The Strategic Force Density Problem:

A Historical Perspective for Operations in Afghanistan

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UNLIMITED

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Definitions

- For the purpose of this study
  - Force Density is defined as:
    - » *Security Forces (SF) per 1000 population*
  - Force Ratio is defined as:
    - » *Security Forces per Insurgent (RED)*

Background: Quinlivan et al

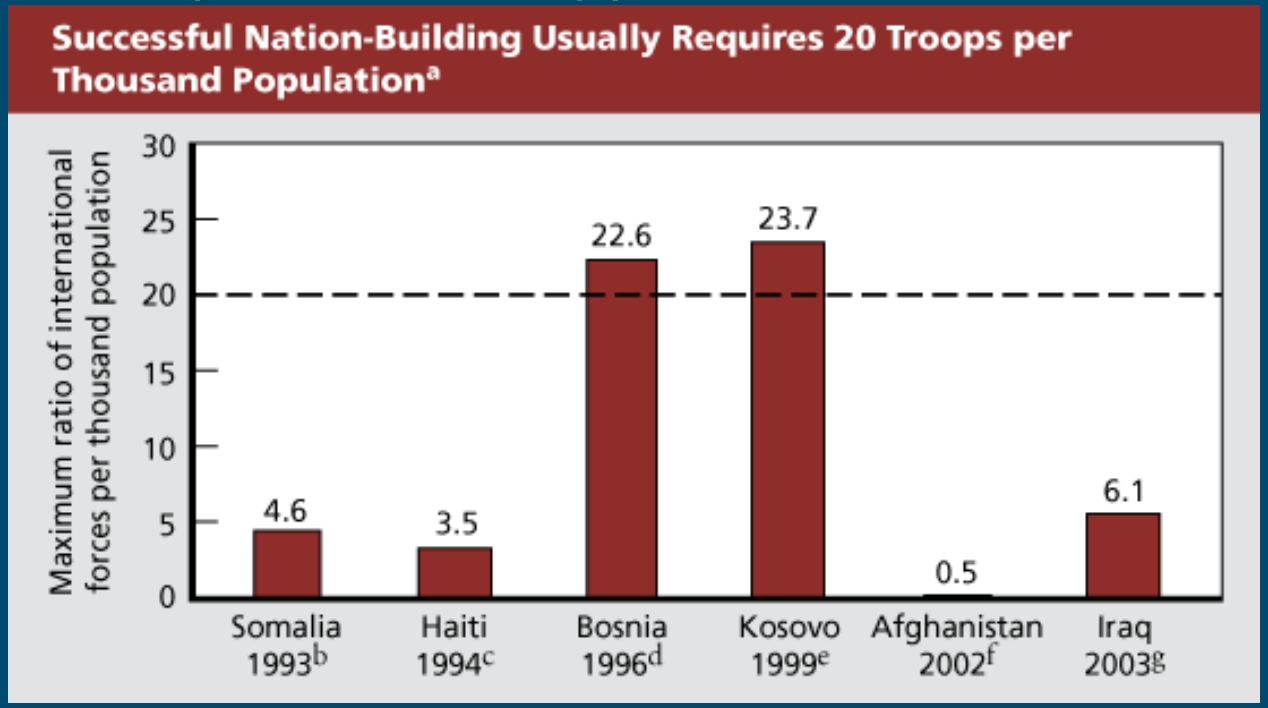
Quinlivan & Force Density (1)

- **1995:** James Quinlivan @ RAND analysed force-sizing requirements for stabilisation/COIN/nation-building ops.
  - 6-8 campaigns considered
  - Heterogeneous sample of types of operation
  - **No attempt made at statistical analysis**

- Force Density used as a measure of deployed force-size:
  - Security/Stabilisation Forces per 1,000 Inhabitants
  - Used by analogy with civil law enforcement

Quinlivan & Force Density (2)

"…successful strategies for population security and control have required force ratios either as large as or larger than 20 security personnel (troops and police combined) per thousand inhabitants."



J Quinlivan. *Burden of Victory. The Painful Arithmetic of Stability Operations.* Rand Review, Summer 2003. http://www.rand.org/publications/randreview/issues/summer2003/burden.html

Quinlivan & Force Density (3)

- In recent years this observation has increasingly been:
  - Quoted as fact in academic papers
  - Used as a planning “Rule-of-Thumb” for sizing Security Force requirements in IRAQ, AFGHANISTAN
  - **Employed at an operational level**

- Easy to see why:
  - There are no better alternatives
  - Simple to understand
  - It requires only population size

Quinlivan & Force Density (4)

- Problems:
  - Not a statistically robust sample
  - Ranges drastically in terms of scale, nature of threat
  - Requires that Force Density be correlated with campaign success (a currently unproven assumption)
  - No indication whether 20 SF per 1,000 Inhabitants represents 95% success-rate, or 75% or….
  - **No consideration of the scale of opposition**

Background: This Study

Force Ratio vs. Force Density

- Cornwallis XII: AD Hossack presented preliminary analysis comparing Force Density and Force Ratio
  - 34 completed CT/COIN campaigns
  - Tested for statistically significant correlation between Military Campaign Success and scale of Security Force deployment

- Discovered:
  - A *marginally significant correlation* with Force Ratio
  - No correlation with Force Density

The Hypothesis

- RED Density inside a Civilian Population is related to the nature of the campaign that SF will have to fight.

Hossack (2004): Cornwallis IX

- RED opposition to stabilisation:
  - *minimal*
  - *fragmented*
  - *disorganised or non-existent*

FORCE DENSITY

as a predictive measure

- RED opposition to stabilisation:
  - *substantial*
  - *organised*
  - *armed*

FORCE RATIO

as a predictive measure

Background to This Study

- Two blocks of work proposed to support planning, policy, and doctrine:
  - Initial block for September 2008 to inform ARRCADE FUSION 09
    - < 50 mostly COIN campaigns
    - Limited to review of Quinlivan Force Density Rule-of-Thumb
    - Possibly investigate relative importance of:
      - Indigenous vs Exogenous Security Forces
      - Military vs. Police manpower etc.
  - Second block to run until end (Ma
    - Extend nu
    - Inves
      port

In practice, this second block largely superseded by investigation of a US study giving very different conclusions to Dstl analysis

