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A shared sense of purpose

Cyber Targeting Cycle (CTC)

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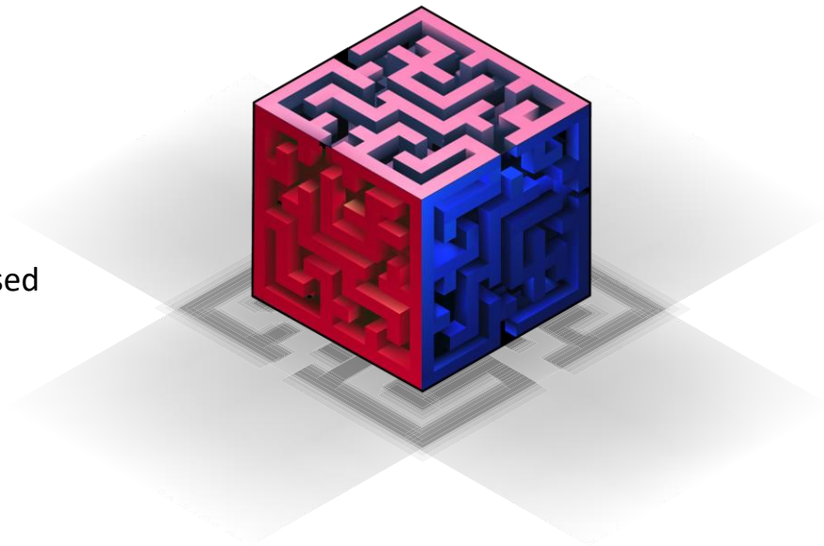
The Labyrinth Security Group is a consortium of passionate and dedicated cyber security professionals with a desire to contribute to the cyber security community by sharing knowledge and concepts through collaboration.

Sharing Cyber Security Knowledge & Community Collaboration

- Business Enablement
  - Strategy
  - Business Alignment
  - Architecture & Design
- Security Operations
- Risk Management
- Identity Access Management
- Legal & Regulatory
- Governance
- Research and Development
- Cyber Threat Intelligence

