



# Acquiring 21<sup>st</sup> Century Blitzkrieg via Physic-Based Gaming

4/24/2014

Dr. Rob E Smith

[rob.e.smith@us.army.mil](mailto:rob.e.smith@us.army.mil)



Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>12 AUG 2014</b>		2. REPORT TYPE <b>Briefing Charts</b>		3. DATES COVERED <b>03-02-2014 to 21-06-2014</b>	
4. TITLE AND SUBTITLE <b>Acquiring 21st Century Blitzkrieg via Physic-Based Gaming</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) <b>Rob Smith</b>				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Army TARDEC, 6501 East Eleven Mile Rd, Warren, Mi, 48397-5000</b>				8. PERFORMING ORGANIZATION REPORT NUMBER <b>#24641</b>	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) <b>U.S. Army TARDEC, 6501 East Eleven Mile Rd, Warren, Mi, 48397-5000</b>				10. SPONSOR/MONITOR'S ACRONYM(S) <b>TARDEC</b>	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) <b>#24641</b>	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <b>Briefing Charts for GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM (GVSETS), SET FOR AUG. 12-14, 2014</b>					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Public Release</b>	18. NUMBER OF PAGES <b>33</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



# Agenda



- ESP in Systems Engineering
- Whole System Trade Analysis
- Defense Acquisition University MindRover/ Dragonfly
  - MAJ Keena's MindRover Tradespace Analysis
- Conclusions



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# BLUF

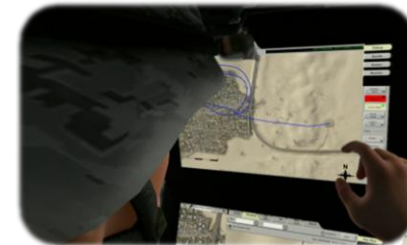


Finding the sweet-spot among competing objectives (performance, unit cost, O&S costs, development risk, and growth potential) is a non-trivial task. Ultimate metric is **affordable mission success**.



Ground vehicles are complex systems with many interrelated subsystems.

Matériel and Tactical Employment are not separable in real world.







# Early Synthetic Prototyping



## ARCIC Early Synthetic Prototyping (ESP)

- MG Hix tasked LTC Vogt to setup a persistent game environment for Soldiers to play emerging technologies.
  - ARCIC is looking for >20 year out concepts for the Army to try out in a gaming environment
  - End state: 1000 Soldiers in **persistent** environment
- Initially pursuing robotic wingman concept as pilot study
- First person shooter environment to start (VBS3 currently)

**Random Fact:** After one month of the release of Call of Duty Black Ops, gamers accumulated 68,000 years of play.



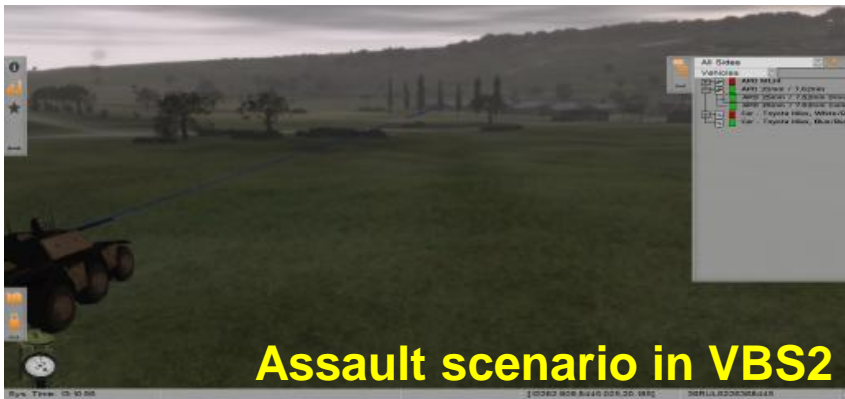


U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN INNOVATION FOCUSED

# Early Synthetic Prototyping NPS Pilot Study: Robotic Wingman



- Robotic wingman based on actual demonstrator system
- Three scenarios:
  1. Track a red convoy (AI) to a specific location, then eliminate it. 4 blue
  2. Assault a defended, fixed location to free prisoners. 2 blue/ 2 red
  3. Defend an urban location for five minutes. 2 blue/ 2 red



