

**BACK BRIEF
REPORT**

**Impact of Reconnaissance on Mission
Success**

"THE RECON SCENARIO"

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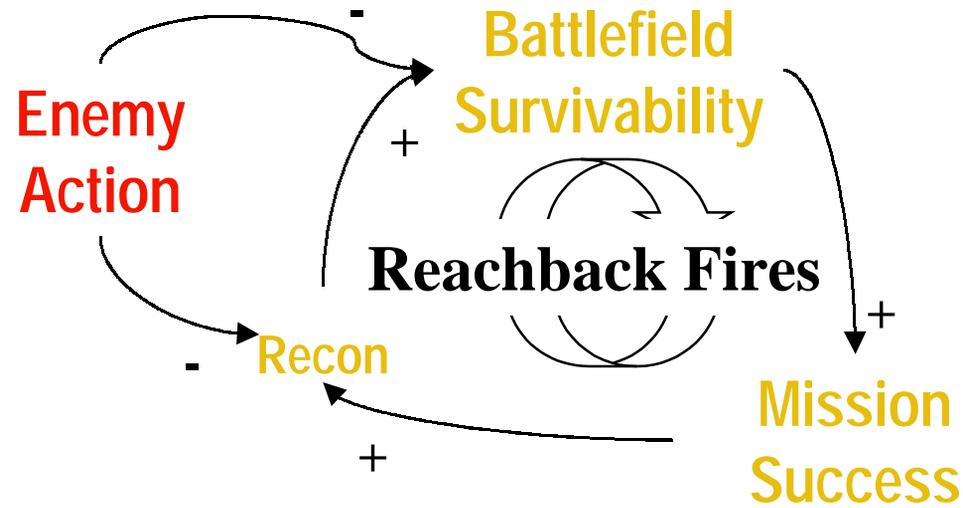
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Outline

- Recon Concept and Study Motivation
- Scenario:
 - Recon (original)
 - ~~'Flag' ISAAC Scenario~~
 - ~~'Destroy' MANA Scenario~~
- Excursions:
 - Force Mix and LAV characteristics
 - Fixed force; vary UAV characteristics

Rescued!

Concept – Battlefield Survivability and Recon



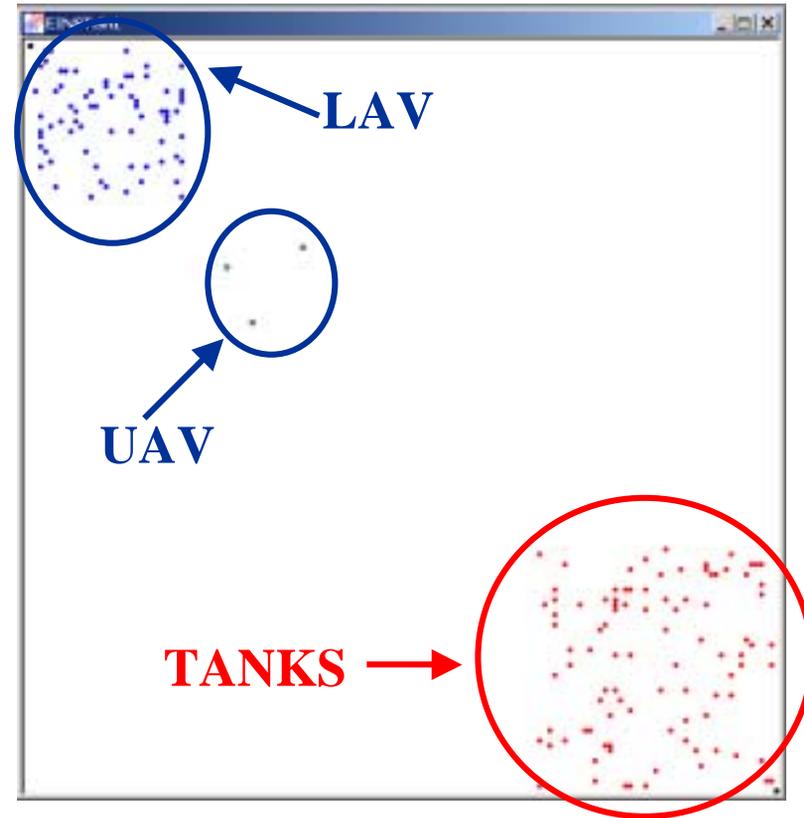
What is the relationship between Recon and battlefield survivability, strike and mission success?

