



# An introduction to Cyber Warfare

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# Cyber attack technologies

Technology is not the issue



# Cyber attack events

- Estonia (2007)
- Georgia (2008)  
What we see is a tip of the iceberg
- Palestine (2008)
- Kyrgyzstan (2009)
- ...



Cyberspace is a wonderful  
new dimension in an existing world  
...and is here to stay

# Land, Sea, Air, Space & Cyberspace

- 1,733,993,741 users worldwide (Sep 2009)
- Instant access to anyone, anywhere
- Business at light speed
- E-banking, E-business, E-dating, I-phone



Unlimited possibilities and opportunities



# We depend on Cyberspace



*Electronic communication services and networks provide  
the backbone of the European economy.*

COMMISSION OF THE EUROPEAN COMMUNITIES  
Protecting Europe from large scale cyber-attacks and disruptions, 2009

# We depend on Cyberspace

- Population
- Economy
- Government
- Critical Infrastructures (Power, traffic control, telecom, etc)
- Defence



# Cyberspace is not a new world

- No cyber law
- No cyber state & government
- No cyber police
- No cyber identity
- No cyber computer



# Cyberspace is not a new world

- Cyber Vandalism
- Cyber Activism & Propaganda
- Cyber Crime
- Cyber Terrorism
- Cyber Espionage
- Cyber **Warfare**

The same actors with the same intentions  
But with new possibilities



Cyberspace is  
a new domain of warfare



# Cyber warfare

*'The use of computers and the Internet  
in conducting warfare in cyberspace'*

## Computer Network Operations (CNO)

- Computer Network Attack (CNA)
  - Denial of Service Attack (*visible*)
  - Intrusion (*invisible*)
- Computer Network Defence (CND)
- Computer Network Exploitation (CNE)



# Cyber warfare

- Among first actions during conflict
  - Easy build up (relatively cheap)
  - Anonymous (if highly sophisticated)
  - Limited impact
    - not “An armed attack” (cfr Nato Art 5)
- Hybrid operations
  - Cyber warfare does NOT replace conventional warfare

# Adversaries grow strong in Cyberspace

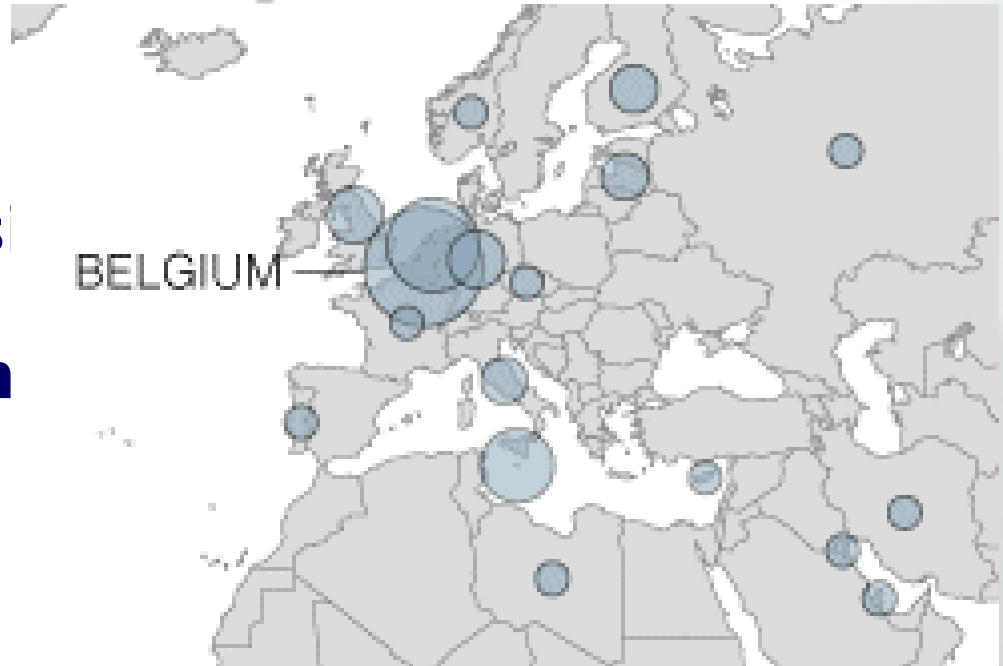
- The '**Net Militia**' is a force engaged in continuous preparation and support activities under the leadership of the Communist Party of China and is **a component of the armed forces**.



Source: I-Defense, Development, Capacity and Motivations of the Chinese Hacker Community, Oct 2008

# Adversaries grow strong in Cyberspace

**Chinese hackers use  
control em**



1,295 computers in 103 countries and belonging to  
international institutions have been spied on

*Source: The SecDevGroup Toronto Canada 2009*

# The Risk is High

$\text{Risk} = \text{Vulnerability} * \text{Probability} * \text{Impact}$

- Vulnerability is high
- Probability is very high
- Direct impact is fairly low

# The indirect impact on military operations

- What is the impact if adversaries can
  - Have more efficient lines of communication
  - Access all your information (and plans)
  - Can shut down your lines of communications
  - Can disturb the proper functioning of your weapon systems
  - Can take over your weapon systems...





Cyber warfare is challenging  
but comes with new opportunities

# Challenges

- Nobody wants Cyber Security
  - Cost and limitation of freedom
- Fast Worldwide integration
  - A realistic risk assessment?
- Requires specific capabilities
  - A soldier  $\neq$  cyber defence expert



# Challenges

*"in het kader van de cyberaanvallen op militaire informatica- en verbindingssystemen of systemen die de minister van Landsverdediging beheerst, de aanval neutraliseren en er de daders van identificeren, onverminderd het recht onmiddellijk met een eigen cyberaanval te reageren overeenkomstig de bepalingen van het recht van de gewapende conflicten"*

(Wet betreffende de methoden voor het verzamelen van gegevens door de inlichtingen- en veiligheidsdiensten)

*Military in operations will be challenged by cyber attacks*

# Defence Opportunities

- Gain strategic and tactical advantage in operations
- Deliver a National security service to
  - Population
  - Government (incl National critical infrastructure)
  - Economy
- Deliver a significant contribution with
  - Limited resources
  - Limited risk on casualties

# Conclusion

- Cyberspace is a wonderful new dimension in an existing world
  - We depend on cyberspace and introduce new threats
  - Cyberspace is a new domain of warfare
  - Cyber warfare is challenging for Nations and Defences
- but comes with new opportunities



# Thank you

"Change is the law of life.

And those who look only to the past or the present  
are certain to miss the future."

John F. Kennedy,  
Frankfurt, 25 June 1963.