TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

18262 – Minimalist Foreign Artillery Digitization

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- **Classification: UNCLASSIFIED**
- **Distribution A: Approved for Public Release. Distribution is unlimited.**
- **Type of Briefing: INFORMATIONAL**

Introduction

- BLUF: It is possible to create a 'good enough' fire control system for foreign artillery, at an affordable price, if we sacrifice stringent US military requirements

Problem: Ukraine

- July 2015, “Lessons Learned” from the Russo-Ukrainian War by Dr. Phillip Karber
  - Artillery fire contributed to the vast majority of casualties on both sides
  - Use of UAV’s and counter-battery radars lead to significant counter fire against Ukrainian artillery units
- Ukrainian artillery is largely un-digitized with limited capability to shoot and scoot

Problem: Foreign Artillery

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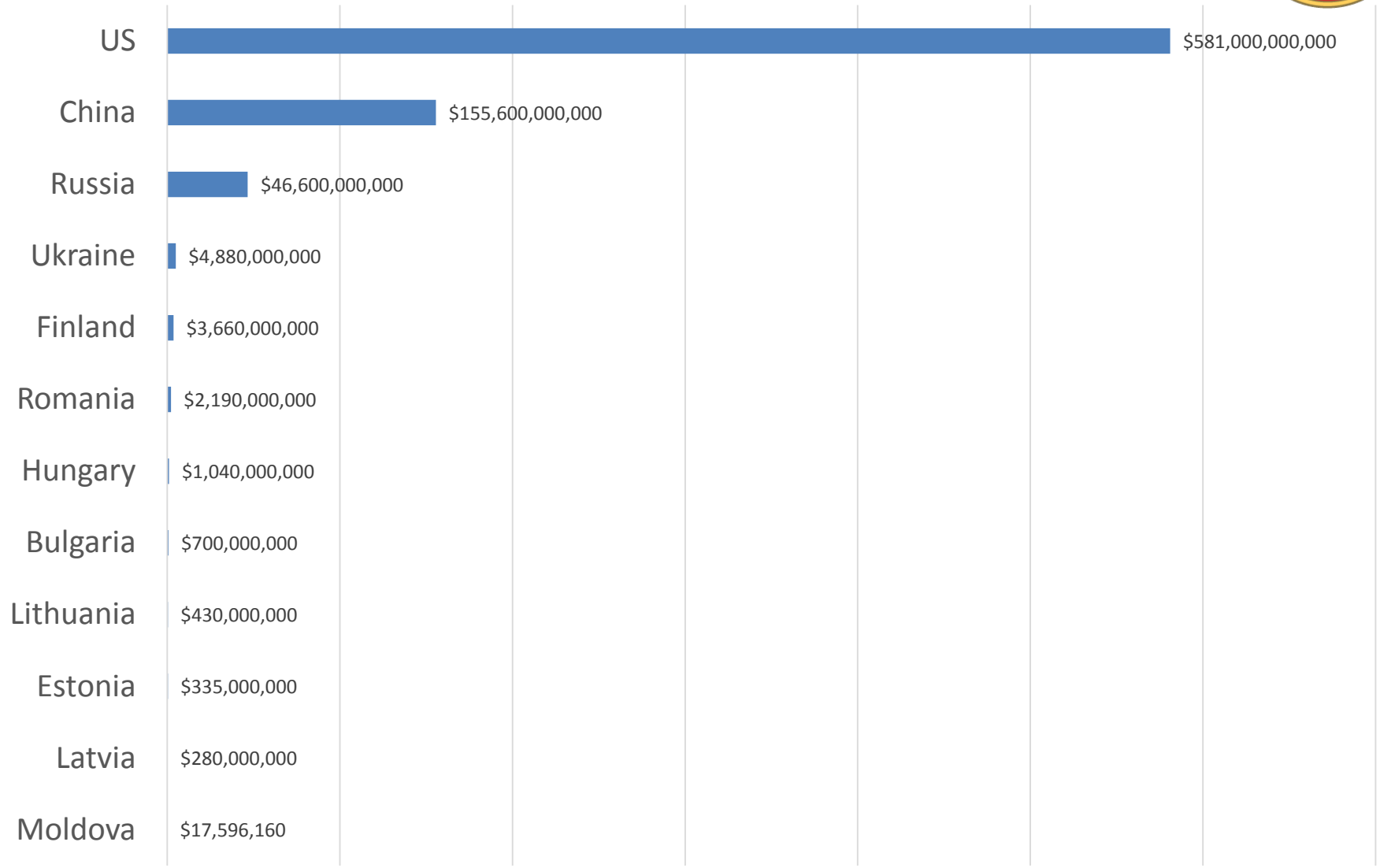
Problem: Military Budgets



Meeting the Customer Needs

What they have now….