Questions we wish to Answer

- Q1: 'Does increased SA provide improved survivability?'
- Q2: 'What Blue force mix best provides this?'
- Q3: 'What capabilities and/or tactics are most critical?'
- Q4: 'How does terrain complexity affect Q1 – 3?'

ISAAC Recon Scenario Dimensions

- 150 x 150 Battlefield:
 - 0.5 km grid; 1 min intervals
- Baseline Force Sizes:
- Blue:
 - 70 LAV – Employing manoeuvre
 - 3 UAV – Providing SA
- Red – 100 Tanks – Static, defending COG



Initial Brainstorming (Observations)

- Lot of 'interesting' ideas/solutions generated but ...
- 'Most' were too complex for ISAAC to model however ...
- Quickly started thinking in ISAAC mindset so that ...
 - Applicable solutions determined
 - 'Rescued' original scenario

Blue Representation – Attributes

- **Air Recon**
 - High mobility and ‘spotlight’ sensors
 - Very high survivability
- **Light Combat**
 - Good mobility and sensor over-match on Red
 - Weapon under-match on Red
- **All Blue entities can communicate with each other**

Blue Representation – Personalities

- Air Recon
 - Aggressively seeks out Red for info relay
 - Do not require support of other Blue entities
- Light Combat

**Manoeuvre
Concept
 $B_0/R_0 \gg 1$**

- Move towards Red based on info from Recon
- Tend to stand off from Red but will attack if numerically advantaged

Red Representation – Attributes

- Average mobility and poorer sensor range
- Lethality overmatch, good survivability
- No communications

Red Representation – Personalities

- Remain effectively static until Blue detected
- Aggressively chase Blue when Red detects
- Do not require support from other Red to engage

Baseline ISAAC Model Parameters

	Combat	Air Recon	Red
Mobility	1	2	1
Sensor	10	4	6
Wpn Range	4	N/A	4
P(kill)	0.4	N/A	0.5
Defence	2	999	2
Com Range	80	80	0

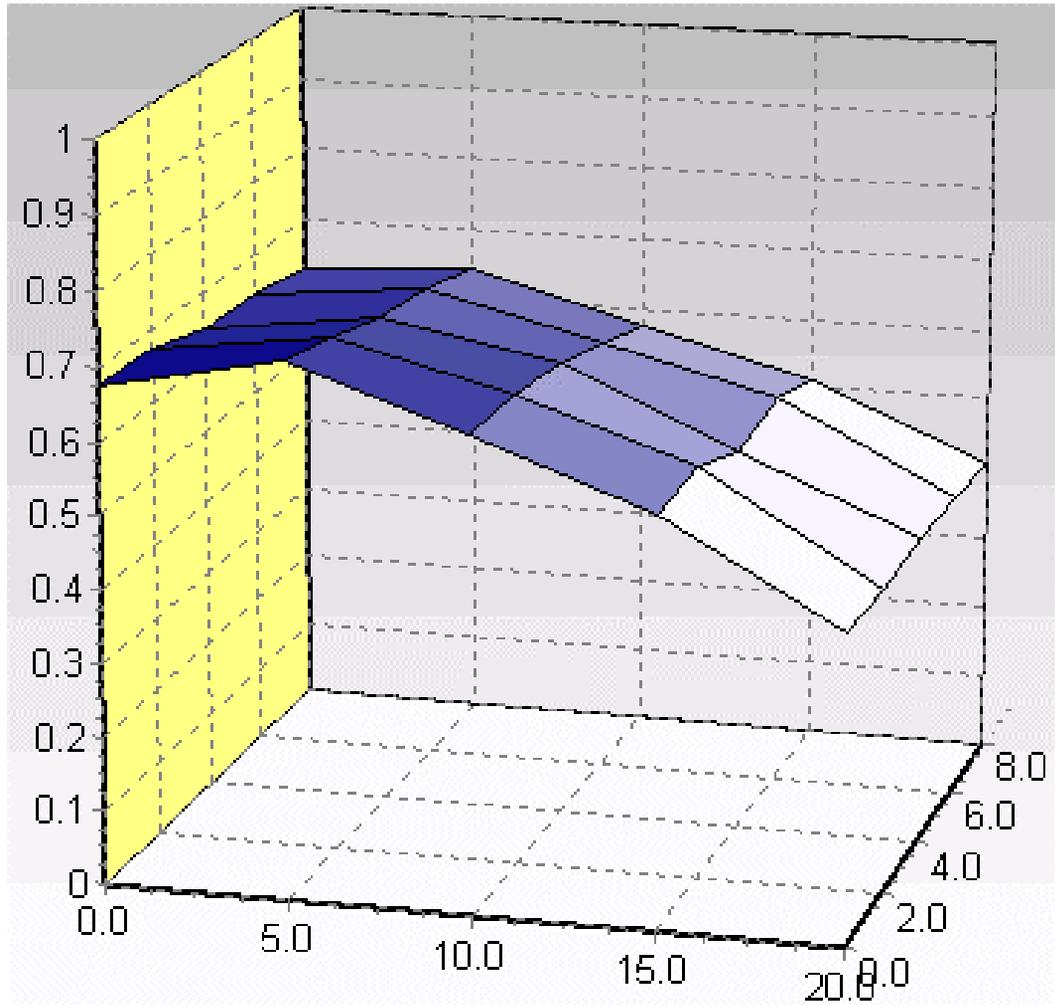
	Combat	Air Recon	Red
Friendly	10	0	0
Enemy	20	50	50
Flag	1	1	0
Combat	5	N/A	0