Purple Team
Facilitate collaboration toward a common business goal



Red Team
Adversary Emulation & Campaign-based Testing

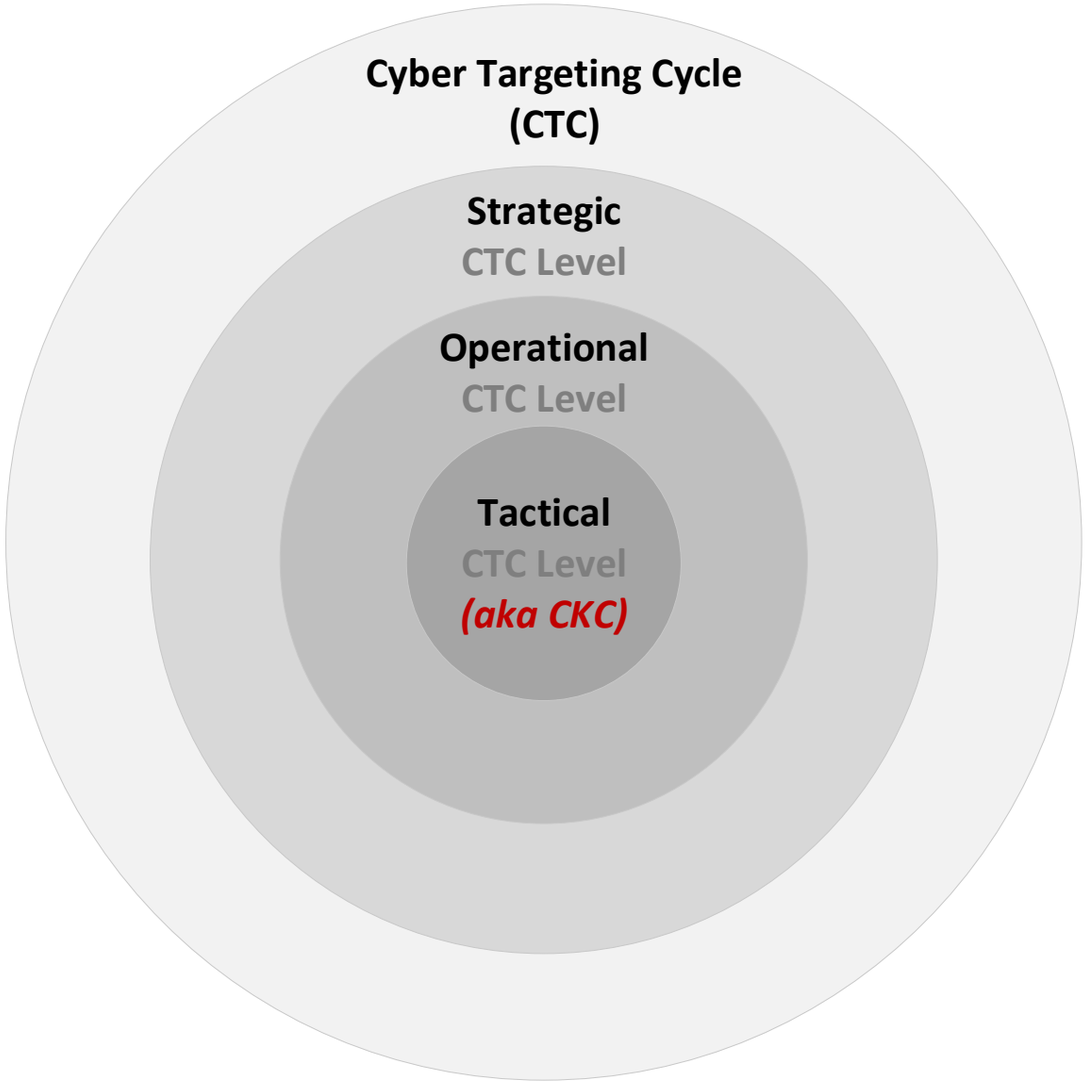
Blue Team
Defensive and Counter Operations

CTC Overview

The Lockheed Martin Cyber Kill Chain (CKC) is part of a larger process – The Cyber Targeting Cycle (CTC)

CTC Slide Deck Overview

- Describes additional levels and steps which lead to cyber attack execution (e.g. rationale, desired end-state, objectives, assessment measurement criteria, planning, target development, etc.)
- Cyber security professionals should have an understanding of potential adversaries and probability in order to develop appropriate defense posture, counter measures and adequately manage risk
    - Private sector organizations are also part of the national critical infrastructure and should adequately defend themselves from this perspective as well
- Lets pull the thread on the Cyber Targeting Cycle (CTC) using an "alleged" complex nation-state use case – Operation Olympic Games ("Stuxnet") – This use-case demonstrates the need for a broader process (e.g. CTC) to execute the campaign



[1]The source material used for this presentation was derived from publicly available information
[2]The intent is to use Stuxnet as a use-case to support the Cyber Targeting Cycle discussion

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Use Case: Operation Olympic Games (Stuxnet)