~$10,000

What they need…

~$300,000

What we've been trying to sell them

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Minimum Requirements

- Pointing
- Position
- Basic Ballistics

Pointing

US Standard

- <1.0 mils accuracy
- High speed automatic pointing (50-200hz refresh rate)
- Highly automated
- Support navigation

~$60-120k

Minimalist

- ~3 mils accuracy
- Slower updates (10hz)
- Requires more soldier intervention
- "Just Points"

~$7k

RDECOM

Position

US Standard

- <5 meters accuracy
- GPS aiding
- Highly automated
- Supports navigation
- Works anywhere on Earth

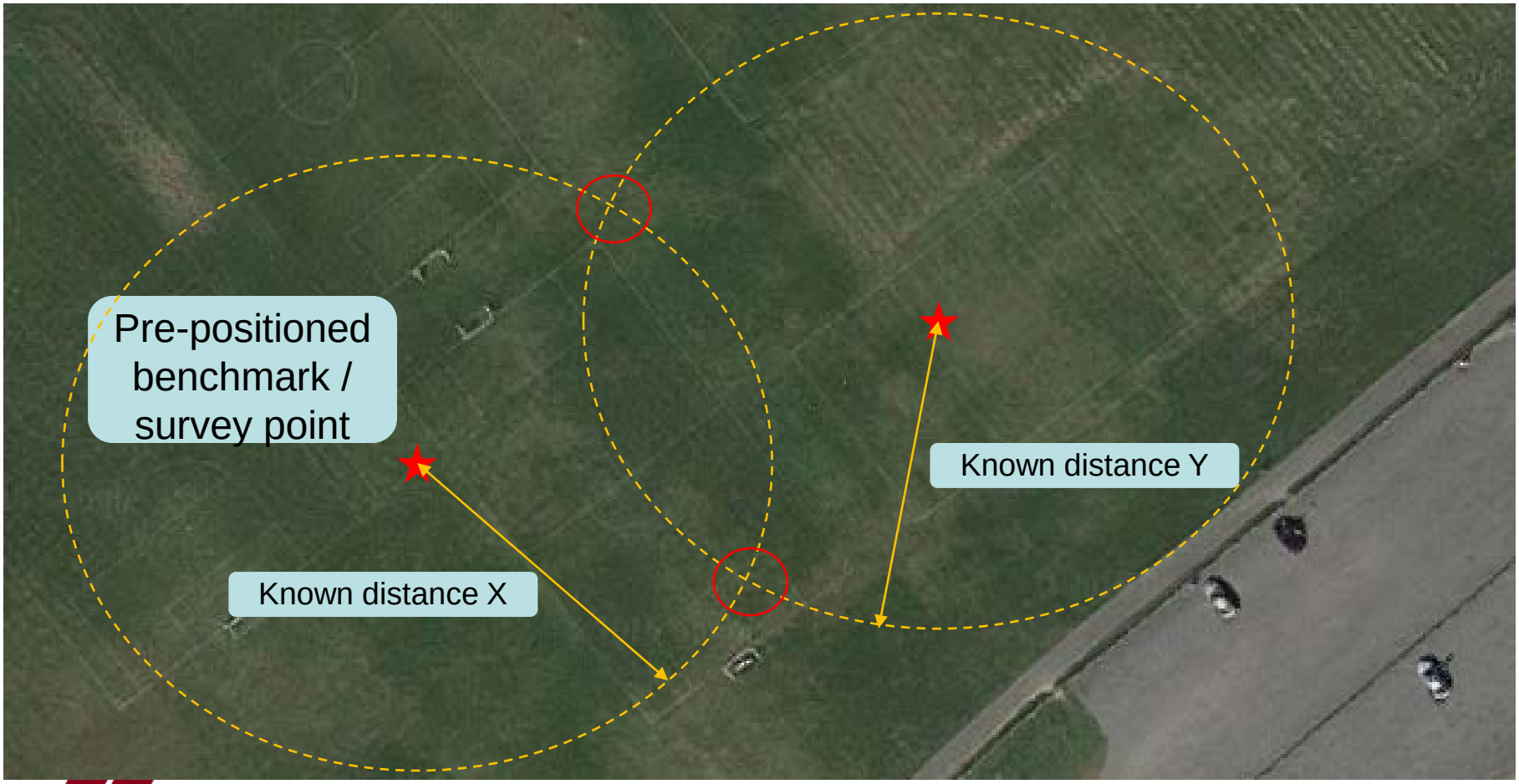
~$60-120k

Minimalist

- ~10 meters accuracy
- Start with GPS when available
- Cell tower triangulation when available
- Benchmarks/survey points
- Locally cached maps
- Manual steps
- Only has to work ‘at home’

<$1k

Position: Benchmarks



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Position: Local Map Features

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Basic Ballistics

US Standard

- Many variables to consider:
  - Tube wear
  - Propellant lot
  - Propellant type
  - Propellant charge
  - Propellant temperature
  - Shell type
  - Projectile weight
  - Tube temperature
  - Muzzle velocity variance
  - MET data
  - Etc.

