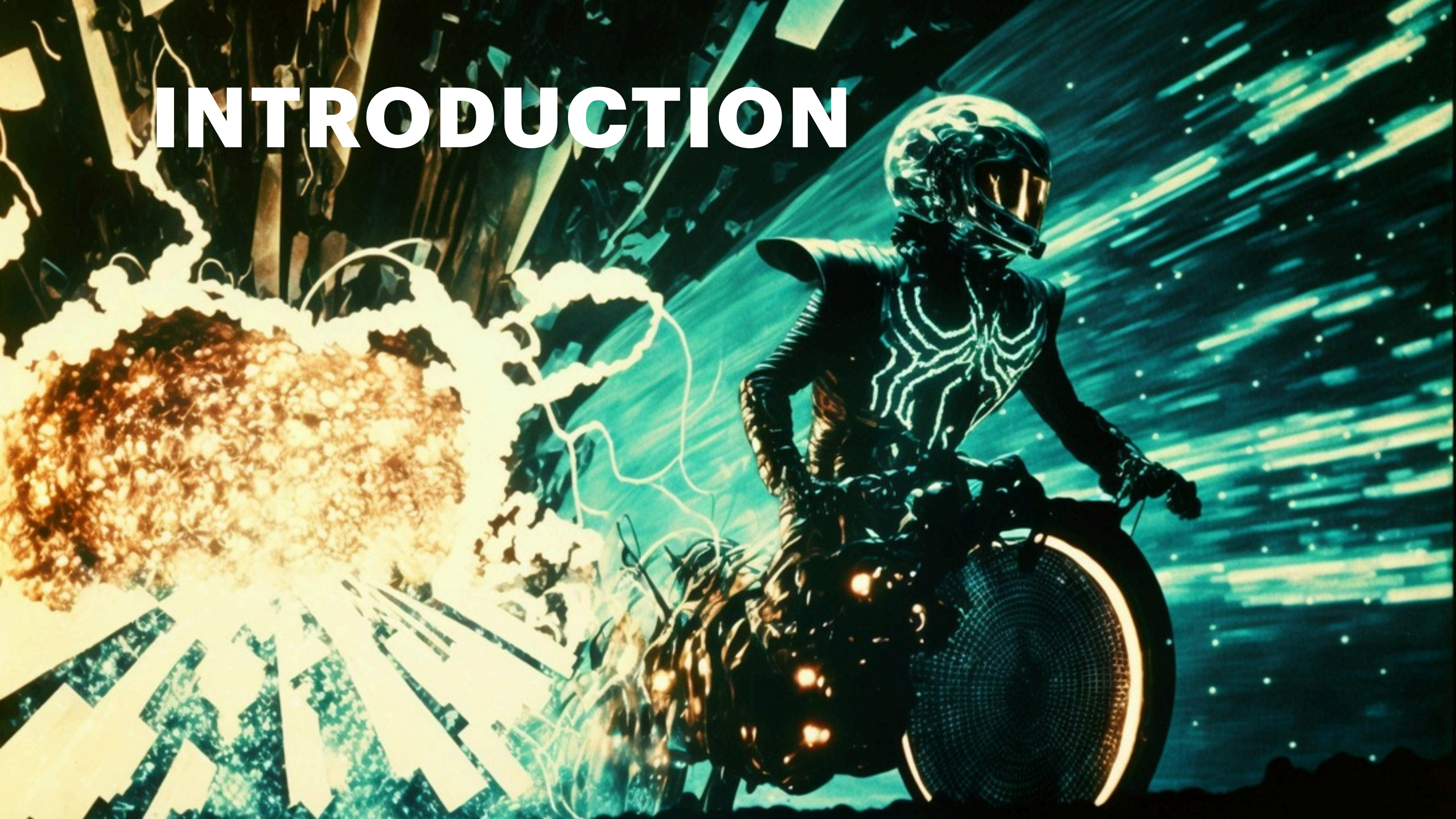
28 MONTHS LATER

The evolution of Russia's Cyber War in Ukraine, 2022-2023

@thegrugq

INTRODUCTION



A YEAR AND A HALF OF CYBER WAR

Pre War Cyber

The Cyber War

Conclusion

2022

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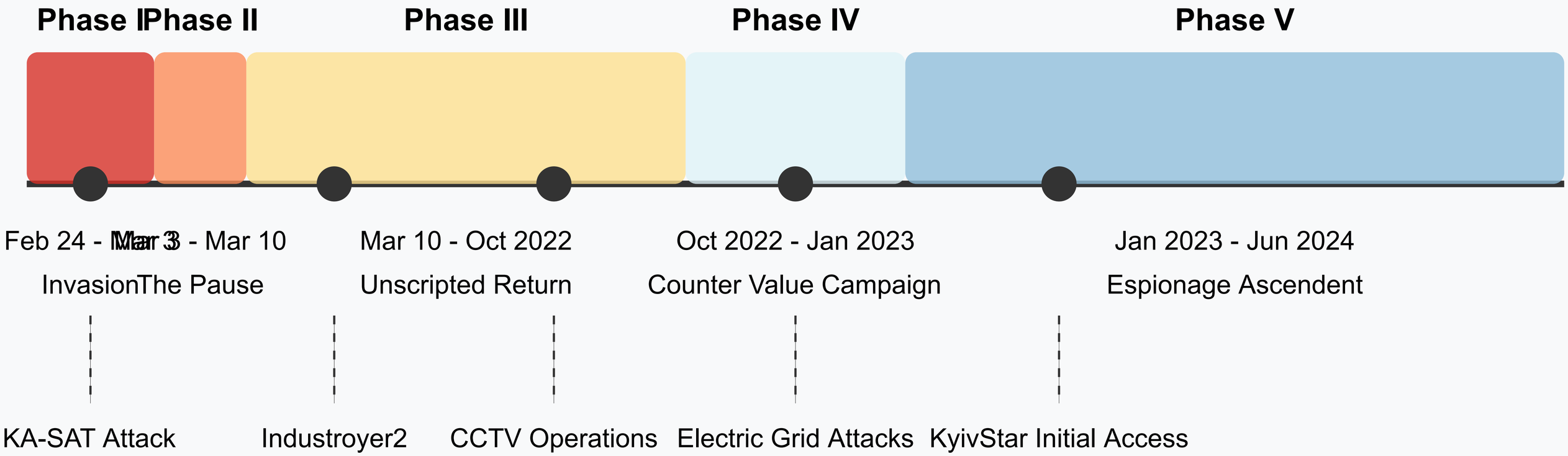
Evolution of Russian Cyber Operations in Ukraine