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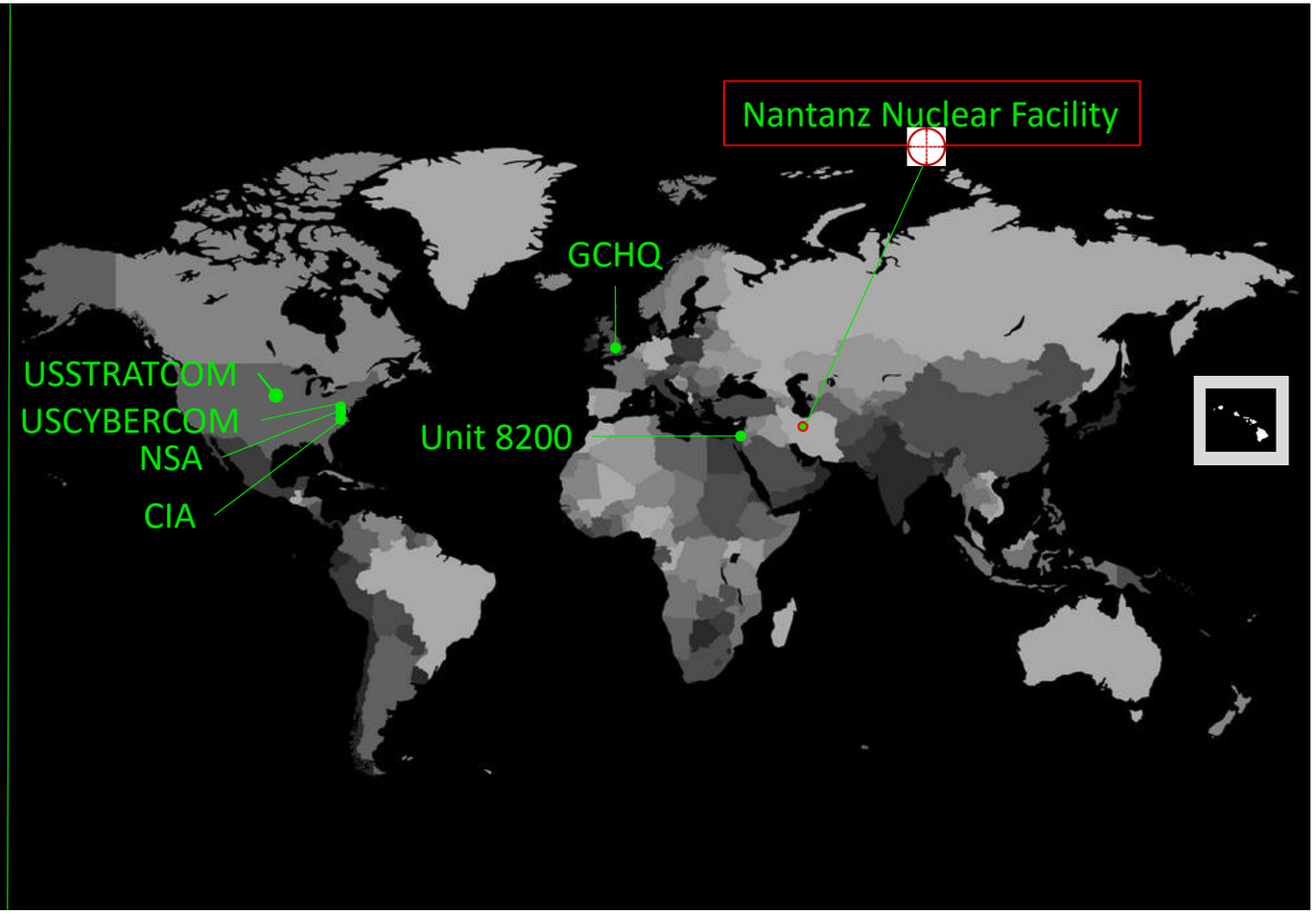
Characteristics

- Alleged Actors: United States, Great Britain, Israel
- Target(s): Iran Nuclear Development Facility Centrifuge PLCs
- Objective(s):
  - Deny Iran a military nuclear capability
  - Slow down nuclear program-Buy time
  - Covert kinetic "cyber target"
  - Get Iran to negotiating table
- U.S. Cyber Authorities:
  - POTUS approval
  - USSTRATCOM/USCYBERCOM execution
- Version 1.x Self Kill Date: 6/25/2012
- **Assessment:**
  - Coalition: Failed to meet U.S. objectives
  - Iran: Political isolation, economic sanctions, program development impeded ~1 yr, followed by exponential nuclear development growth



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Campaign Timeline

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Operation: Olympic Games

1957 Iran starts a nuclear R&D program

1967 U.S. pledges nuclear capability support to Shah of Iran

1979 Iranian Revolution – U.S. relations impact

1987 Pakistan transfers nuclear tech to post revolution Iran

2007 Israel conducts kinetic op against Syrian nuclear facility

2007 US Israeli concerns results in non-kinetic COAs against Iran

2006-2007 US considers and approves cyber approach to avoid being dragged into a war by Israel