**Game Physics Based on  
Autonomous Platform  
Demonstrator**



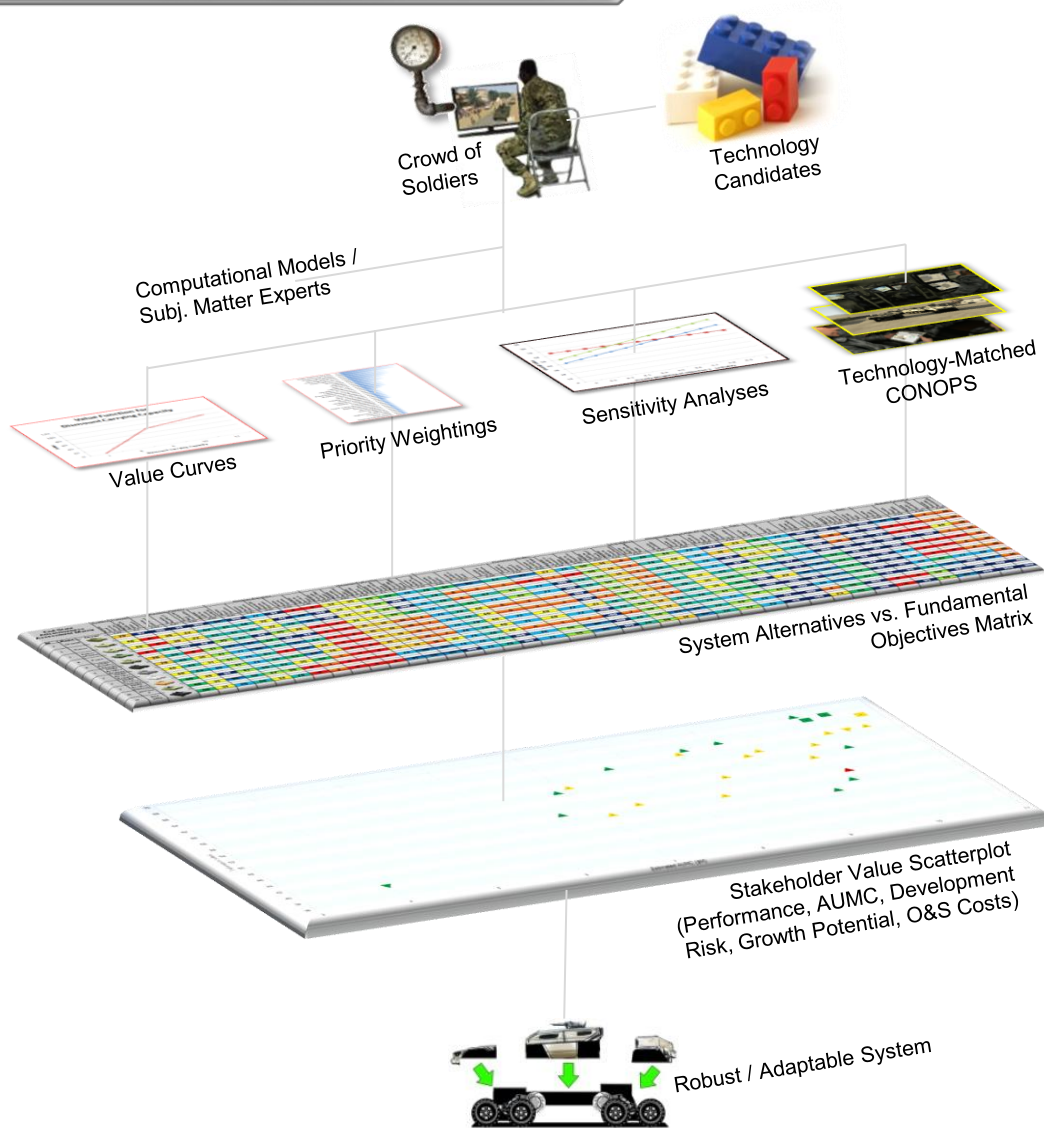
## Big Takeaways:

- Soldiers very enthusiastic about playing game – especially head-to-head
- Game interface is very important (which key does what)
- Scenarios showed definite desire to tailor platform for mission

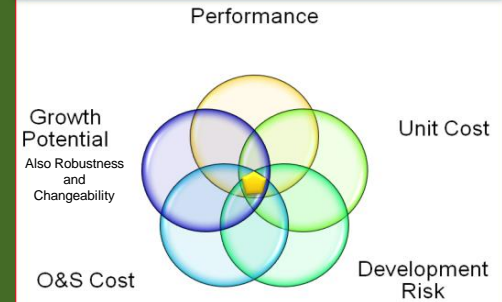


U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN INNOVATION FOCUSED

# Early Synthetic Prototyping: Systems Engineering Construct



## Elements of Stakeholder Value



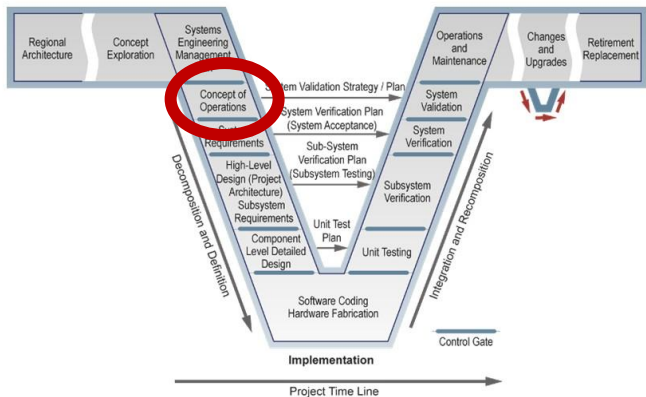
Capture and synthesize analyses being conducted by Soldiers AND subject matter experts into visualizations designed to facilitate rapid and complete understanding of the trade-space to stakeholders and provide drill down capability to supporting rationale.