February 2022 - June 2024



WHAT WE'LL LEARNED

- Why intelligence collection delivers lasting advantage
- How cyber forces adapt to military demands
- When "cyber fires" work
- The reality of sustained cyber operations
- Why Day 400 matters more than Day One

CYBER BEFORE THE WAR

DESIGN BY DESCRIPTION

- Theoreticians have heard about cyber
- Develop strategies and tactics from first principles
- “Assume a hacker of radius *R* traveling at constant velocity in a vacuum…

CYBER FIRES

Like kinetic, but different

CYBER SUPER WEAPON

Devastating futuristic capability

DEVASTATING OPENING STRIKE

Overwhelm and destroy

REAL CYBER WAR

NOT EVERY DAY IS D-DAY

ROUTINE CYBER OPERATIONS

Most days

MISSION REQUIREMENTS

- Do what needs doing
- Meet military needs today
  - Preferably yesterday
- Objectives dictate capability

MILITARY GRADE CYBER

WARTIME CYBER MODALITIES

Information Operations:

- **Using the information environment to influence people**

Effects Operations:

- **Directly impacting adversary systems and infrastructure**

Espionage Operations:

- **Collecting information, typically over a long time**

Note*: *Both Effects and Espionage depend on Access, while Information Operations can function independently

THE EFFECTS/ESPIONAGE ACCESS DICHOTOMY

Effects Operations

- **Usually visible/apparent**
- **Burns access resource**
- **Primary value is in exploiting the effects**

Espionage Operations

- **Relies on secrecy**
- **Covert use of access resource**
- **Continuing intelligence yield**

UTILITY OF ACCESS-BASED OPERATIONS

Espionage Operations

- **Almost always valuable - provides ongoing intelligence advantage**

Effects Operations **Valuable only when:**

- **Effect can be immediately exploited**
- **Tactical gain outweighs loss of intelligence source**
- **No alternative means to achieve same effect**

STRATEGIC PRINCIPLE

ESPIONAGE IS THE BEST USE OF ACCESS
***EXCEPT* WHEN EFFECTS CAN BE EXPLOITED**

THE WAR

THE STRUCTURE OF
RUSSIAN CYBER

- **SVR: Foreign Intelligence Service**
  - Self-styled elite cyber operators
  - Traditional espionage focus

- **FSB: Federal Security Service**
  - Large cyber capability
  - Internal + cross-border operations

- **GRU: Military Intelligence**
  - Technically military intelligence
  - Actually a broad state actor
  - Most active in Ukraine

PHASE I: INVASION

2022

January 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

February 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 25 26 27 28

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THE PLAN

- Largest combined arms cyber operation ever
- Goal: Support coup de main strategy
  - Isolate Ukrainian leadership
  - Disrupt military communications
- Enable rapid regime change
- Years of preparation

OPENING MOVES

- KA-SAT Attack (3:02 AM)
  - Satellite communications disrupted
  - Tens of thousands of modems bricked
  - Europe-wide impact
- Government Systems (4:00 AM)
  - DDoS against official websites
  - Wiper malware deployed
  - Communications degraded

TACTICAL SUCCESS

- Communications successfully disrupted
- BUT:
  - Leadership maintained contact via alternate channels
  - Social media and messaging apps still worked
  - Military adapted to civilian infrastructure
  - Prepared operations quickly exhausted

CATCH-22

- Need to isolate leadership from military/population
- But also need communication channels for:
  - Announcing new regime
  - Maintaining civil order
  - Basic governance
- Can't have it both ways

LESSONS LEARNED

- Technical capabilities ≠ Strategic success
- Prepared operations run out
- Target adapts and route around damage

PHASE II:
STRATEGIC PAUSE

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OPERATIONAL PAUSE

- Successfully executed all prepared operations ✓
- Used all pre-positioned access ✓
- Ran all the scripts ✓
- Wrote all the after-action reports ✓
- … Now What?

PHASE 1 PHASE 2 PHASE 3

Invade Ukraine

?

Profit

THE GENERALS ARE
OCCUPIED RIGHT NOW...

WHAT SHOULD I DO WITH MY COMPUTER?

TACTICS IS WHAT YOU DO WHEN THERE IS SOMETHING TO DO. STRATEGY IS WHAT YOU DO WHEN THERE IS NOTHING TO DO.