Only a handful of parameters

Excursion A – Force Mix and LAV Characteristics

- 3 Blue Parameters:
 - Number of UAV's (traded one-for-one with LAV's)
 - Minimum LAV force ratio to Attack
 - LAV Weapon Range (undermatch to overmatch)
- Questions of interest:
 - Is there an optimal UAV-LAV mix?
 - Is there an optimal Attack tactic?
 - Does the Attack tactic vary with the number of UAV's?
 - How sensitive are these questions to the LAV lethality?

Excursion A – Number of UAV's vs Attack Advantage



Attack Advantage:

No trend

Not dispersed initially?

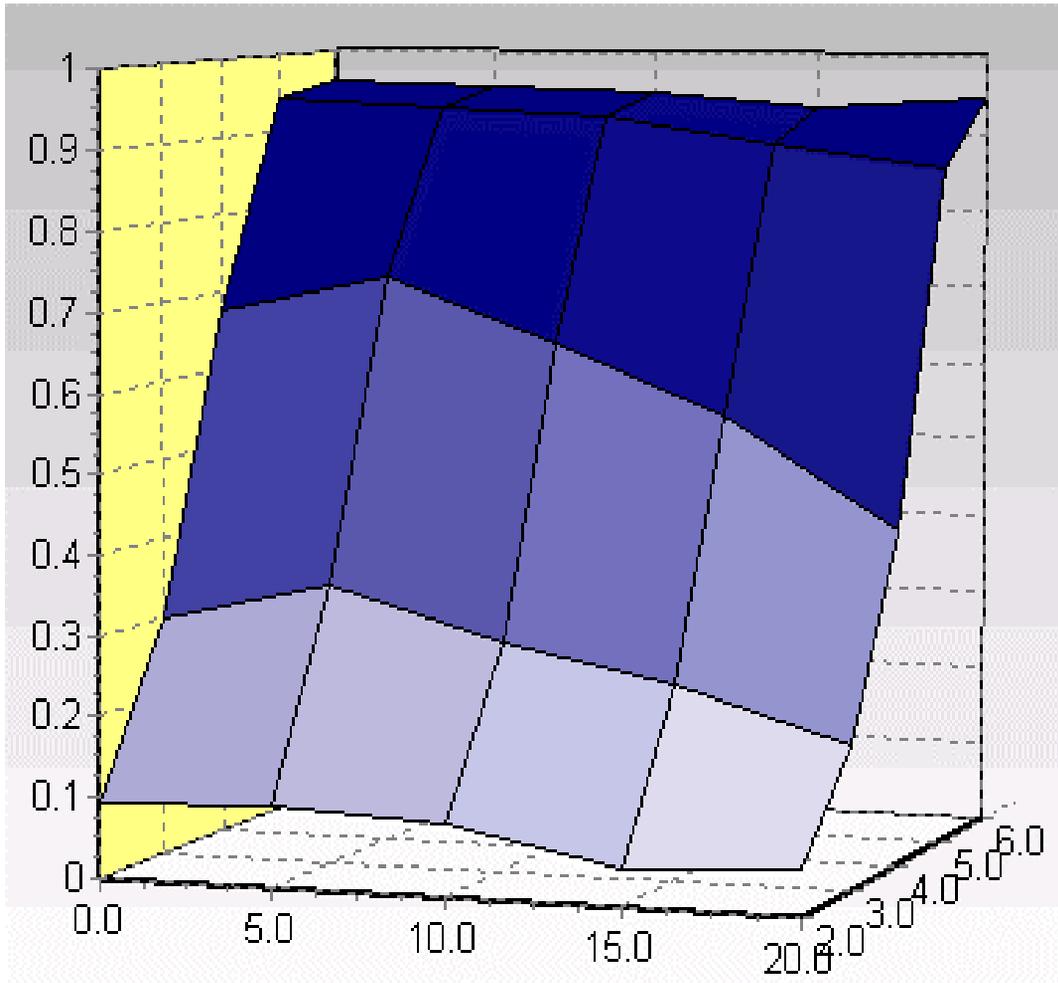
UAV Mix:

Downward trend

Possible Optimum (low)

Illustrates info-fight balance?

Excursion A – Number of UAV's vs LAV Weapon Range



UAV Mix:

- Optimum at weapon range match

LAV Weapon Range:

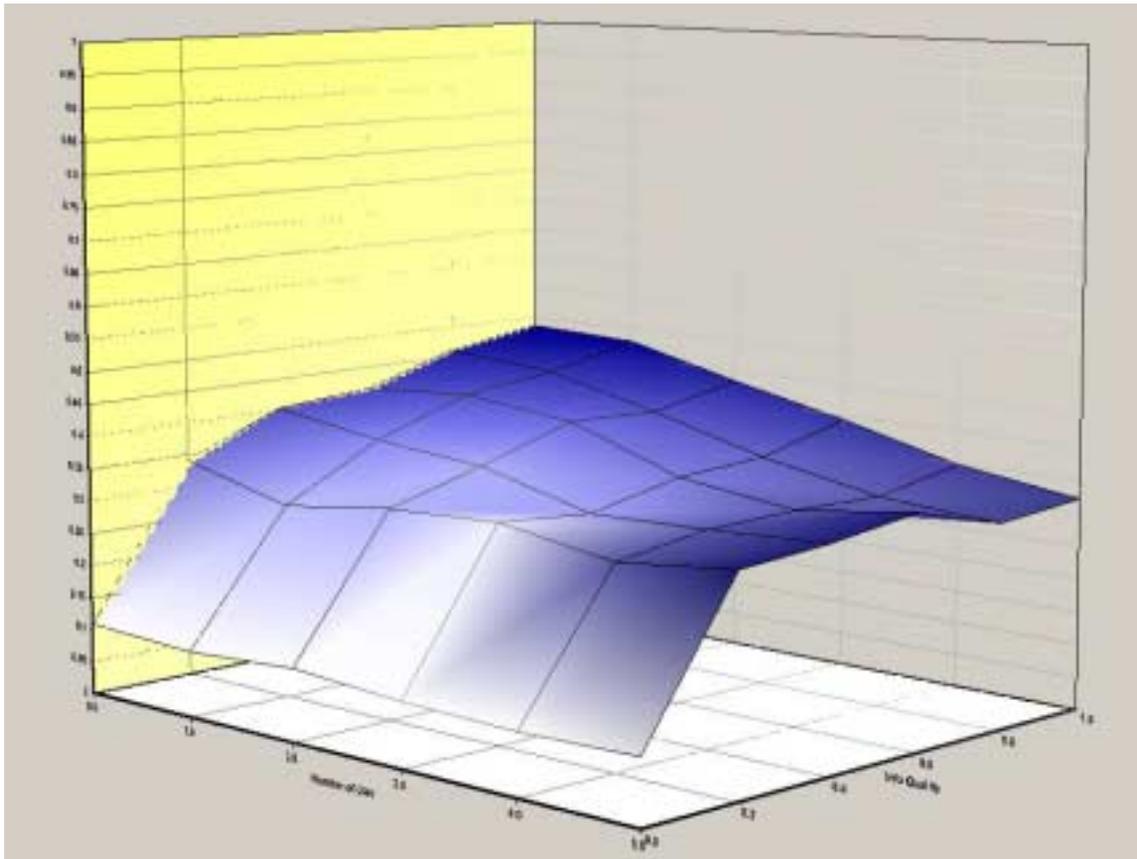
- Significant change in the number of Red losses

Excursion B – Force Augmentation and UAV Characteristics

- 3 Blue Parameters:
 - Number of UAV's (added to our baseline 15 LAV's)
 - Quality of Information relayed by UAV's
 - UAV Lethality (simulating reach-back fires)

- Questions of interest:
 - What is the marginal rate of return of UAV's?
 - Does this return vary with UAV performance?
 - What level of reach-back fires is sufficient?

