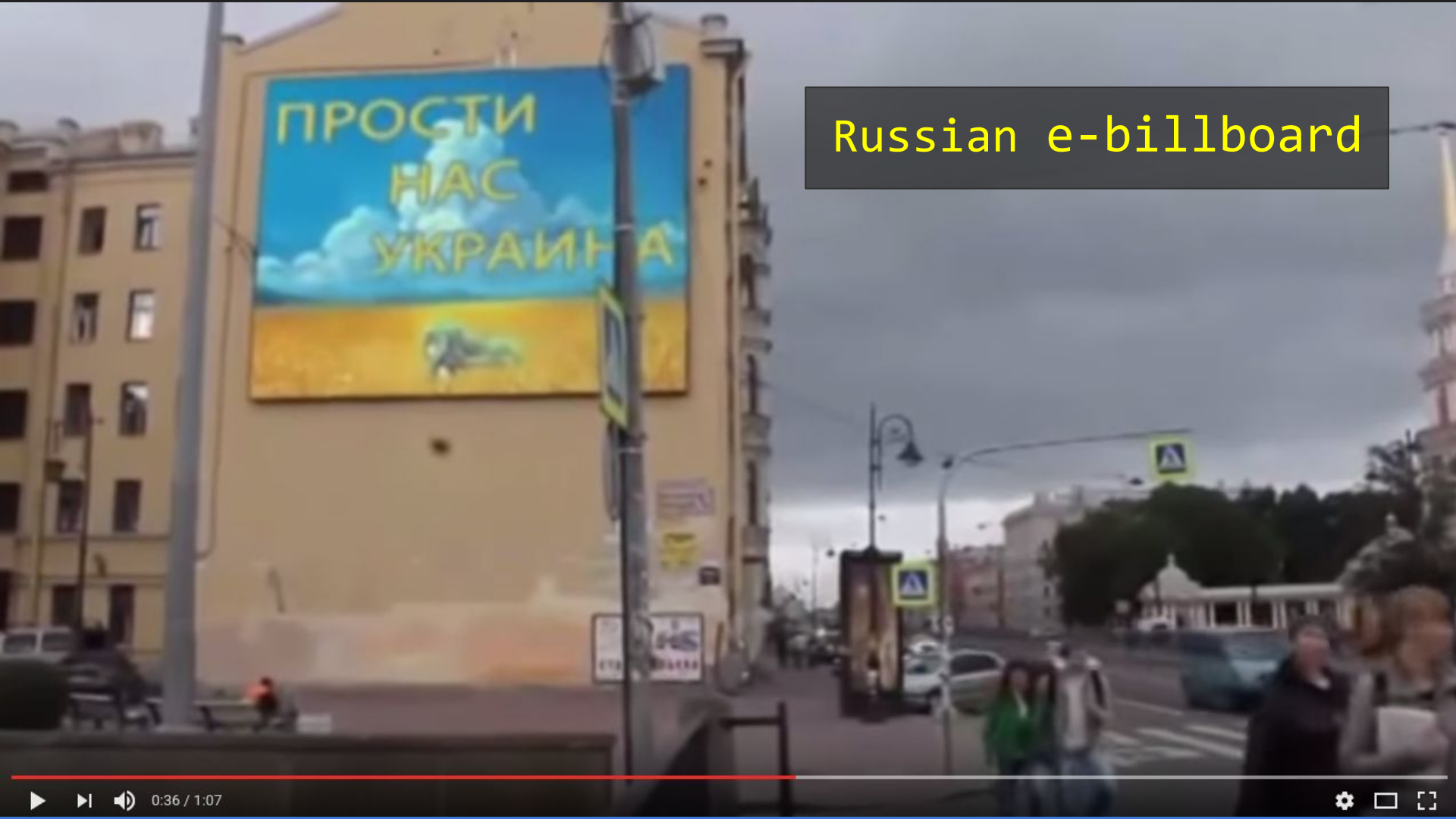


Presidential election hack: 25 May 2014

- CyberBerkut vs. Central Election Commission
- Most technically advanced hack (CERT-UA)
- 2+ months recon / Admin access
- Sofacy / APT28 / Sednit malware
- Disabled core CEC nodes
- Possible Cisco ASA zero-day
- Announced “winner” on CEC website
- UA Right Sector boss Dmitry Yarosh
- Broadcast on Russian TV
- Real paper ballots guarantee