Savielly Tartakower

LESSONS LEARNED

- What to do after you've done everything?
- Theres always something to do...

PHASE III: UNSCRIPTED RETURN

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CHAOTIC STRATEGY, STRATEGIC CHAOS

- Diverse operations with unclear strategic intent
- Multiple threat actors operating independently
- Range of targets and attack types

- No strategic guidance
- No clear objectives
- But need to show value
- Everyone doing… something

QUICK, LOOK BUSY!

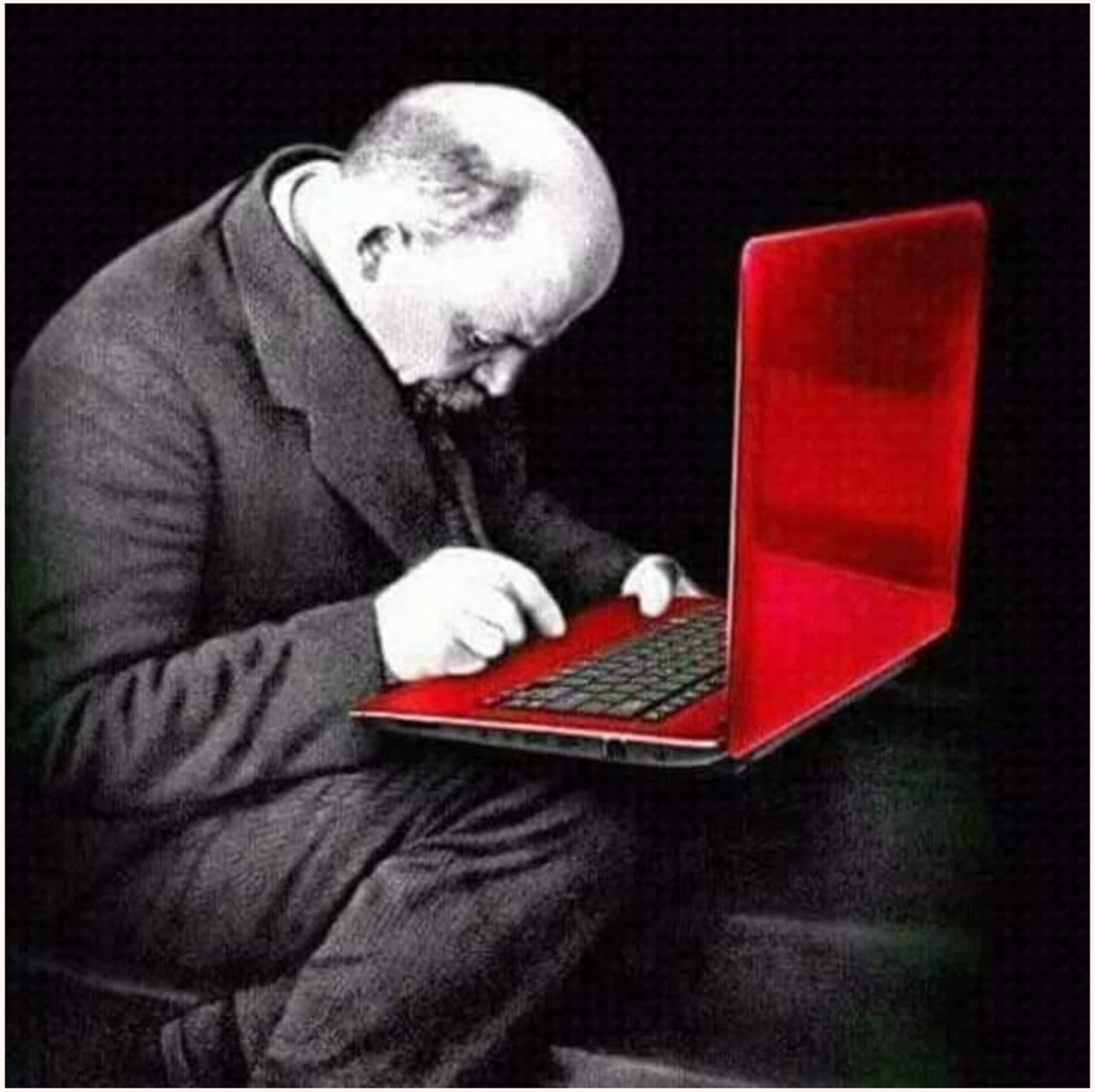
The boss is coming...

METRICS OVER MEANING

- Focus on quantifiable results:
  - More companies hacked
  - More DDoS attacks
  - More wipers deployed
  - Line goes up!
- But to what end?