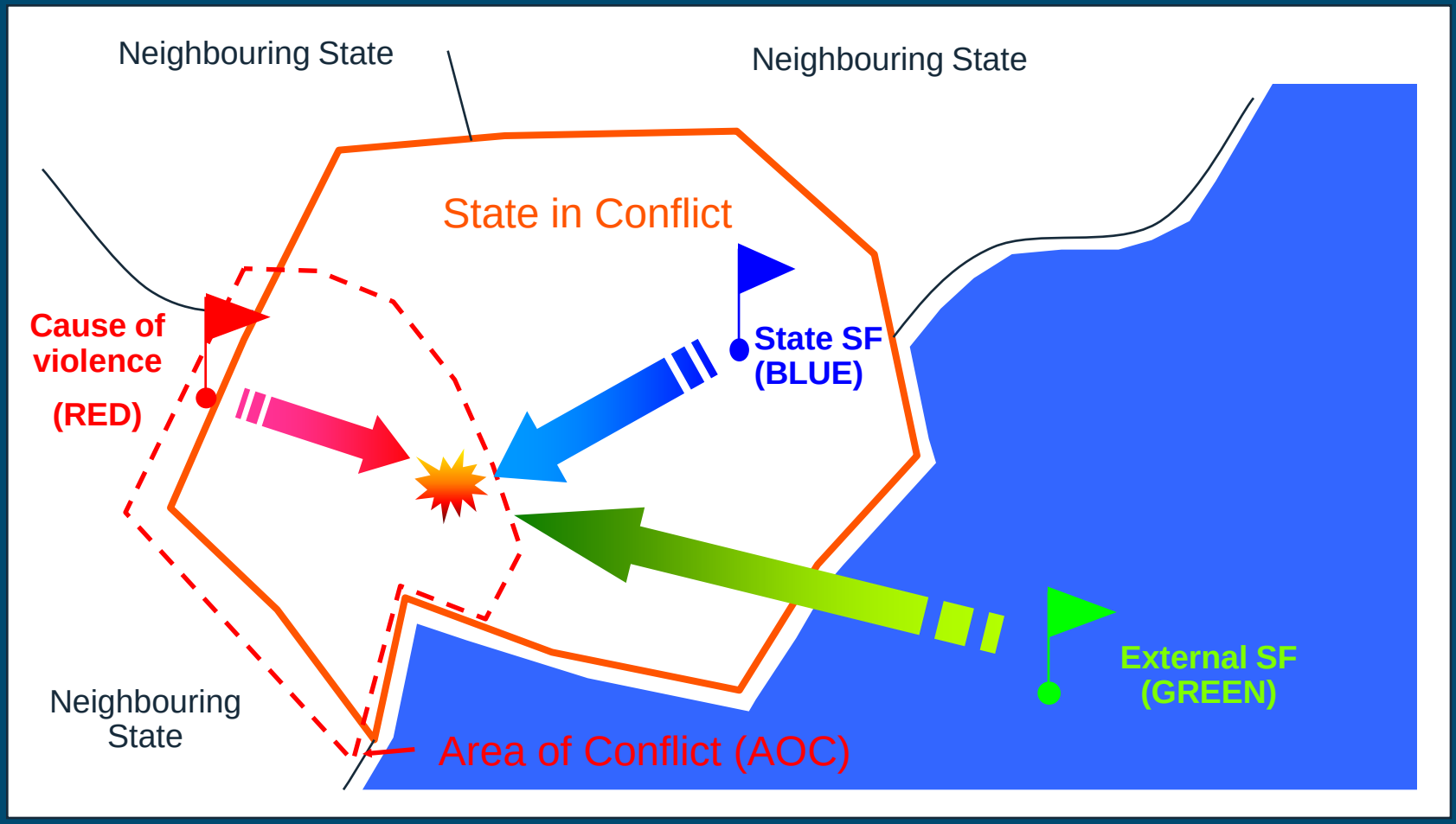
Concept of Analysis

Concept of Analysis (1)

- Adapted conceptual model from 2004-07 CT/COIN Study:
  - COIN (or other stabilisation) takes place within a BLUE State
    - May take place within the entire state or some localised region
  - A RED Non-State Actor causes instability within the State
    - CT/COIN: e.g.: Terrorist or Insurgent Movement
    - Law Enforcement: e.g.: Organised Crime
    - Civil Unrest: e.g.: Protest Movement
  - The Indigenous BLUE Security Forces attempt to prevent instability
    - They may be supported by External GREEN Security Forces
  - Ops take place amongst WHITE Civilian Population of BLUE State

Hossack 2004: Cornwallis IX, Hossack & Sivasankaran 2005: Cornwallis X

Conceptual Model of Campaign



Concept of Analysis (2)

- Treat each campaign as a static data-point
- Use Military Outcome (from COIN study) as indicator of achievement of Stabilisation Success or otherwise:
  - Assumed to be a zero-sum factor
  - Three Outcome classes Allowed:
    - SF Military Success & RED Military Failure ("SF WIN")
    - SF Partial Success & RED Partial Success ("DRAW")
    - SF Military Failure & RED Military Success ("SF LOSS")
  - Coded upon possession of *the monopoly of (lethal) violence* at end of campaign

The Basic Analysis Plan

- Undertake ordinal logistic regression using both Force Density and Force Ratio
  - Establish which is the *better* predictor of Campaign Success:
    - At different levels of RED Density (RED/1,000 Inhabitants)
  - Establish whether there is variation in the effectiveness of:
    - Internal SF vs. External SF
    - Military vs. Police

Campaigns in Current Analysis

- The Irish War of Independence
- The Great Iraqi Revolution
- Axis Occupation of Yugoslavia
- Lithuanian Anti-Soviet Resistance
- The Jewish Insurgency in Palestine
- Ukrainian Independence Movement
- Greek Civil War
- Huk Rebellion
- Indonesian Independence Struggle
- The Malayan Emergency
- Puerto Rican Nationalist Uprising
- Mau Mau Rising
- The Algerian War of Independence
- The Cyprus Emergency
- 26 July Movement
- Tibetan Revolt
- Thai Communist Insurgency
- Katanga
- FLQ Terrorism in Quebec
- Guinea-Bissau War of Independence
- Aden Emergency
- Borneo 1963 - 1966
- Colombian Civil War
- Struggle for Mozambique Independence
- Namibian War of Independence
- Vietnam 1965 -1973
- Chad Civil War
- Guevara Guerilla Campaign
- Cabanas
- Red Army Faction
- Tupemaru Insurgency
- The Troubles in Northern Ireland
- Rhodesian Civil War
- Sandinistas
- Angolan Civil War
- East Timorese Independence
- Aceh Conflict
- Mozambique Civil War
- Egyptian Fundamentalism
- Vietnamese Intervention in Cambodia
- Soviet "Occupation" of Afghanistan
- Polisario
- El Salvador Civil War
- The Shining Path Insurgency
- The Nicaraguan "Contras" Campaign
- The Tamil Insurgency
- PKK Kurdish Rebellion
- First Intifada
- UN Peacekeeping in Cambodia
- Algerian Islamic Insurgency
- UN/US in Somalia
- Rwanda
- Chechnya 1
- Maoist Insurgency in Nepal
- Peacekeeping in Sierra Leone
- 2nd Chechen War
- Second Intifada
- Burundi 04-05