2008-2009 Multi-national Inter-agency Ops planning and execution begins

2010 Alleged Israeli "Stuxnet" release into the wild

2010 Global infection

2010 Public Domain discovery – Coined "Stuxnet"

2010 U.S. DHS Responds to newly discovered "Stuxnet" cyber threat

2010-2011 CyberOp resulted in 1 year slowdown of Iranian nuclear program

2011-2012 Continued cyber target development

2012 Automated termination embedded in code

Cyber Capabilities: ***Unlimited Range, High Speed, Low Signature, Low Cost***

CTC Discussion

Cyber Targeting Cycle Discussion

- Complex, high stakes, offensive cyber operations require planning and resources
  - There must be a Time Sensitive Target (TST) cycle in place to support small windows of opportunity
- Robust formal/informal CTC is used to inform good and malicious decision-makers (cyber criminals, hactivists, military, nation-state, etc.)
- In this discussion, I suggest the Lockheed Martin Cyber Kill Chain is the tactical level of the CTC
- The following slides illustrate high-level processes of the CTC

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CTC Strategic Level

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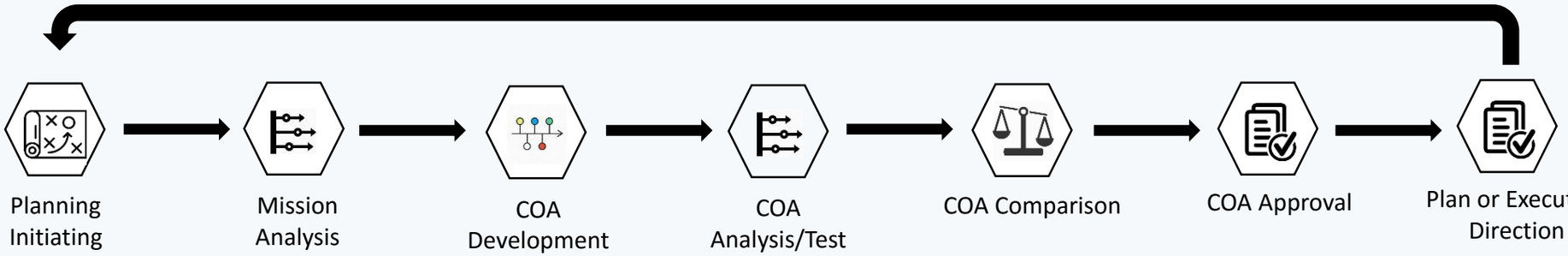

Planning begins with authoritative approval	Analyze and restate strategic objective for approval and subordinate planning	**Course of Action (COA)** provides options to meet objective end-state for decision makers consideration	Conduct COA Pro/Con analysis	Independent COA review and identification of option with highest success potential	Estimates and recommended COA presented for authoritative approval	Concept of Operation (CONOP) clearly and concisely expresses operational intent and actions

Determine cybersecurity objectives, guidance and required resources to achieve objectives and desired end-states

"The ability to act at scale and speed" - Modernized, Modular, Agile, Flexible, Scalable, Orchestrated

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CTC Operational Level

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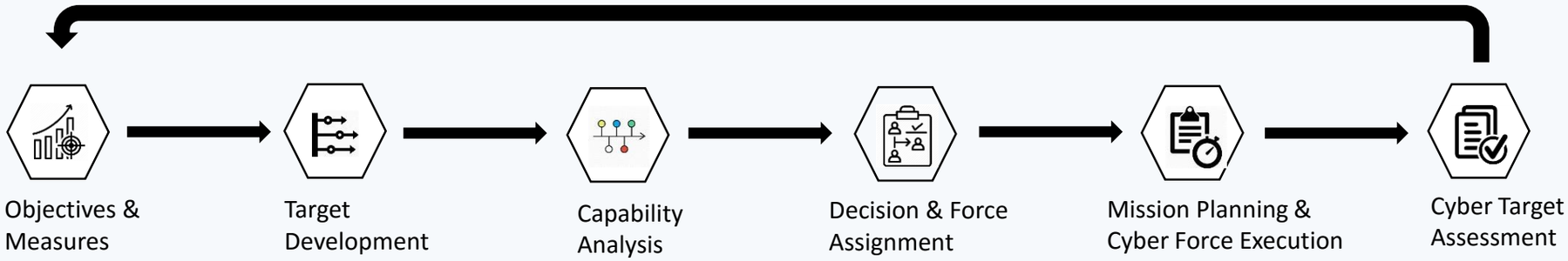