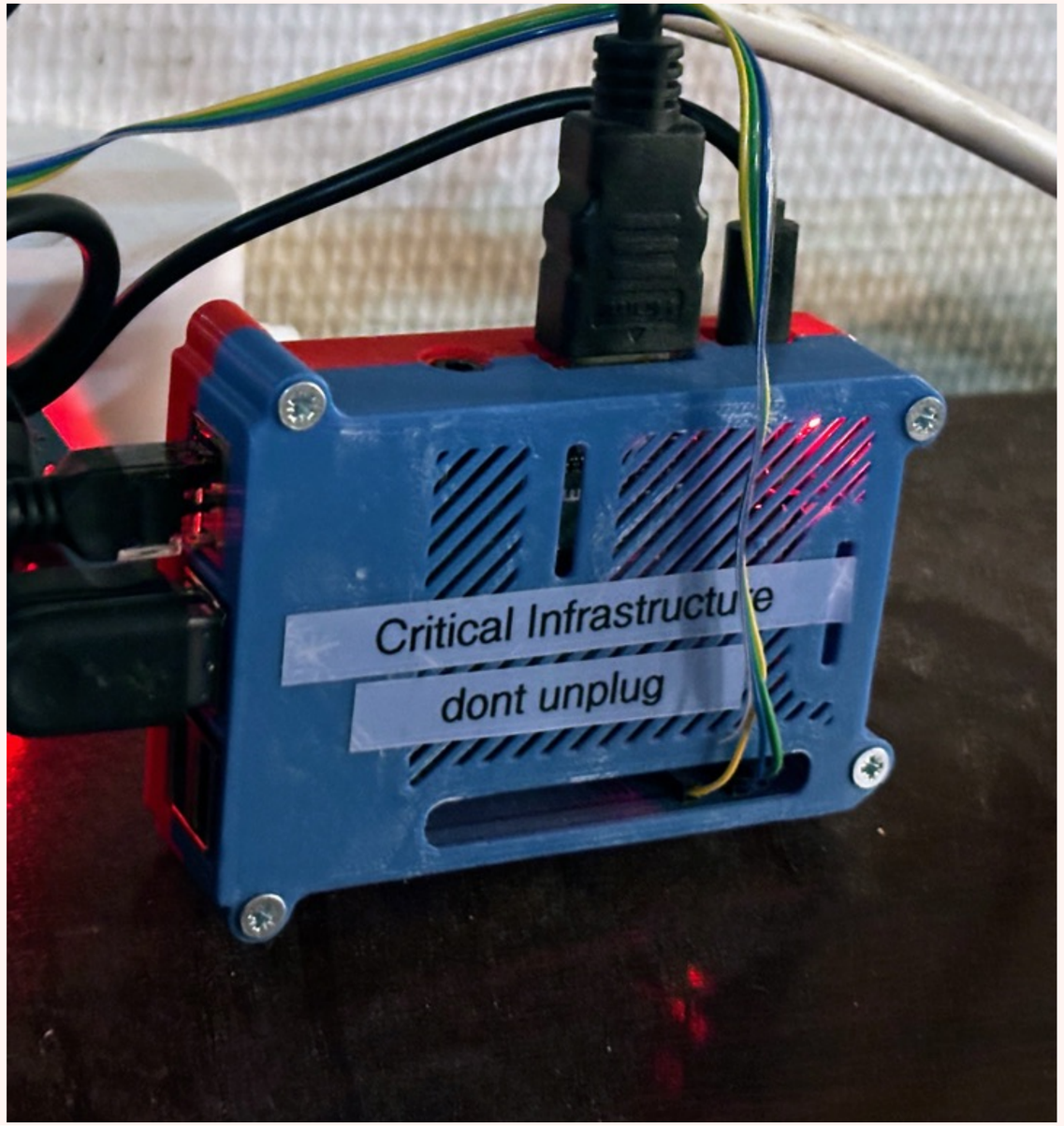
THE POLITICS OF ACTIVITY

- Cyber forces showing they're contributing
- But no clear military objectives
- Lots of activity ≠ Impact
- External observers confused
- Internal metrics satisfied