Results: Force Density vs. Force Ratio

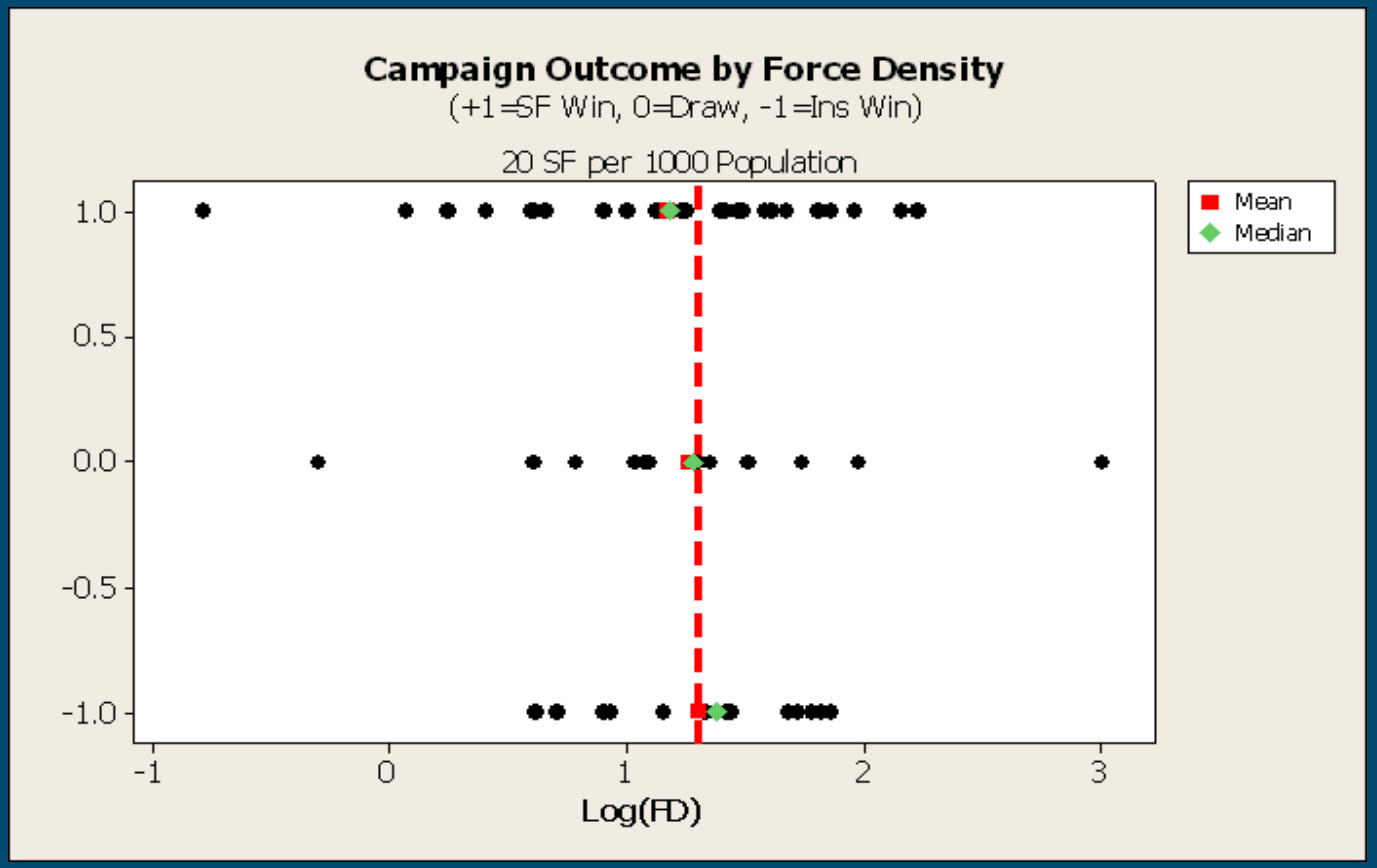
Force Density vs. Outcome (1)

- The available data *as coded by Dstl* provides no evidence that Overall Force Density is in any way related to campaign *end-state* outcome

- Tested for significance of factor coefficients within regression models:
  - LOSE vs. DRAW vs. WIN: p ~ 0.530
  - [LOSE + DRAW] vs. WIN: p ~ 0.494
  - LOSE vs. [DRAW + WIN]: p ~ 0.604