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# How do you develop a system if you do not know what it is supposed to do?



## 108 SE's surveyed:<sup>1</sup>

- 36% never had CONOPS
- 73% did not complete CONOPS by program start
- 50% did not update CONOPS
- 30% did not involve a user

## 60 CONOPS examined:

- took 3-30 months to complete
- 25% did not state mission needs
- 80% did not discuss system risks
- 50% did not include operational scenarios
- 50% of IEEE or ANSI standard elements were not included

NOTE: CONOPS = Concept of Operation





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Value of Digital Combat vs. "Magazine Racing"



**Magazine Racing:** Where you pull out the specs and never run the race.

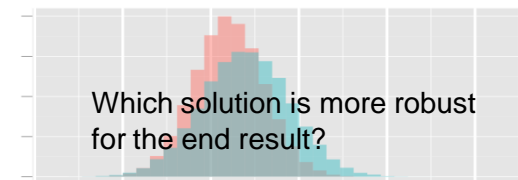
**DATA Based:** Maintenance, weather, driver tactics, trans type, component durability, run-to-run variation, etc

## Camaro SS 2010

Engine: 6.2 Liter LS3  
Power (SAE): 426 BHP @ 5900 RPM  
Torque: 420 ft-lb @ 4600 RPM  
Weight: 3,860 lbs

## Mustang GT 2011

Engine: 5.0L V8  
Power (SAE): 412 hp @ 6,500 rpm  
Torque: 390 ft-lb @ 4,000 rpm  
Weight: 3,605



NOTE : Performance specifications are notional. No particular company is endorsed.



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. MISSION FOCUSED.

# Tactical Utility Concept



Major driver of **future** acquisitions is to maximize combat success at a minimal cost:

$$\text{Tactical Utility} = \text{Mission Success} / \text{Total Cost}$$

- Mission Success resiliency **quantified by game data**
- Total Cost = development, acquisition, future customization, maintenance, disposal

Future will bring tension between two extremes and solution robustness:

1. Mass produced, but adaptable / flexible via modularity
2. Custom specific purpose “disposable” vehicles



# Closer Look at WSTAT Tradespace Exploration

Whole System Trade Analysis was developed by TACOM to identify relationship between high level design decisions & stakeholder value. Contact: Shatiel Edwards.

[shatiel.b.edwards.civ@mail.mil](mailto:shatiel.b.edwards.civ@mail.mil)





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Example Stakeholder Value Scatter Plot Window