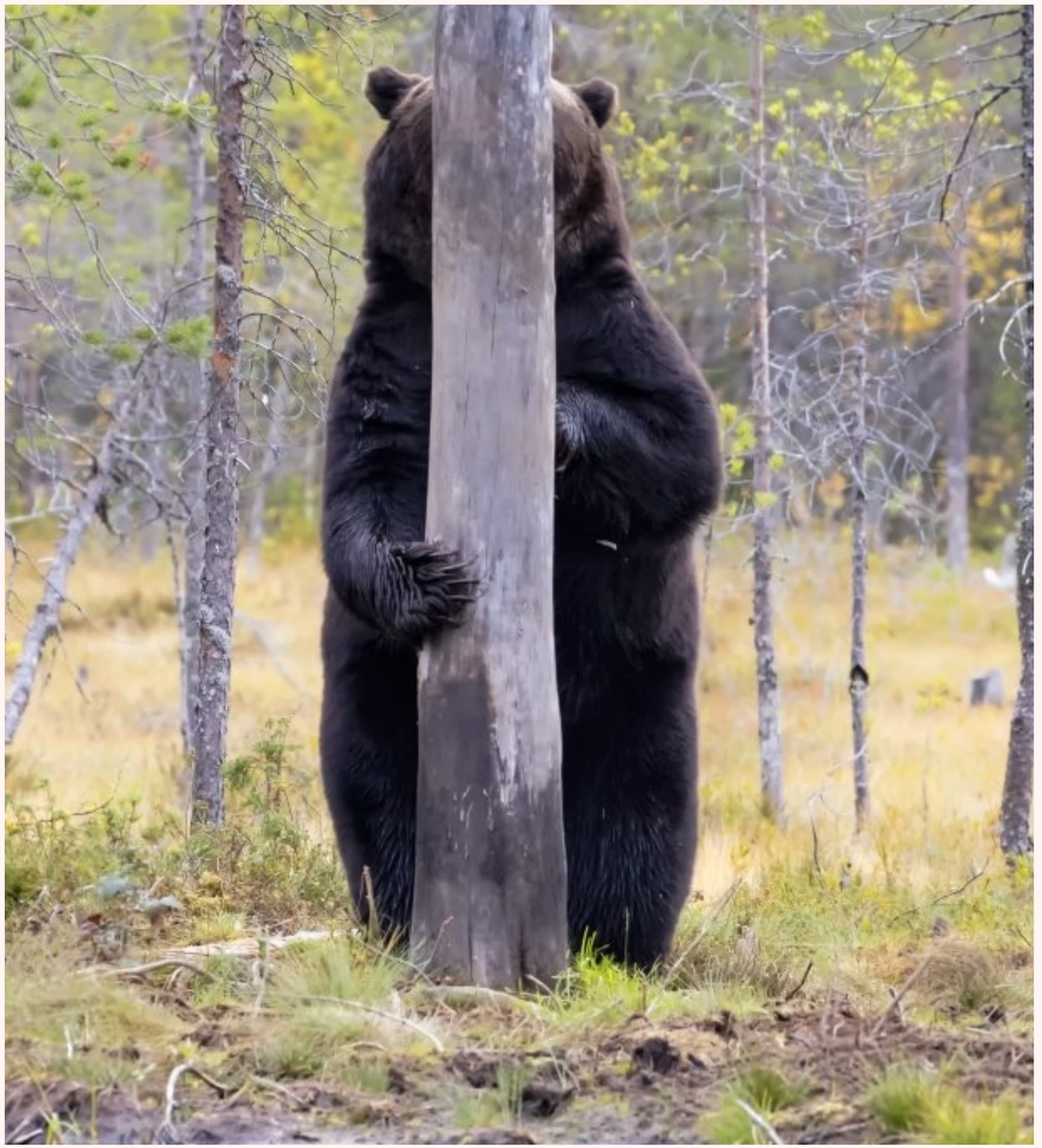
INDUSTROYER2

- Target: Ukrainian power grid
  - Quick, cheap operation
  - Minimal impact
- Why bother? Because:
  - "Cyber war means hitting infrastructure"
  - Political necessity of demonstrating value



LESSONS LEARNED

- Some empirical discoveries:
  - CCTV operations prove valuable
  - Intel collection works
  - Proximity to front matters
- Real adaptation emerging



PHASE IV: COUNTER VALUE CAMPAIGN

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WINTER STRATEGY

- Targeting civilian infrastructure alongside missile campaign
- Attempt to undermine Ukrainian society's will to resist

PLAYING THEIR PART

- Winter counter-value campaign begins
- Missile forces hitting infrastructure