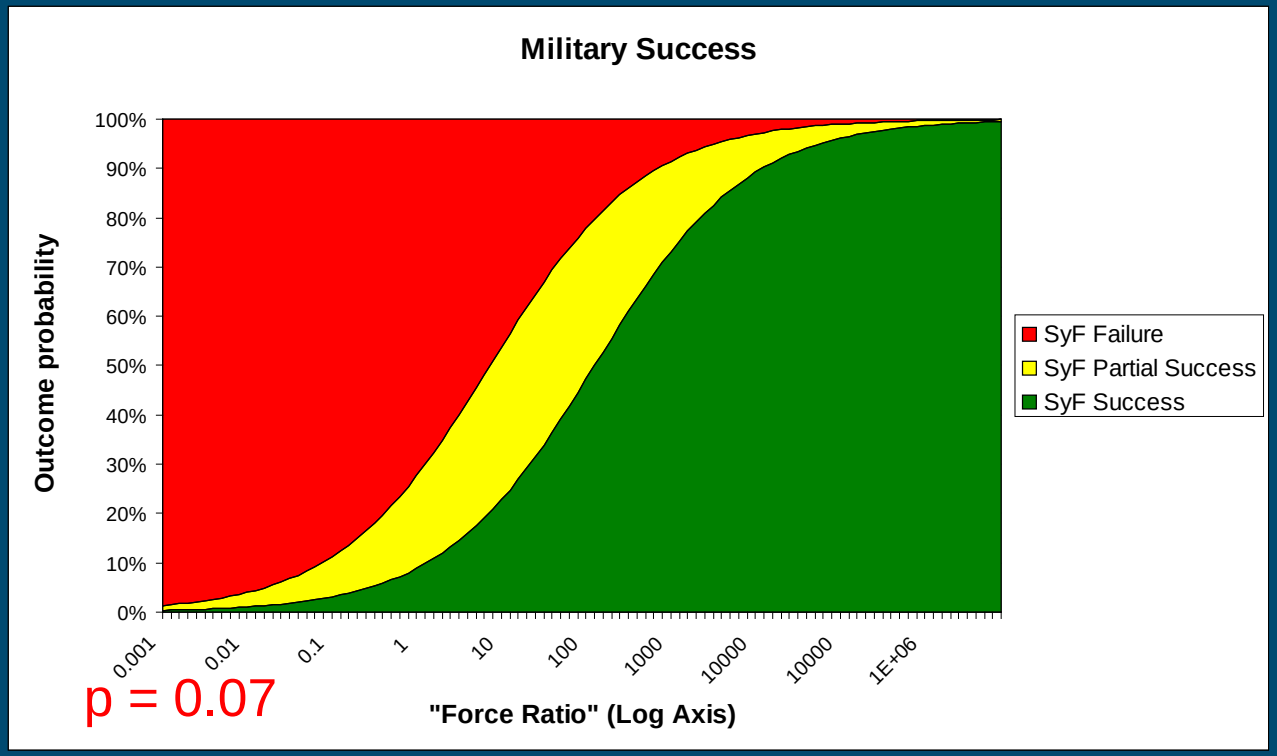
» (N = 58 cases, of which 41 COIN, 13 CT, 4 Other)

Force Density vs. Outcome (2)



Force Ratio vs. Outcome (1)

- It is already known that Overall Force Ratio is (marginally) significantly associated with Campaign outcome:



Hossack 2007: Cornwallis XII

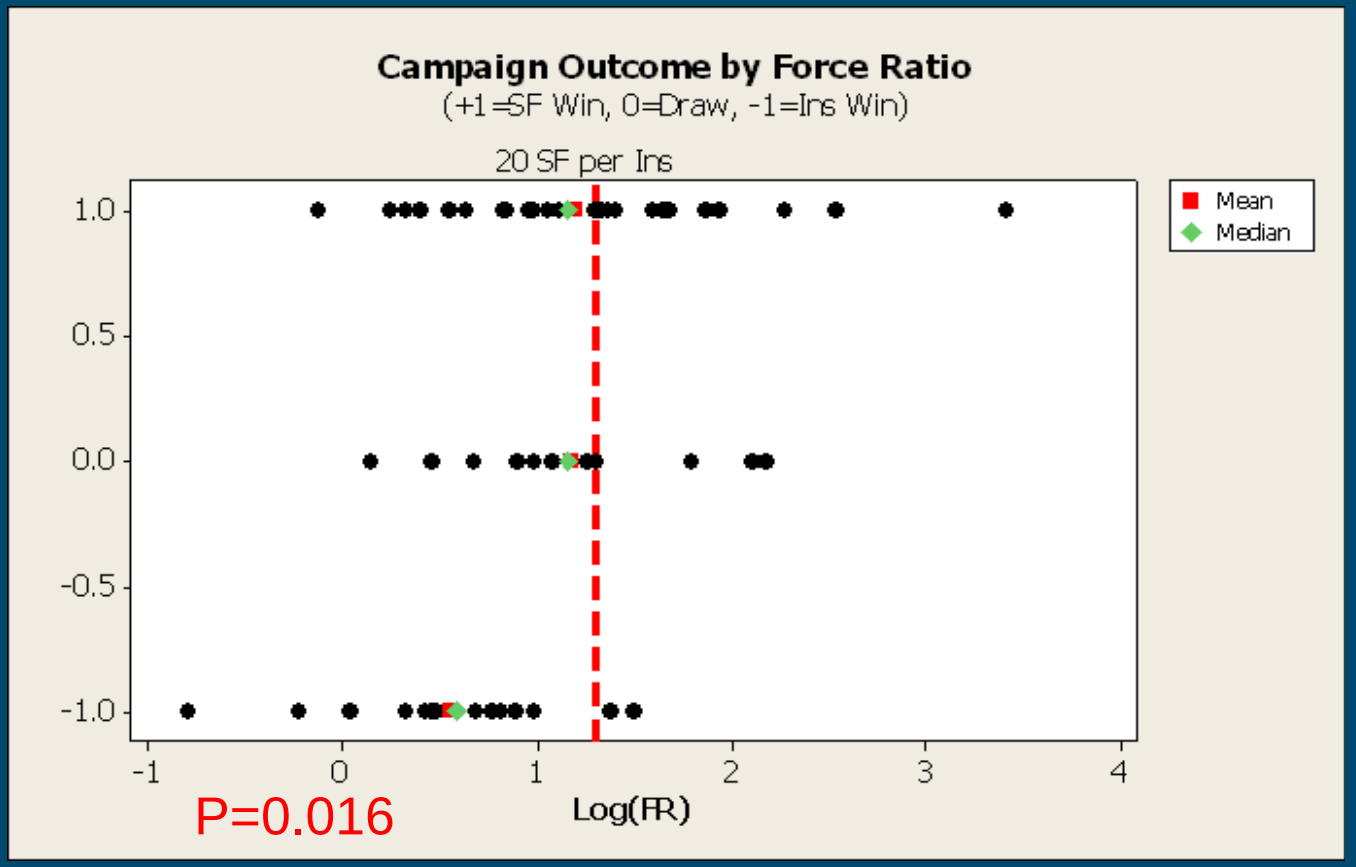
Force Ratio vs. Outcome (2)

- The available data *as coded by Dstl* indicates that Overall Force Ratio is a statistically significant predictor of (at least historical) campaign *end-state* outcome

- Tested for significance of factor coefficients within regression models:
  - LOSE vs. DRAW vs. WIN: p ~ 0.016
  - [LOSE + DRAW] vs. WIN: p ~ 0.074
  - LOSE vs. [DRAW + WIN]: p ~ 0.008