## Legend

### Development Risk

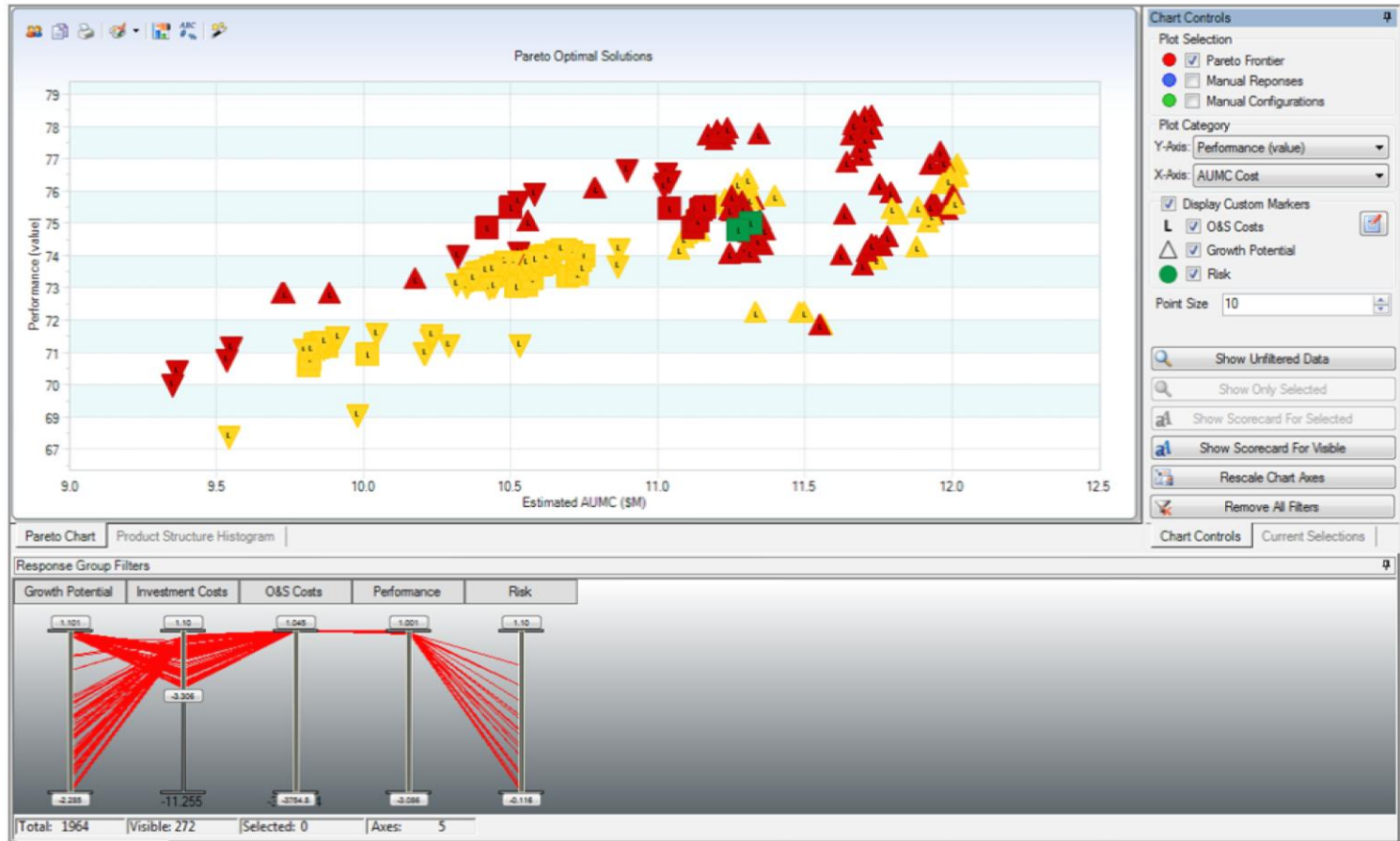
- High Risk
- Moderate Risk
- Low Risk

### Growth Potential

- ▲ high growth potential
- moderate growth potential
- ▼ low growth potential

### O&S Costs

- Ⓜ High O&S Costs
- Ⓜ Moderate O&S Costs
- Ⓜ Low O&S Costs

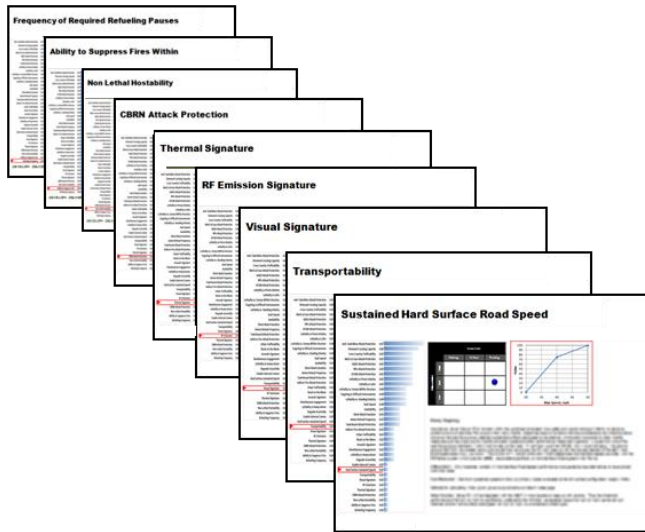


The stakeholder value scatterplot synthesizes data to show each system alternative's response in dimensions of stakeholder value (unit cost, O&S cost, performance, development risk, growth potential)