Excursion B – Number of UAV's vs Information Quality



UAV Rate of Return:

- Marginal!
- Stronger with better info

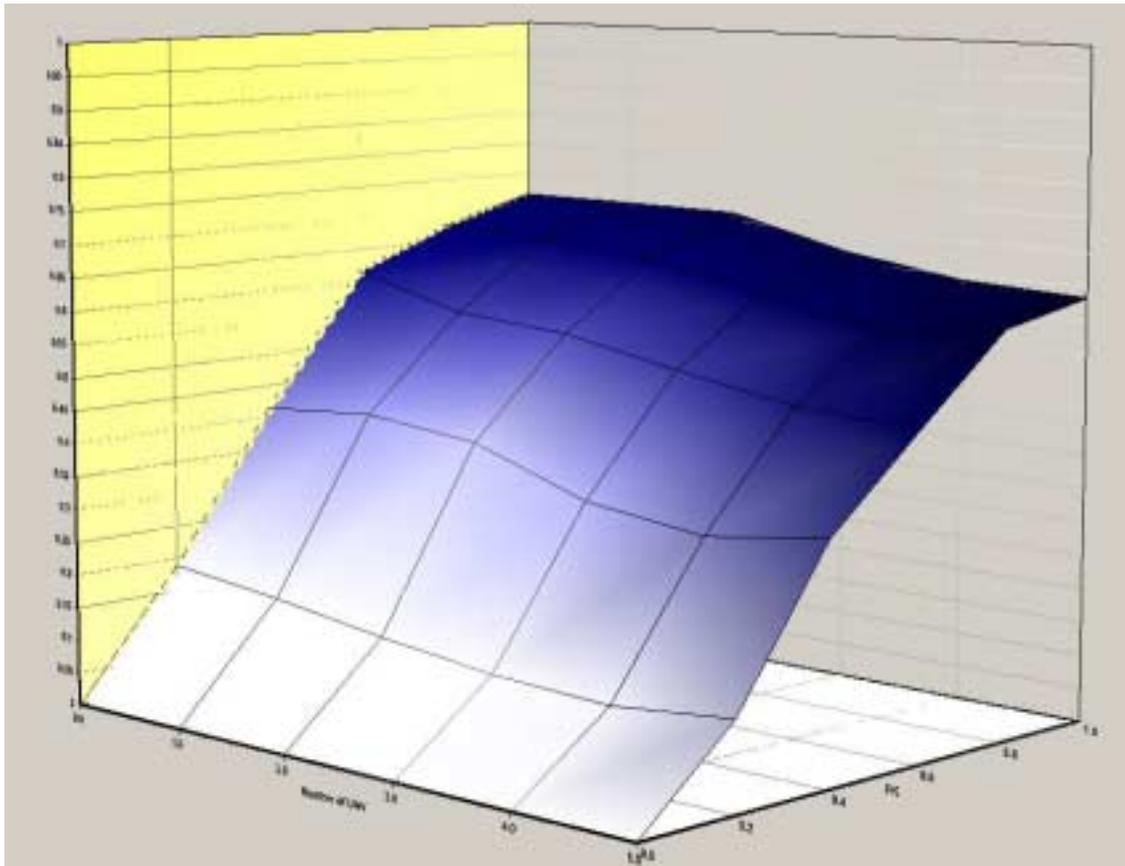
Information Quality:

- Greater return by improving poor (no) info

LAV only case:

- Possible detriment with 'perfect' info??

Excursion B – Number of UAV's vs Reach-Back Fires



Cannot handle squad specific parameter changes!

No apparent improvement with reach-back fires

Reasons:

- Limited target acquisition range?
- Concentrated recon assets?

Summary

- ISAAC useful for generating discussion
- (a tool for thinking with)
- Two-parameter landscapes useful to capture:
 - Broad effects (direction and magnitude)
 - Trade offs and synergies (potentially)
- Two-parameter landscapes generally don't deduce causes for these effects
- But do suggest possibilities (start point for other models)

Summary

- ISAAC results provided trends to compare/contrast with CASTFOREM (e.g. reach-back)
- ISAAC modelling and analysis generated precautions for CASTFOREM (e.g. recon tactics)
- Note: Effect of terrain not examined yet
- Limitations:
 - Surveillance (static) and Intel (human) difficult
 - Interactions between squad types
 - Data farming of squad specific parameters