Cyber end state, objectives and success measures	Cyber target development & prioritization	Cyber capability analysis	Operational authority decision and cyber force assignment	Mission planning and cyber force execution	Cyber target assessment

Operations are designed, planned, conducted, sustained, assessed, and adapted to accomplish strategic goals within acceptable scope

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CTC Tactical Level

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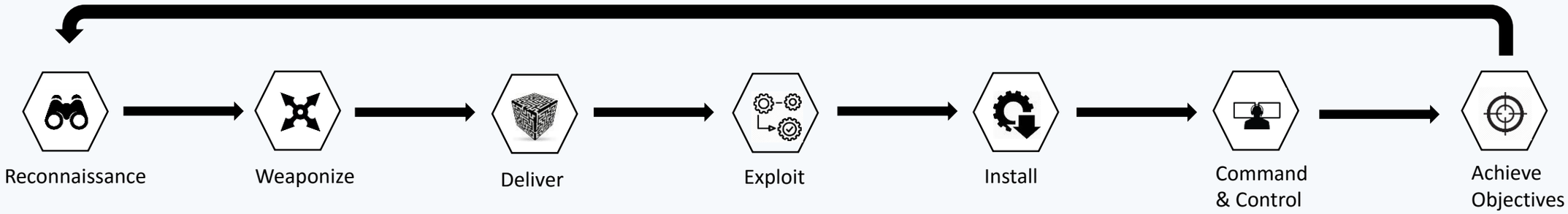

Reconnaissance	Weaponize	Deliver	Exploit	Install	Command & Control	Achieve Objectives
Harvesting email addresses, conference information, etc.	Coupling exploit with backdoor into deliverable payload	Delivering weaponized bundle to victim via email, Mobile Code, USB, Supply Chain, etc.	Exploiting a vulnerability to execute code on victim's system	Installing malware on the asset	Command channel for remote manipulation of victim	With "hands on keyboard" access, intruders accomplish their original goals

Tactical application of cyber force action in accordance with plan to meet operational and/or strategic effects

"The ability to act at scale and speed" - Modernized, Modular, Agile, Flexible, Scalable, Orchestrated

Conclusion

- The cyber kill chain is the tactical sub-process the Cyber Targeting Cycle (CTC)
  - Cyber attacks require a network of organized actors to plan, coordinate, execute/monitor, and assess campaign effectiveness
  - There are many linkages between cybersecurity and intelligence disciplines
    - Target, Human, Counterintel, Open Source, Signal, Geospatial, Fusion, All-Source
    - Identifying the target network is a cyber intelligence target development function
  - Cyber Threat Modeling and Simulation, third party intelligence reports, publicly available information, combined with internally developed reports can help with cybersecurity design and planning (*Develop and test your plans!*)
    - Verizon 2019 Data Breach Investigations Report (pdf)
    - DHS Cybersecurity Risk Determination Report May 2018 (pdf)
  - Most enterprise organizations need to modernize and redesign security architecture based on current advanced persistent threats - Consider zero trust architecture, defensible architecture, or a hybrid architecture
    - Zero Trust is a paradigm shift but you will be surprised what can be done with existing technology mechanisms to potentially improve security posture, without capital expenditures – Check out the SANS webcast below for ideas
      - SANS Zero Trust Architecture Webcast (by Justin Henderson)
      - https://www.youtube.com/watch?v=5sFOdpMLXQg&t=1792s

Sources

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