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN INNOVATION FOCUSED

# Relative Feature Priority / Value Functions



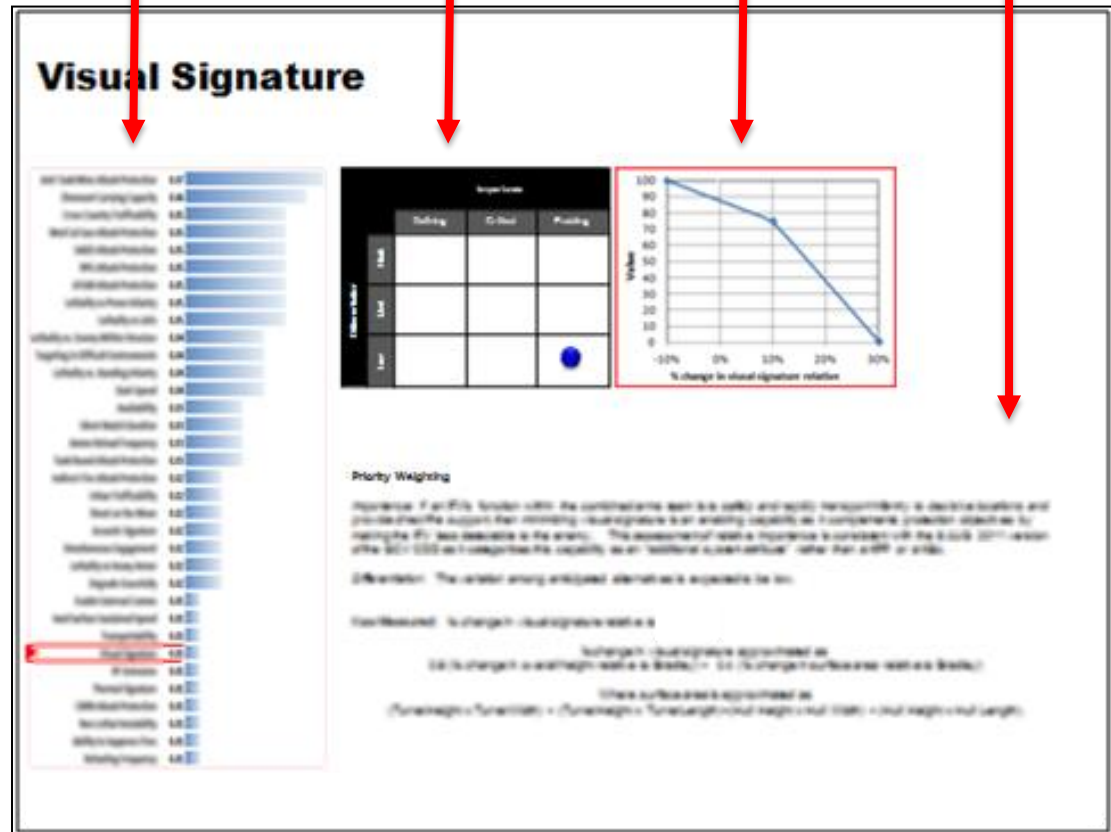
Priority weightings and value functions for each objective are well reasoned based on SME input and gaming data.

Relative  
Priority  
Weighting  
Indicator

Swing Weight  
Matrix  
(Performance Gap  
vs. Importance)

Value  
Function  
(knee in the  
curve)

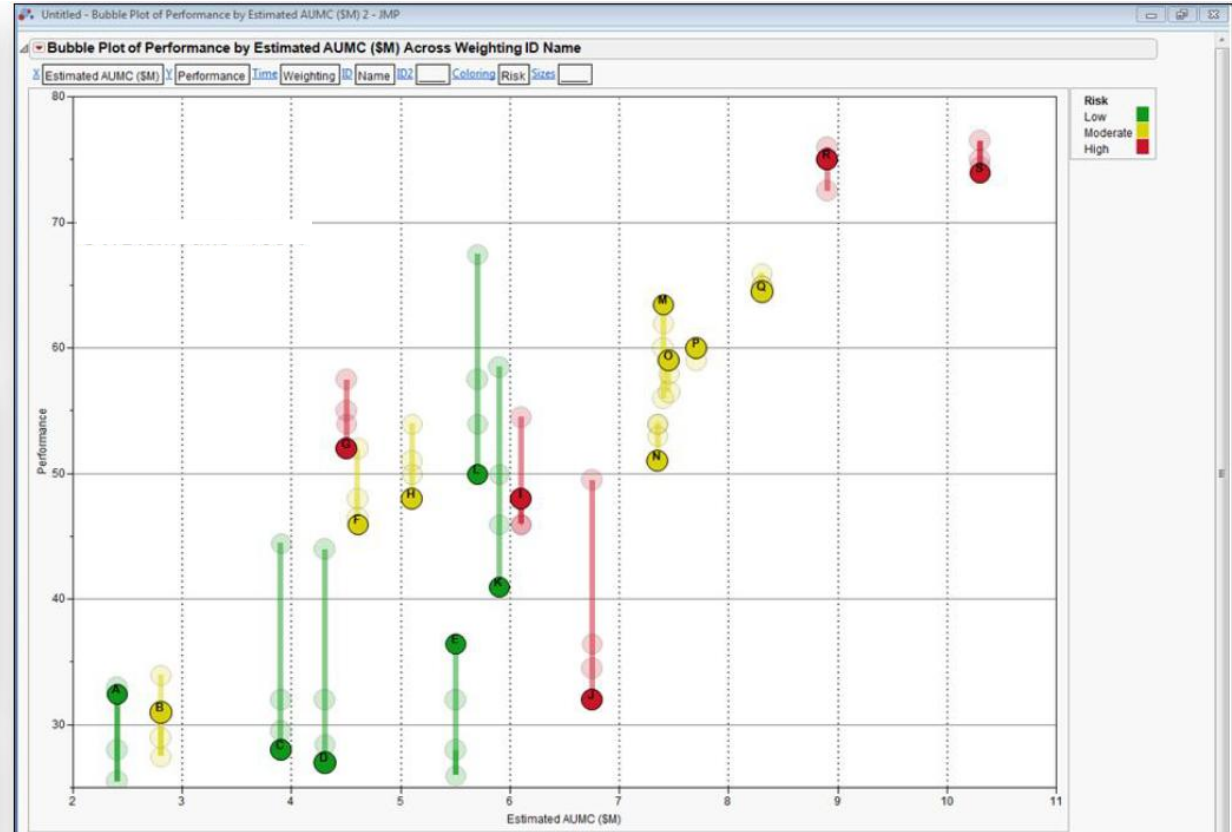
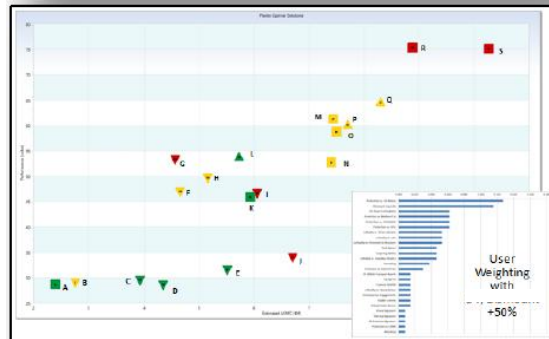
Supporting  
Narrative