» (N = 58 cases, of which 41 COIN, 13 CT, 4 Other)

Force Ratio vs. Outcome (3)



Results: Force Density, Ratio By Composition

Origin of Security Forces (1)

- Origin of Security Forces:
  - Internal (BLUE): Indigenous to the State experiencing conflict
    - can include colonial settlers e.g. White Rhodesians
  - External (GREEN): Exogenous to the State experiencing conflict
    - includes colonial / imperial forces

Basic Rule-of-Thumb:

Internal Security Forces will have been brought up amongst (or in close proximity to) the civilian population and will be able to "feel" the "mood on the street"

Origin of Security Forces (2)

- BLUE Significant on FR measure
  - Positive Effect

- GREEN Significant on FD measure
  - Negative Effect

- Apart from any other problems, sample size IS an issue:
  - The dataset has only 31 cases where GREEN is present
  - As Security Forces are broken down into finer resolution, get more cases with zero values, so less variation in subsamples

Type of Security Forces (1)

- ORGANISED (or FORMED) GROUPS: Personnel are permanently deployed in coherent, formed, standardised units ("companies", "brigades" etc) to achieve their purpose.

Basic Rule-of-Thumb:

Is the fundamental unit of operation the individual or the trained group of individuals?

- "ARMED" GROUPS: Personnel are equipped with lethal weapons for offensive as well as for purely self-defensive purposes.

Basic Rule-of-Thumb:

Is the force routinely equipped with anything more than side-arms?

Type of Security Forces (2)

<table>
<tr><th>Military</th><th>Paramilitary</th><th>Police</th></tr>
<tr><td colspan="3">• Permanent</td></tr>
<tr><td colspan="2">• Organised and Armed</td><td>• Unarmed</td></tr>
<tr><td>• Primary purpose is to use armed force to advance the state's national interests externally and to defend the state's territory.</td><td colspan="2">• Primary purpose is to regulate behaviour and maintain order amongst the WHITE population.</td></tr>
</table>

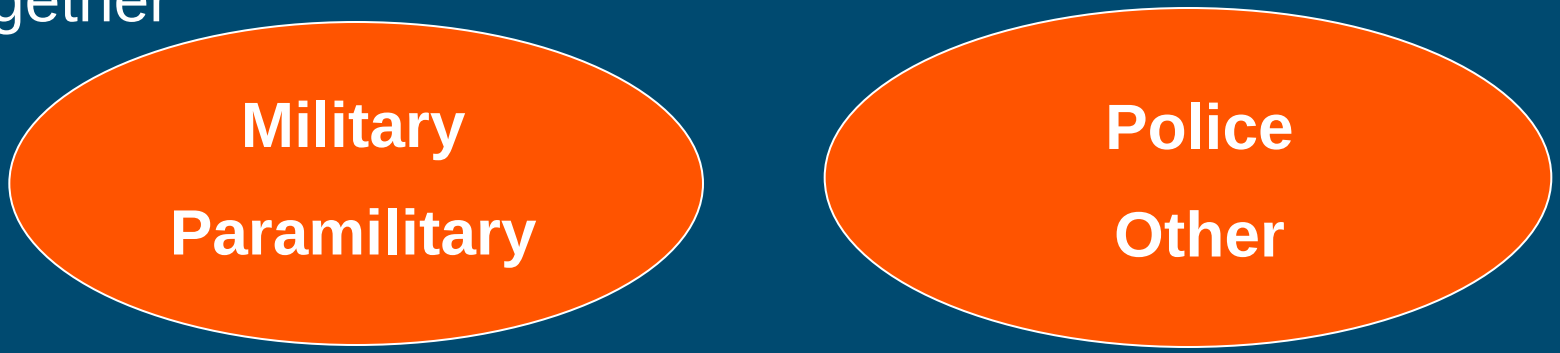
Type of Security Forces (3)

Other		
Militia	**Homeguard**	**Private Military Contractor**
•Temporary		
• Armed	• Unarmed	• Armed
• Raised Within the State		• Raised State
• Primary purpose is to defend a section of the population from the use of force against them	• Primary purpose is to provide protection to a section of the population from internal use of violence against them.	• Primary to provide armed protection to designated parties within the State

Currently also used as a holding category for mercenaries

Type of Security Forces (4)

- Preliminary regression analysis provides no reason to suppose that different types of Security Forces are more effective than others.
- This may be a result of the way forces have been grouped together



- May also be a result of the general crudeness of available Police/Paramilitary data sources

Results: Insurgent Density

Insurgent Density

- Preliminary regression analysis suggests that ID is only significant on a FD measure

Outcome Coding	FD Measure		FR Measure	
	FD	ID	FR	ID
L vs D vs W	0.209	**0.016**	0.209	0.546
L vs. [D + W]	0.452	**0.079**	0.452	0.548
[L + D] vs W	**0.101**	**0.007**	**0.101**	**0.465**

Insurgent Strength does have some significant effect on SF chance of Not-Losing

The American Connection

2009 US Research on Force Density

- In late 2008, US DoD OSD CAPE commissioned a study on force-sizing rules-of-thumb for COIN:
  - As part of Quadrennial Defense Review
  - To estimate the cumulative force-sizing demands of future stability operations
  - Study awarded to The Institute for Defense Analysis (IDA)
  - Liaised with Dstl during their study start-up phase
  - IDA Study reported in Sep 09, concurrently with Dstl's interim findings

Differences Between IDA & Dstl (1)

- IDA findings differed from Dstl's interim findings
  - Dstl's interim findings in Sep 09 found no evidence that FD was related to COIN campaign outcome
  - IDA's findings in Sep 09 were that FD was a significant predictor of COIN campaign outcome