- Air forces bombing power grid
- And cyber forces...?
  - "We should probably do something too"

POLITICAL THEATRE

- Target: Power infrastructure
- Small-scale grid attacks
- Just enough effort to work
- Just enough impact to report

LIMITATIONS REVEALED

- Diminishing returns of cyber "fires"
- Comparison with kinetic effects
- The reliability problem of cyber attacks

WRONG TOOL FOR THE JOB

LESSONS LEARNED

- Minimum Viable Campaign
  - Execute some attacks
  - Show willing
- Save effort for what matters
- Meet political requirements efficiently

PHASE V: ESPIONAGE ASCENDENT

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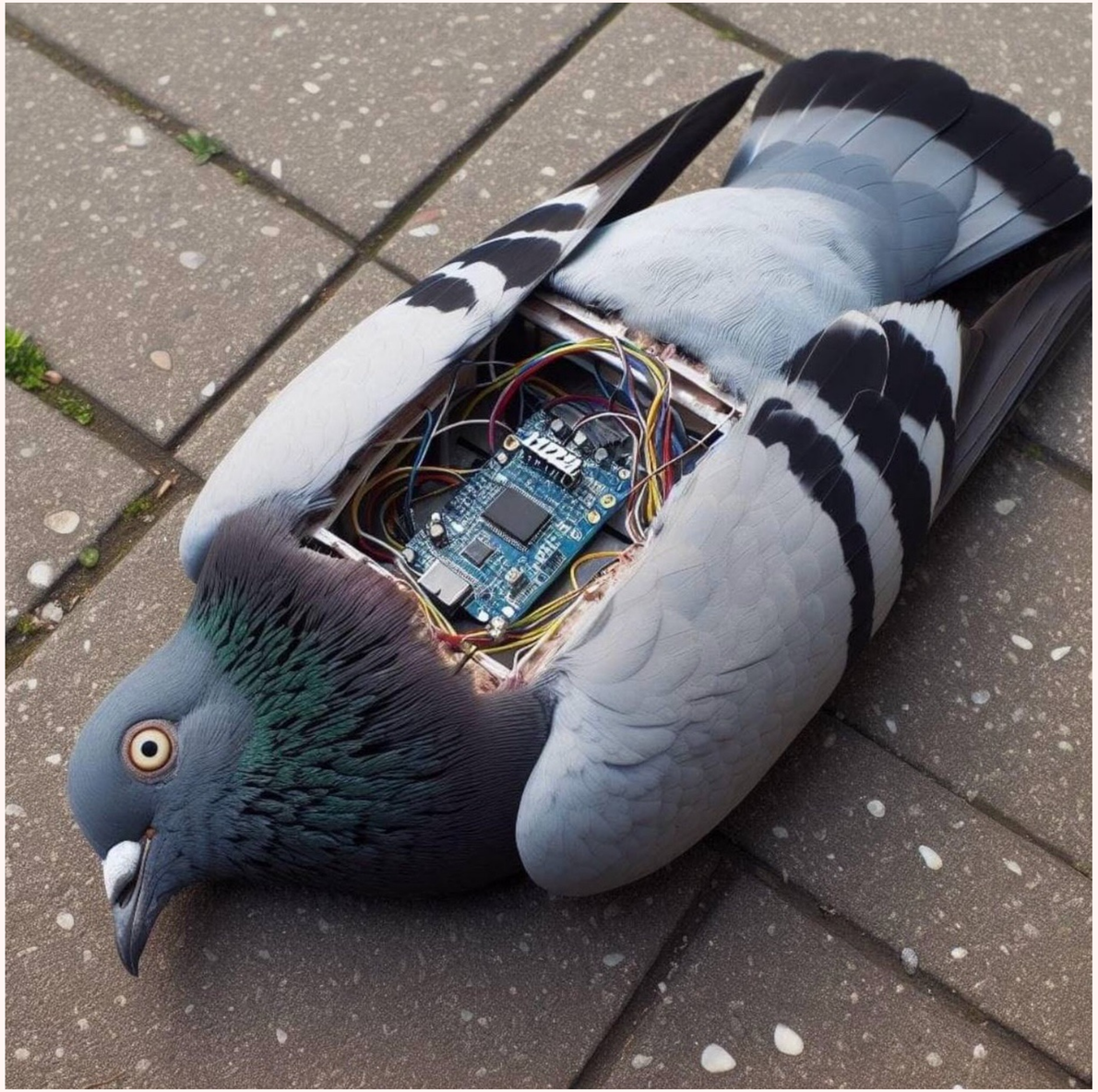
SPYING IS BACK ON THE MENU