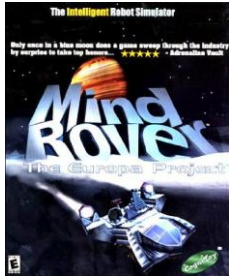
U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Sensitivity Analysis



**Sensitivity analysis allows decision makers to see how performance values for each alternative move as priority weightings change.**





# ESP Crowdsourced Demonstrator: Defense Acquisition University's MINDROVER / DRAGONFLY



- PMT-352 Program Management teaching tool
- Ver 1: Mindrover based on commercial game
- Ver 2: Dragonfly simplifies the “wiring requirements” and tunes for teaching
- MAJ Keena example DOE using MindRover

JRATS = (Joint Reconnaissance and Targeting System) robotic combat vehicle

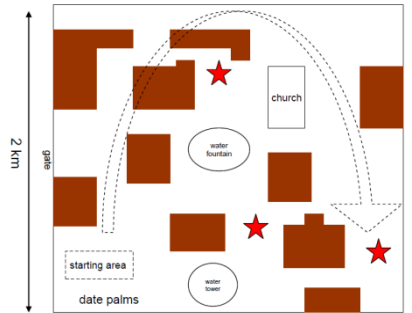


U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN INNOVATION FOCUSED

# Keena Study: Over 1400 MindRover Runs Using 14 ROTC Cadets



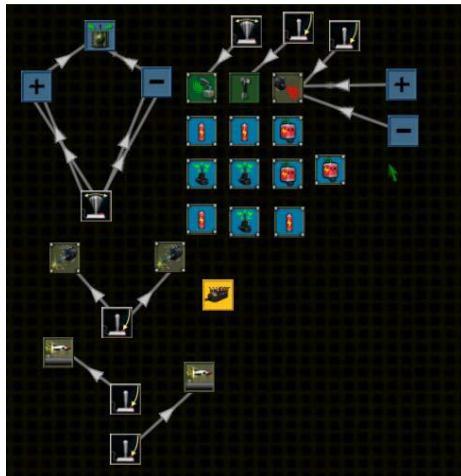
## Move to Contact Urban Scenario



JRATS screenshot during contact. In this shot, the guided missile has drifted left of the laser and has missed the threat vehicle.



JRATS vehicle rendering of a completed tracked combat platform.



Design screen: Build components are placed on a virtual breadboard. Logic components and interface modules are wired together to form the functional combat platform prototype..

Very similar to SysML or DARPAs AVM META!



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Keena's Game Based Design of Experiments

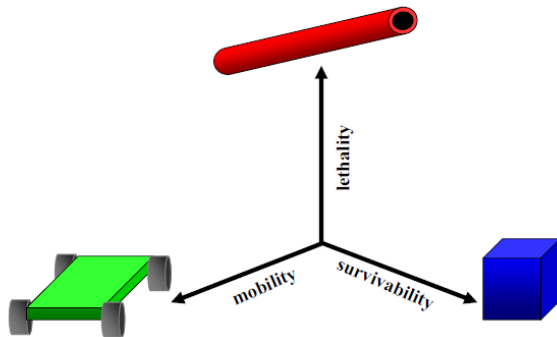


S	S
Acceptable Survivability	Enhanced Survivability
rolled homogeneous (steel) armor aluminum body	depleted uranium armor steel body

I	L
Acceptable Lethality	Enhanced Lethality
2× heavy machine gun laser range finder communications suite ground penetrating radar	2× guided missile pods 2× heavy machine gun laser range finder communications suite ground penetrating radar

m	M
Acceptable Mobility	Enhanced Mobility
low output powerplant aluminum frame	high output powerplant composite frame

- DOE with 18 variants
  - tracked vs wheeled
  - survivability 2 levels
  - lethality 2 levels
  - mobility 2 levels
  - 2 training vehicles
- 14 Operators
  - 15 missions per randomly assigned variants
  - Result= ~100 missions per vehicle
- 1600 ground vehicle missions