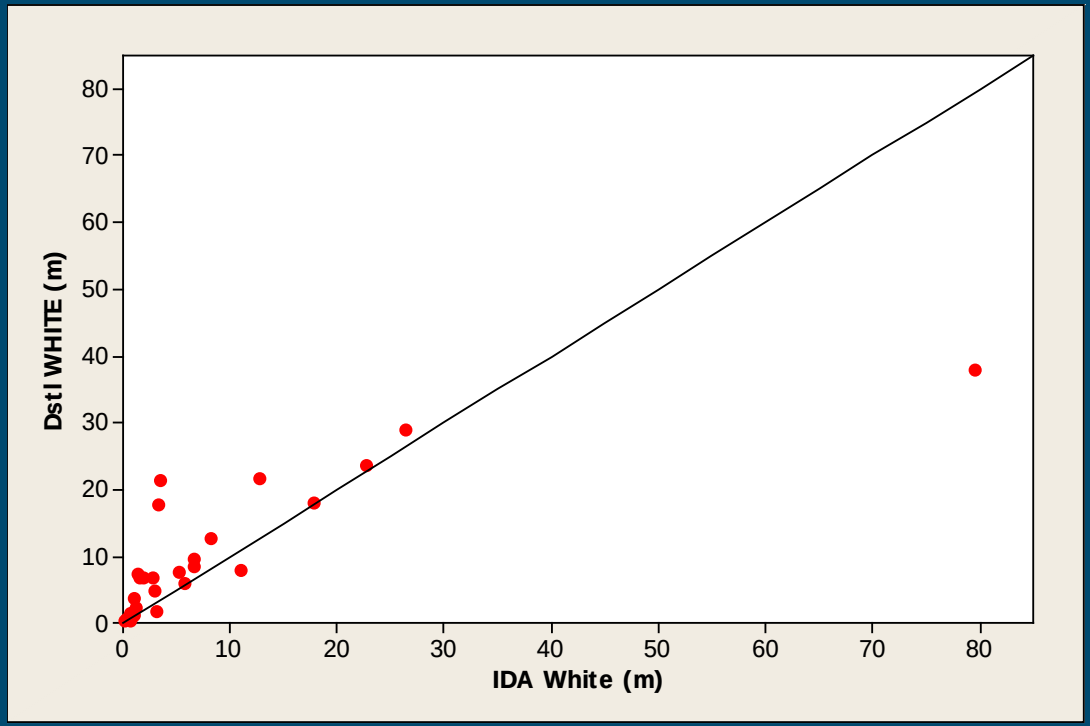
Differences between IDA & Dstl (2)

- Following discussion and liaison with IDA, and other US agencies, the UK notes that there is a widely-held belief that FR has no practical usefulness:
  - Philosophical: US doctrine (FM3-24) is now population-centric, so a population-normalised metric is more relevant
  - Practical: It is impossible to accurately estimate RED strength in real-world, ongoing COIN campaigns

- Following consultation with UK analysis community, Dstl accepts the practical objection whilst noting that it is still useful to know theoretically that the effect has existed in historical campaigns, and presumably still exists today.

Differences Between IDA & Dstl (3)

- Methods of counting WHITE populations differ in detail
  - IDA have occasionally used an ethnic/religious filter to obtain relevant WHITE population of the AOC.
  - IDA WHITE data is generally smaller than Dstl
  - Leading to larger Force Densities



Differences Between IDA & Dstl (4)

- Assessment of campaign outcome differs in 12 of 29 common cases.
  - Partially due to differences in choice of campaign *end-date*:

    "End-date determines end-state"

  - Partially due to differences in assessment of what counts as campaign "SUCCESS" in COIN:

    "Stabilisation" as *process during…* cf. "stability" as *status after…*

Rhodesia (1972 – 1979) (US: "Failure"; UK: "Partial Success"):

UK: Former BLUE & RED factions formed national power-sharing government

Comparison of FD Results

- *"Statistical significance of force density depends on use of both IDA outcome codings and population figures."*

(D Adesnik, 2009 *Towards a Consensus on Force-Sizing Analysis for Stability Operations.*)

Sub-Sample of 29 Cases Common to both Studies		Force Density Measure			
		Dstl SF Data	IDA SF Data	Dstl SF Data	IDA SF Data
		Dstl POPN Data	IDA POPN Data	IDA POPN Data	Dstl POPN Data
Dstl Coding of Outcome	L vs D vs W	0.905	0.333	0.486	0.888
	[L + D] vs W	0.529	0.505	0.865	0.850
	L vs [D + W]	0.630	0.171	0.206	0.600
IDA Coding of Outcome	L vs D vs W	0.915	0.113	0.187	0.937
	[L + D] vs W	0.609	**0.044**	**0.057**	0.605
	L vs [D + W]	0.521	0.463	0.699	0.723

Comparison of FR Results

Sub-Sample of 29 Cases Common to both Studies		Force Ratio Measure			
		Dstl SF Data	IDA SF Data	Dstl SF Data	IDA SF Data
		Dstl RED Data	IDA RED Data	IDA RED Data	Dstl RED Data
Dstl Coding of Outcome	L vs D vs W	0.378	0.176	0.354	0.335
	[L + D] vs W	0.951	0.225	0.546	0.663
	L vs [D + W]	0.111	0.131	0.204	0.125
IDA Coding of Outcome	L vs D vs W	**0.040**	**0.017**	**0.042**	**0.045**
	[L + D] vs W	0.102	**0.020**	**0.040**	0.125
	L vs [D + W]	**0.079**	**0.054**	0.141	**0.065**

Current Ops in Afghanistan

Caveat

- This section provides some work in progress indications of the implications of the analysis for current Operations in Afghanistan.
- However, it is based only on available open source data and takes no account of context specific factors which may have wider reaching implications than the research presented here.
- As such it should not, at this stage, be taken as providing firm results.