SUPPORTING MILITARY OPERATIONS

- Edge device persistence
  - Quick reentry when main access lost
  - Adapt to defender's improvements
  - Sustainable presence
- Battle Damage Assessment
  - CCTV access for missile strike assessment
  - Substitute for limited satellite coverage
  - Emergency services monitoring

TACTICAL ADAPTATION

- New exploitation techniques
- Rapid intelligence collection procedures
- Opportunistic targeting

SIMPLE RELIABLE TOOLING

PROFESSIONAL GROWTH

- **Force structure expansion**
  - More operators
  - Better integration
  - Civilians / contractors
- **Intelligence focus**
  - Clear military value
  - Sustainable operations
  - Tangible results

- New operational doctrine:
  - Speed in execution to beat defenders
  - Grab everything within the first 30 minutes
  - Better some intel than none
- Real adaptation to defender's capabilities

LESSONS LEARNED

- Intelligence over effects
- "Spy first" doctrine
- Force structure expansion
  - 2x increase in operations volume
- Military integration critical

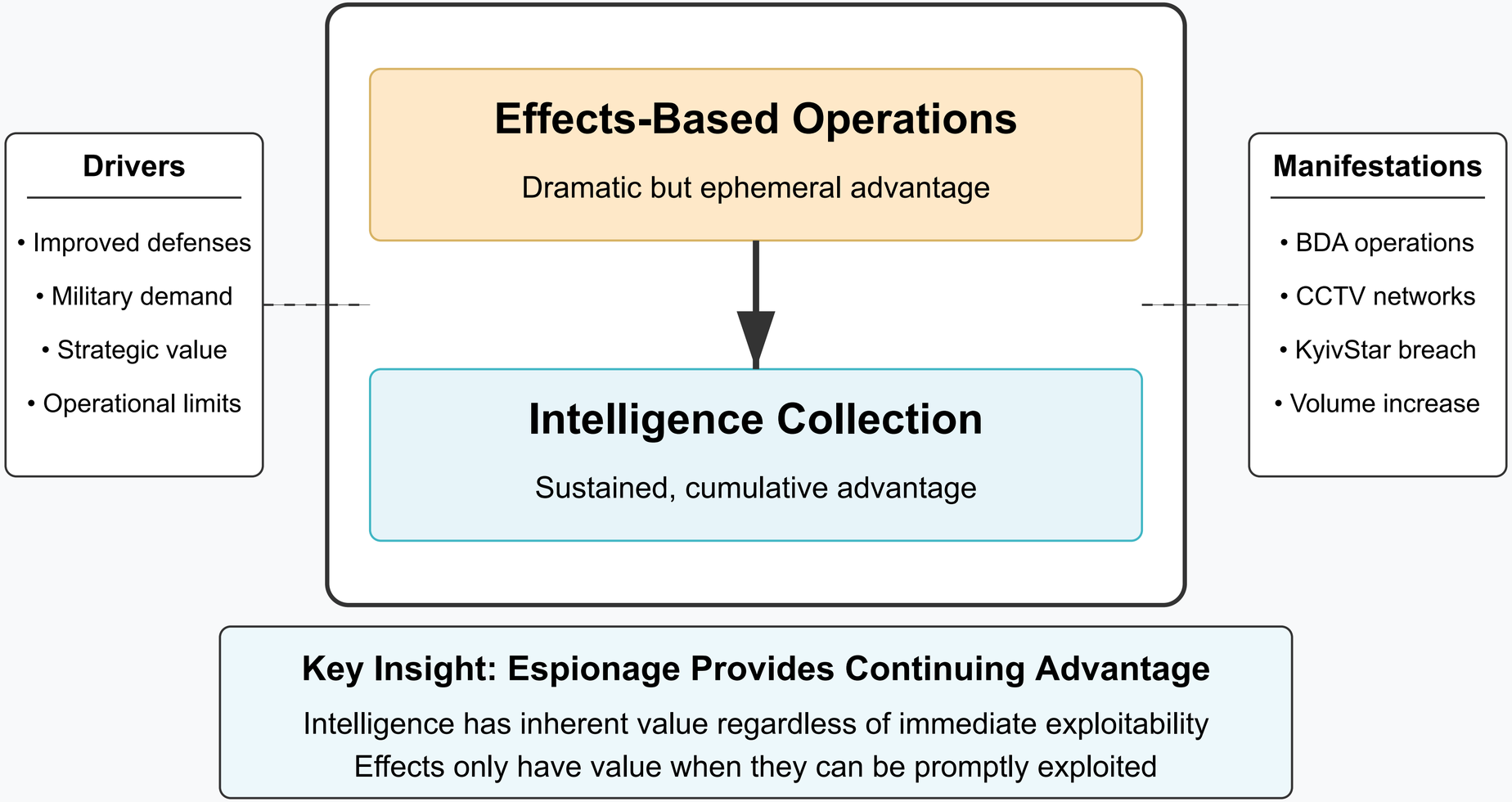
KEY TAKEAWAYS

Russian Cyber Operations: Volume vs. Impact

Shifting patterns across phases

The Strategic Shift to Intelligence Collection

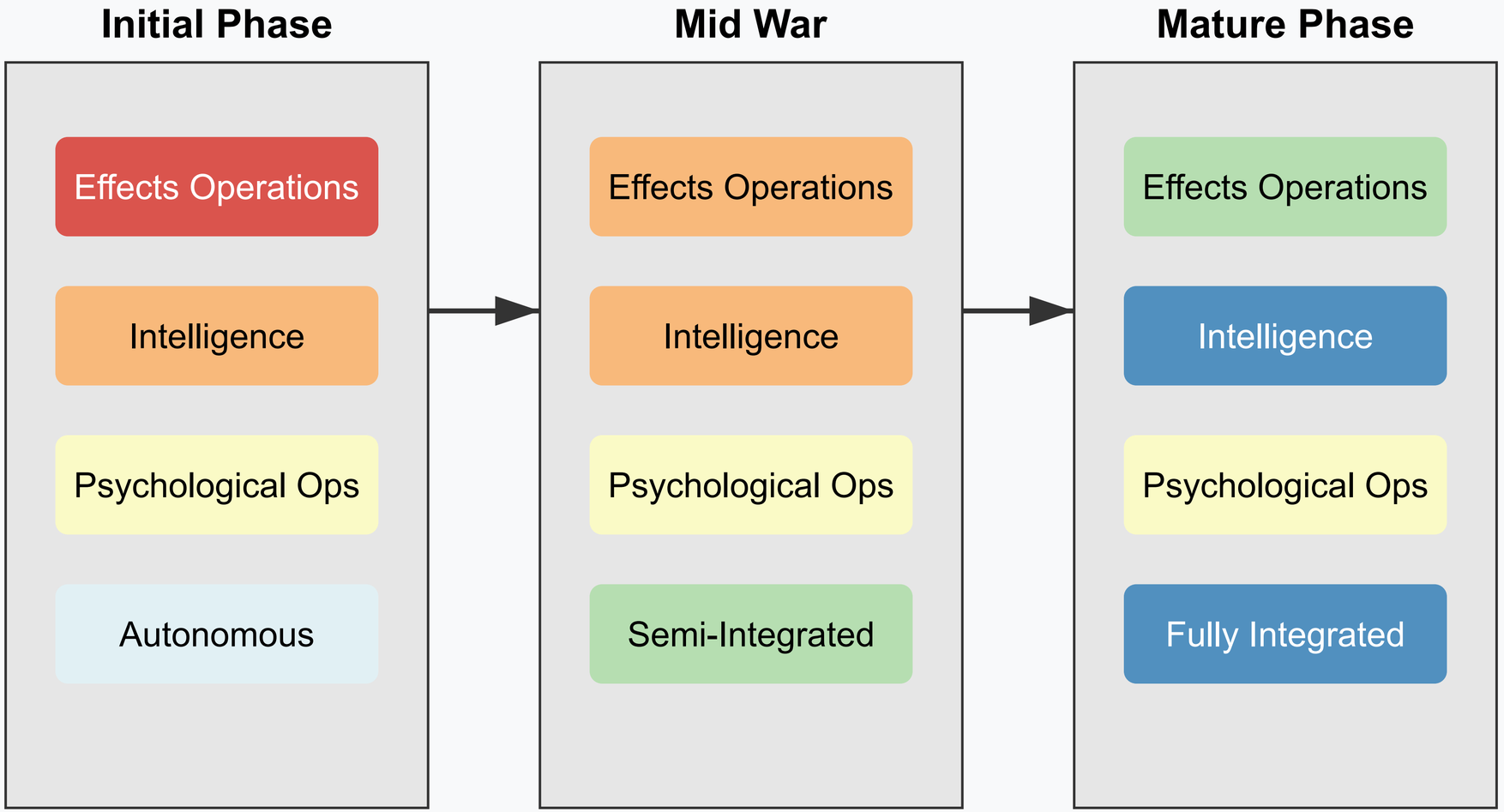
From effects to intelligence: Enduring advantage in attritional war