## OUTPUT METRICS:

- rating of success or failure
- elapsed mission time (time mission)
- the friendly vehicle's remaining health (blue mission %)
- and threat vehicle's remaining health (red mission %)

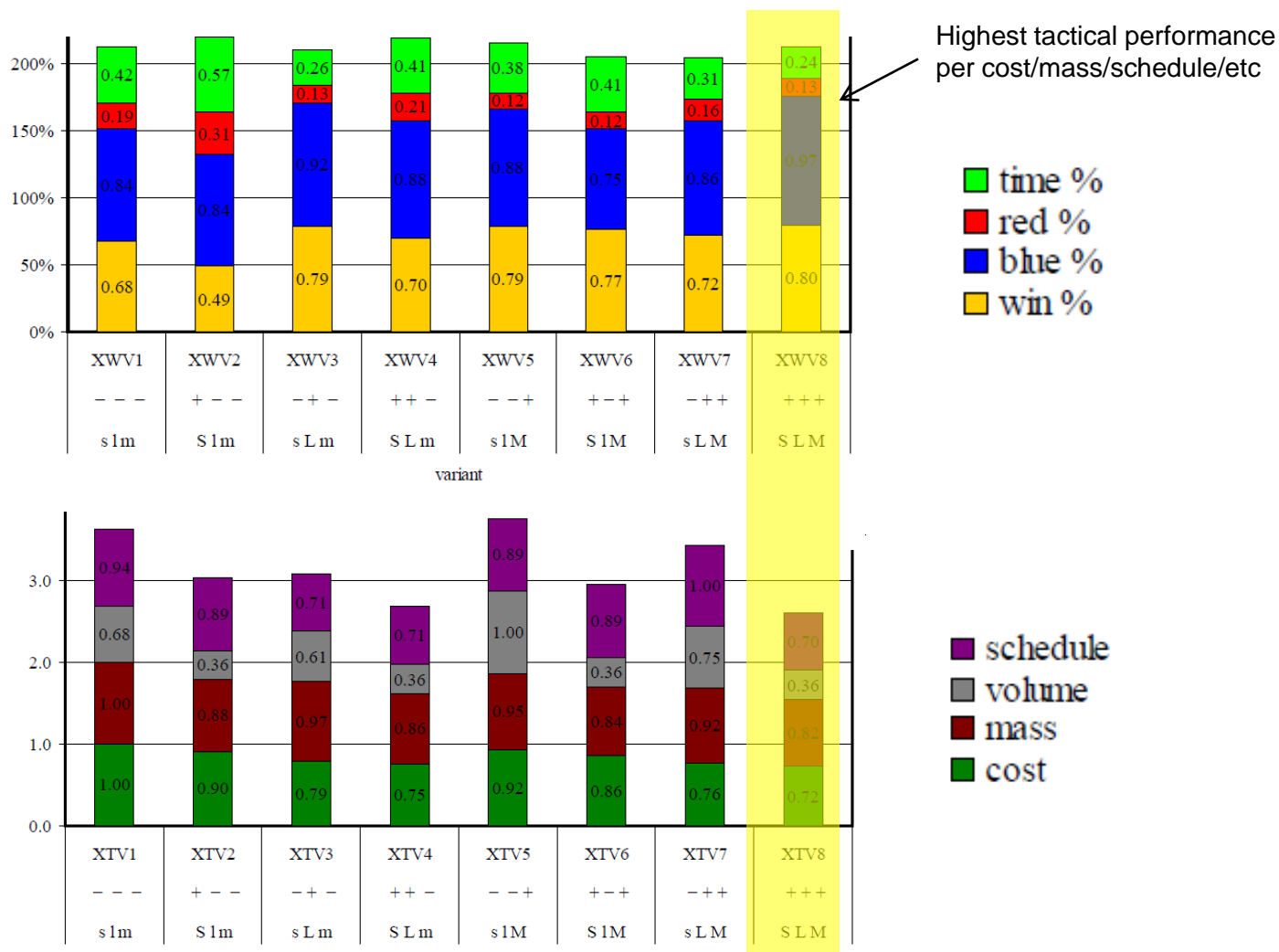




U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Example Output Data

(Could be weighted/ normalized multiple ways)