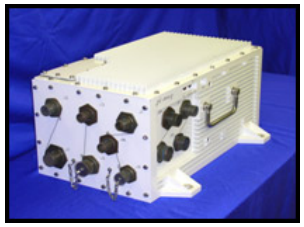
Minimalist

- Just keep the bare minimum:
  - Propellant type and charge
  - Shell type
  - Basic MET

Mission computer

US Standard

- Many requirements:
  - Shock and vibe
  - Wash down
  - IA certification
  - Longevity
  - Milspec connectors
  - Reliability
  - Etc
- Drives cost and size
- Significant training requirement



~$10-60k

Minimalist

- Keep it simple
- Minimal training / intuitive design
- Re-use commercial devices
- Rugged case

~$300

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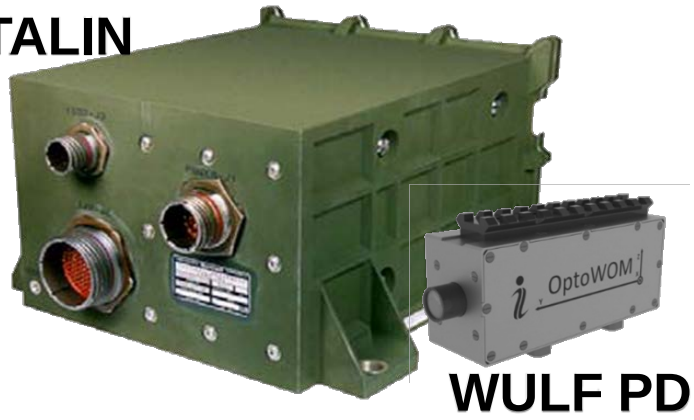
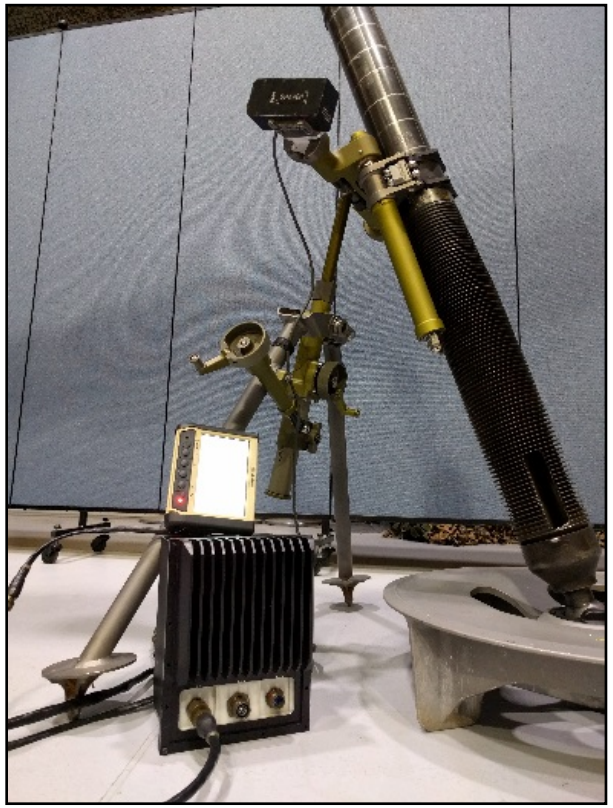
Existing Work: WULF





Low Cost: Total system cost <15k

Accurate weapon pointing: *2 – 3 mils*

Improved accuracy: *Lower collateral damage concerns*

Cost Savings: *~1/10th overall cost vs current digital fire control*

Lightweight: *Pointing Device <1 lb, (comparable device 16 lbs)*

System Weight Savings: 15lbs (*200lb Weight Savings over MFCS-D)*

Easily supportable: *Modular design reduces logistic support requirements*

Improved responsiveness: *Setup time greatly reduced (2:30 min to < 1 min)*

Repeat Rounds: *WULF allows accurate, repeatable, and fast emplacement between rounds*

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Conclusions

- Artillery is key to land warfare
- Allies need the ability to rapidly emplace in order to survive and stay relevant to the conflict
- Allies cannot afford Western digital systems
- If stringent US/Western standards are relaxed, a cheap, ‘good enough’ system can be produced that our allies can afford

Questions

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