Christmas 2015: electricity grid hack

1. Spear phished IT staff
2. VPN credentials to SCADA
3. Backdoor: Black Energy 3
4. Changed passwords
5. Disabled backup power
6. Overwrote firmware: no reconstitution
7. Opened circuit breakers: 3 power distro centers
8. Launched KillDisk via logic bomb
9. 50+ substations offline; 200K+ residents in dark
10. TDoS customer call centers


ПРОСТИ
НАС
УКРАИНА
Russian e-billboard
0:36 / 1:07

Military equipment

FEBRUARY2015
BMP-2 'Lavina'
in Uglegorsk, Ukraine
48.311252, 38.288002

AUGUST 2014
BMP-2 'Lavina'
in Staraya Stanitsa, Russia
48.350068, 40.272248

SEPTEMBER 2014
Msta-S in Novoazovsk, Ukraine
47.1275441, 38.0892229

JULY 2014
Msta-S in Rostov-on-Don, Russia
47.262757, 39.660493

LUHANSK

DONETSK

BORDER BETWEEN UKRAINE AND THE RUSSIAN FEDERATION

MARIUPOL


Social Media
VICE NEWS
14:42
23:13
CC

Igor Rosovskiy

- May 2: Odessa fire
- May 3: new Facebook account
  - “local doctor”
- Claims atrocities, anti-semitism
  - Like “fascist occupation”
- 1000s FB, *ВКонтакте* shares
  - Multiples translations
- Stolen pic: Ruslan Semenov
  - Russian dentist

⚠ Sorry, this content isn't available right now

Здравствуйте, меня зовут Игорь Розовский, мне 39 лет, я живу в городе Одессе. В течении 15 лет я работаю врачом в службе скорой помощи.
Вчера, как вы знаете, в нашем города случилась страшная трагедия, одни люди убили других. Убили жестоко - сожгли живыми. Не в состоянии опьянения, не за наследство бабушки, а потому что они не разделяют политических взглядов националистов. Сначала жестоко избивали, потом жгли.
Как врач я поспешил оказать помощь тем, кого можно было спасти, но меня остановили боевики, не дав подойти к раненому. Один из них грубо оттолкнул меня, пообещав, что скоро меня и других евреев Одессы ждет такая же участь.
Я видел парня, которого можно было спасти, если бы я смог забрать его в больницу, но все уговоры закончились ударом по моему лицу и потерей очков

Pavel Sheremet, Journalist in Ukraine, Is Killed in Car Bombing

By **ANDREW E. KRAMER** JULY 20, 2016

Pavel G. Sheremet, 44, who had worked for Russian state

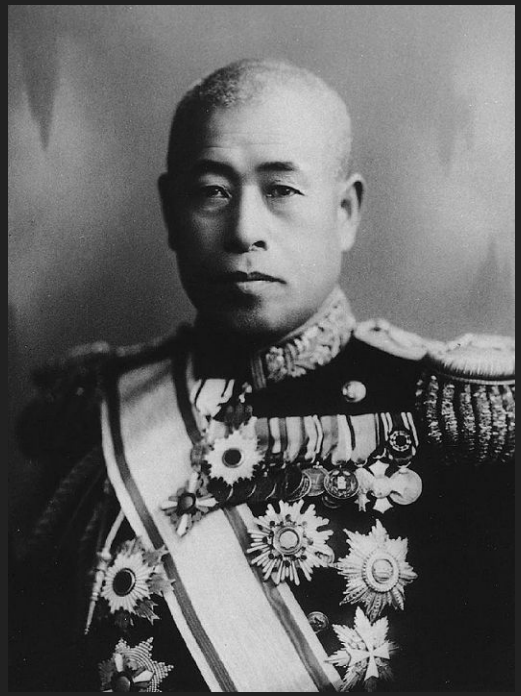
Embed

Cyber War in Perspective

- CND -> CNO -> CNE -> CNA
  - Espionage / Sabotage / PSYOP
- Evolution
  - Estonia 2007
    - Availability
  - Ukraine 2014
    - Integrity
  - USA 2016
    - Confidentiality

CYBERCOM: Cyber Analogies Project

- Cyber war
  - Yes it exists
  - But likely not decisive
- Strategy / tactics
  - Can win individual battles
  - May gain time and space
- ADM Yamamoto
  - No WW2 victory at Pearl Harbor
  - Adversary will respond
  - Attacker beware



National security challenges

- Defense: connectivity, vulnerability
- Attack: peacetime limits?
- Intent: CNE or CNA?
- Deterrence: proactive, reactive
- Security dilemma
- Retaliation: laws of war
- Critical infrastructure: Big Brother
- Arms control: prohibition, inspection
- Policy / law: tech too fast
- Attribution: SECRET (crowdsource?)

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