Security Force Strength

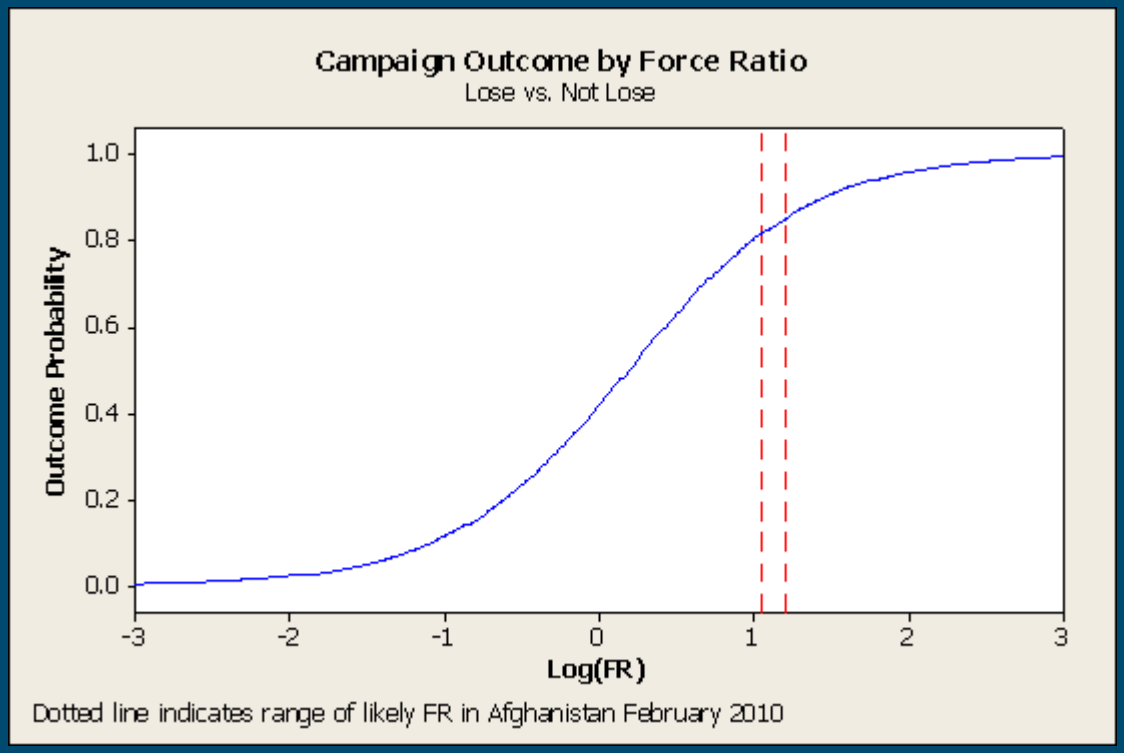
- SF in Afghanistan:
  - Afghan National Army (inc. Air Corps), c. 104,000
  - Afghan National Police, c. 81,000
    - BLUE Total, c. 185000
  - International Security Assistance Force, c.86,000
  - Operation Enduring Freedom, c.30,00
    - GREEN Total, c 116,000
- Total: c. 300,000

Insurgent Strength

- Maj. Gen Mike Flynn
  - Head of ISAF intelligence operations in Afghanistan
  - Estimated that there are anywhere between 19,000 and 27,000 insurgents operating in Afghanistan.
  - Not included:
    - Part-time fighters
    - Bomb-makers
    - Spotters
    - General sympathisers
    - Foreign fighters within Afghanistan (<100) and in the Federally Administered Tribal Areas of Pakistan (400-1500).

Force Ratio in Afghanistan

- March 2010:
  - whole-campaign force ratio
    - 11.1 - 15.8.
  - Probability of the Security Forces *Not Losing*
    - 81-85%



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Force Density in Afghanistan

- March 2010:
  - Whole-campaign force density
    - 10.6
  - Whole-campaign insurgent density
    - 0.67 - 0.95
  - Probability of the Security Forces *Not Losing*
    - 83-87%

Effectiveness of ANSF

- Operational effectiveness of the ANSF unclear.
  - ANA: 48% in highest capability bracket
  - ANP: 75% in lowest capability bracket
- One-to-one relationship between ANSF and ISAF is inadequate.

ANSF Effectiveness (%)	RED = 19,000		RED = 27,000	
	FR Single	FD Multi	FR Single	FD Multi
100	85%	87%	82%	83%
50	81%	84%	77%	80%
0	74%	79%	68%	74%

Summary

FD, FR & Outcome

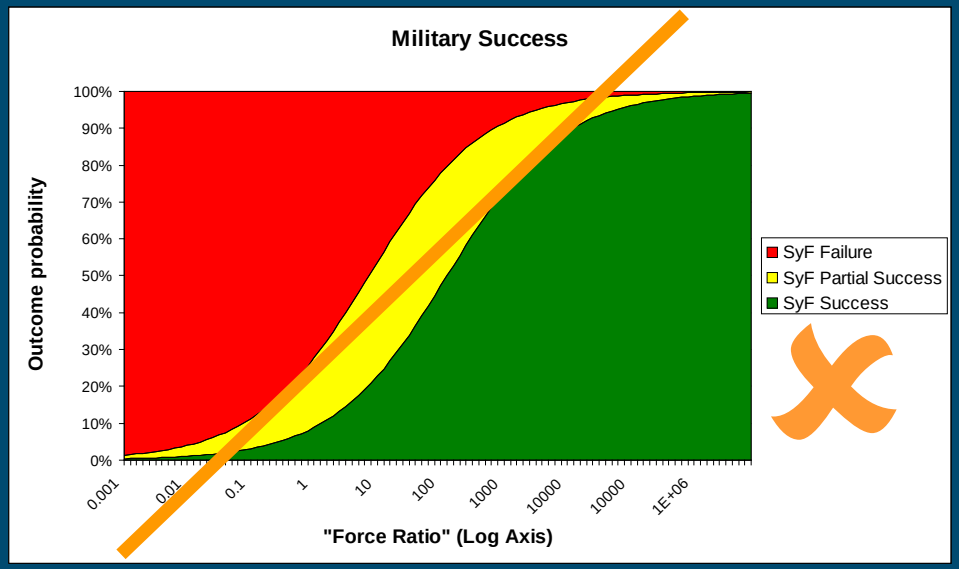
- At least for historical cases, where some estimate can be made of RED strength, Force Ratio is a better predictor of campaign outcome
- The best we can say is that FD provides…
  - …A *predictor* of the *minimal force* size necessary to avoid losing
  - …No information about force sizes sufficient to ensure success
- The most significant FR correlations to campaign success also follow this pattern
- There is currently no strong evidence to believe that:
  - Police are more or less useful for COIN than soldiers
  - Indigenous Security Forces are *intrinsically* more or less useful for COIN than are external forces