Key Insight: Espionage Provides Continuing Advantage

Intelligence has inherent value regardless of immediate exploitability
Effects only have value when they can be promptly exploited

Evolution of Russian Cyber Operational Methodology



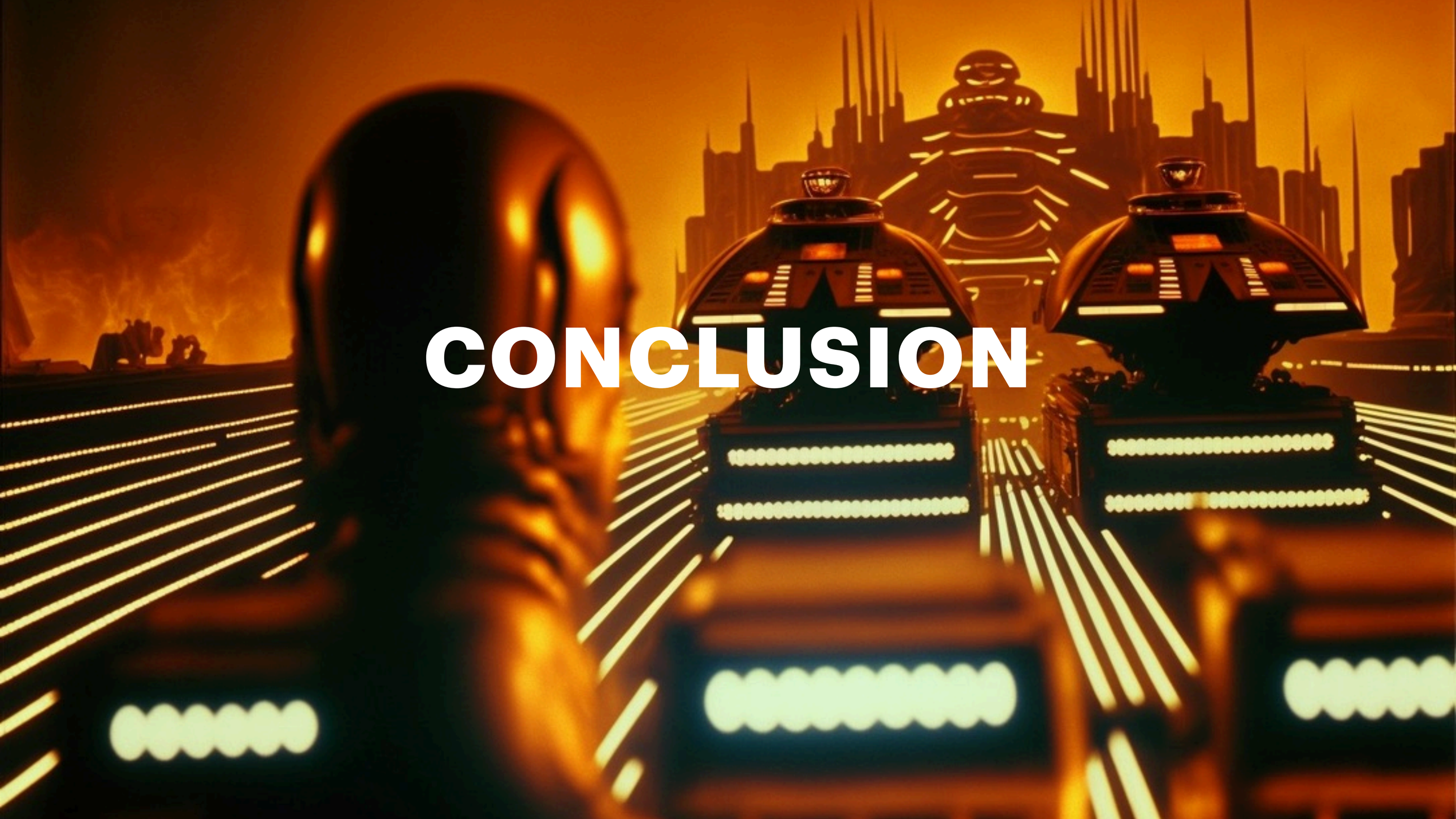
- Pre-planned operations
- Limited adaptability
- Strategic focus

- Tactical adaptation
- Mixed objectives
- Frontline deployment

- "Spy first" doctrine
- 30-min exploitation
- Force expansion

EVOLUTIONARY CHANGES

- Move from effects operations to espionage
- Tighter integration of GRU to military
- Expanded capacity and integrated civilians
- TTP changes
  - Edge devices (plus deception)
  - Rapid exploitation
  - Repeated attacks


CONCLUSION

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REALITY OF PROLONGED CYBER WARFARE

- Espionage provides continuing advantage
- Effects operations have limited strategic value
- Adaptability trumps initial capability

HOW DID WE GET HERE?

- Initial invasion plans run out
- Week-long operational pause
- Chaotic return and adaptation
- Testing counter-value operations

- What actually works:
  - Intelligence over effects
  - Integration over autonomy
  - Adaptation over preparation

LESSONS FOR CYBER WARFARE THEORY

- Why Day 400 matters more than Day One
- Intelligence collection as the enduring value of cyber
- The importance of operational integration

- **Dramatic shifts in operational focus**
- **Adaptation through necessity**
- **Evolution of capabilities**
- **The primacy of intelligence**

SHOOT THE SERVER ROOM DURING EVACUATION

QUESTIONS?

THANK YOU