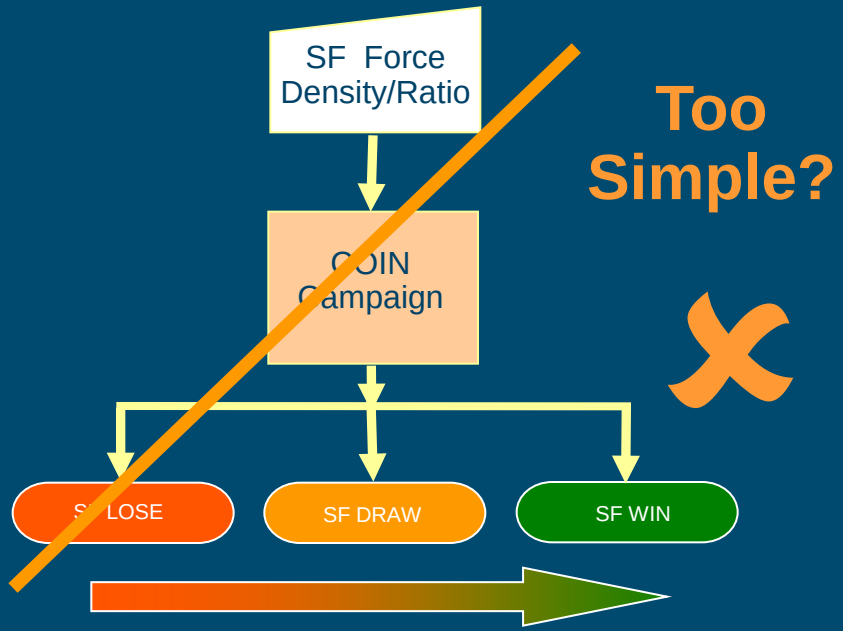
Dstl's Current Best Advice to UK MoD

- Simple Security Force *"size"* (whether per RED or per WHITE) has:
  - A *reasonable* correlation with the avoidance of outright defeat in COIN
  - At best a *weak* correlation with the prediction of "success" in COIN
- Simple force-sizing rules of thumb can be used to estimate necessary (minimum) but not sufficient (adequate) force-sizes for fighting COIN campaigns only.
- Force Ratio:
  - Greater robustness across historical cases
  - May not be a practical metric for ongoing campaigns
- Force Density:
  - Is a practical OR metric for ongoing campaigns
  - Is only statistically meaningful under specific, narrow assumptions

A New Hypothesis (1)

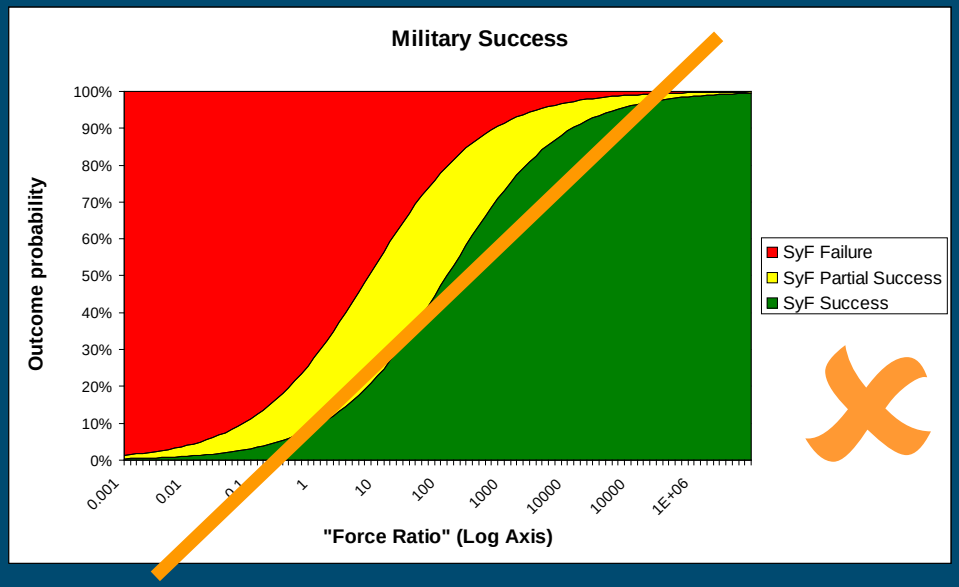
- Existing models of Force Level relationship with outcome implicitly assume:
  - A single stage process (“the campaign”) with:
  - Three equally valid outputs (LOSE, DRAW, WIN)
  - Selection of which is determined (probabilistically) by value of a single factor (FD or FR)

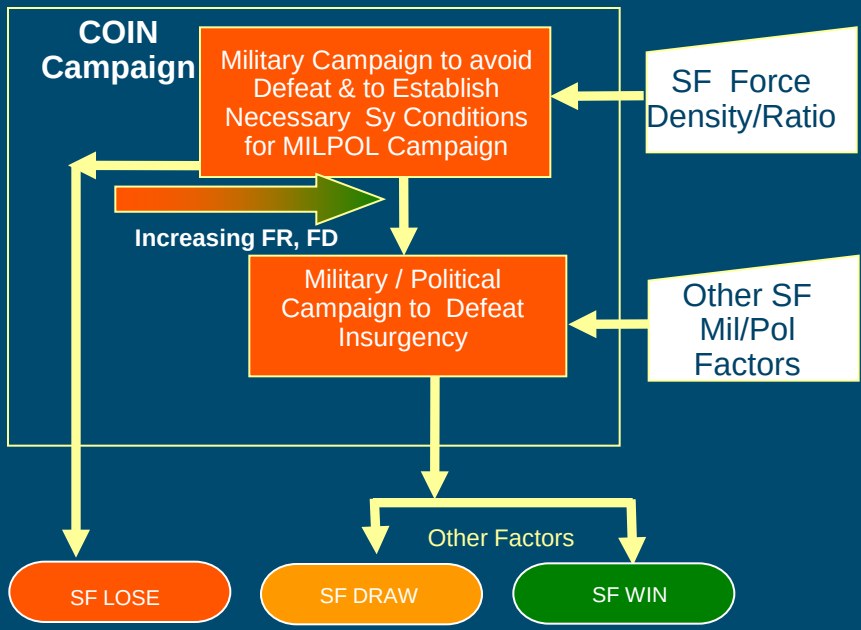




A New Hypothesis (2)

- Does the greater robustness of the LOSE vs. NOT-LOSE model suggest that COIN warfare is actually a two-staged process?
  - Stage 1: Military Campaign to ensure security "space" to allow Stage 2…
  - Stage 2: Military / Political Campaign to Defeat the Insurgency politically





Implication for Afghanistan

- Estimated chance of SF Not-Losing the Afghan campaign
  - 68 - 87%

- The wide spread is due largely to the uncertainty in the operational effectiveness of ANSF
- Active participation in stabilisation activities will be required by all elements of ANSF in order to maintain the security space required to move towards a successful outcome.

Any Questions?

Contact Details

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