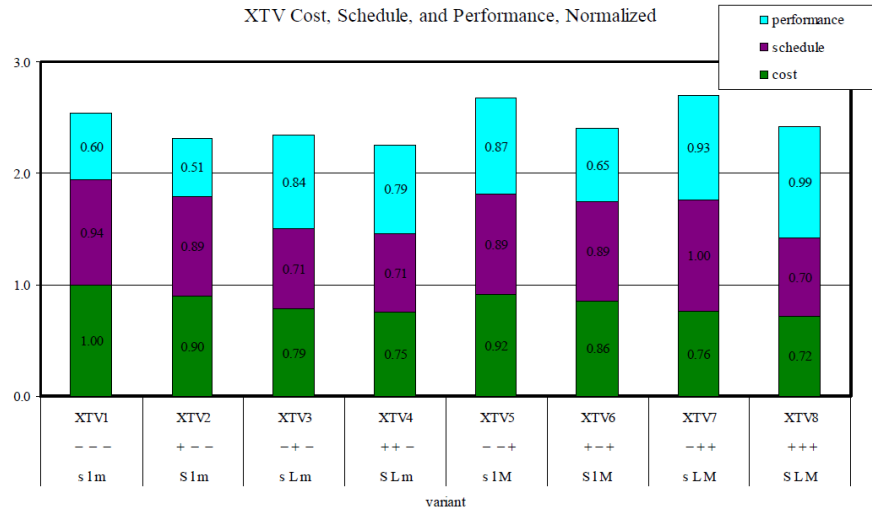
# Example Output Data

(Here's normalized performance, schedule, and cost)



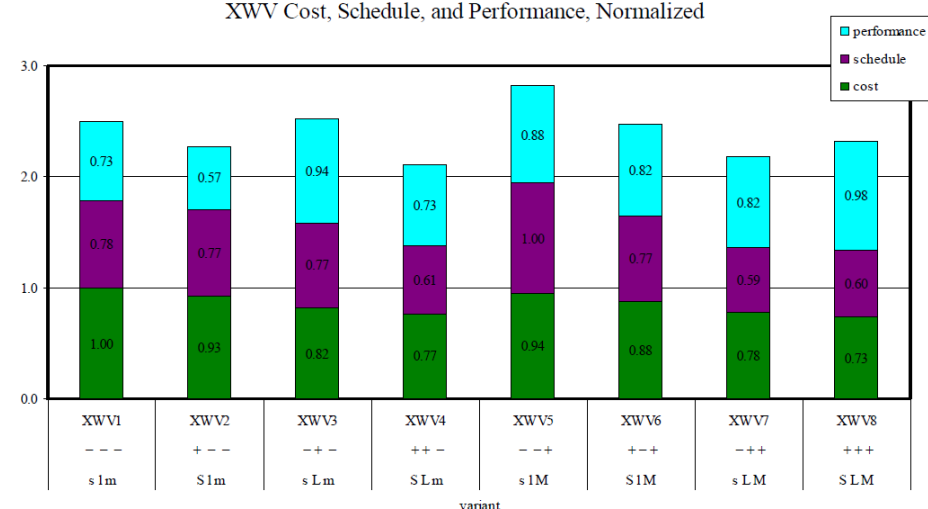
## Tracked

XTV Cost, Schedule, and Performance, Normalized



## Wheeled

XWV Cost, Schedule, and Performance, Normalized

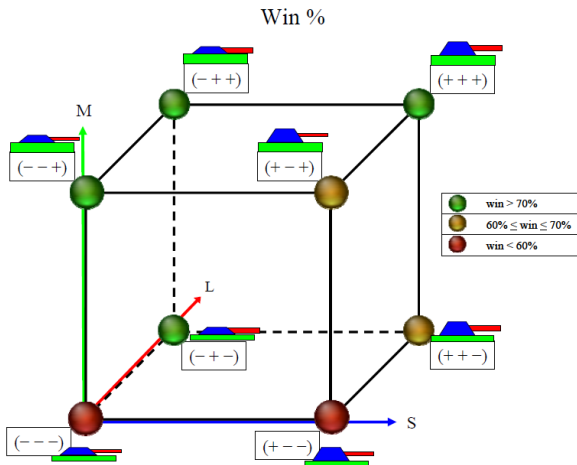


Performance is the sum of the normalized values for variant win %, blue %, red %, and time % divided by the number of *a posteriori* metrics (4). Cost is the per vehicle cost normalized with respect to the variant with the lowest per vehicle cost. Schedule is the normalized schedule index with respect to the variant with the lowest schedule index.



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Relative Contributions and Interactions of Survivability, Lethality, and Mobility on Ground Combat Vehicle Performance



Average variant win record (XTV and XWV) in a survivability, lethality, and mobility domain. An XTV and XWV variant coincident at a point share the same relative levels of survivability, lethality, and mobility.

	Win % [%]	Blue % [%]	Red % [%]	Time % [%]
XTV	L 26	L 9	L 15	L 19
	M 19	S 2	M 13	M 12
	S 10	M 1	S 10	S 1
XWV	M 14	L 8	M 8	L 14
	L 8	S 2	S 4	M 8
	S 7	M 1	L 3	S 7

Effects of principal attributes on *a posteriori* performance metrics for XTVs and XWVs. A red bar indicates a negative effect on the metric, and a green bar indicates a positive effect on the metric. The length of the bar has been scaled in length with respect to the greatest effect for that metric in the XTV or XWV block.





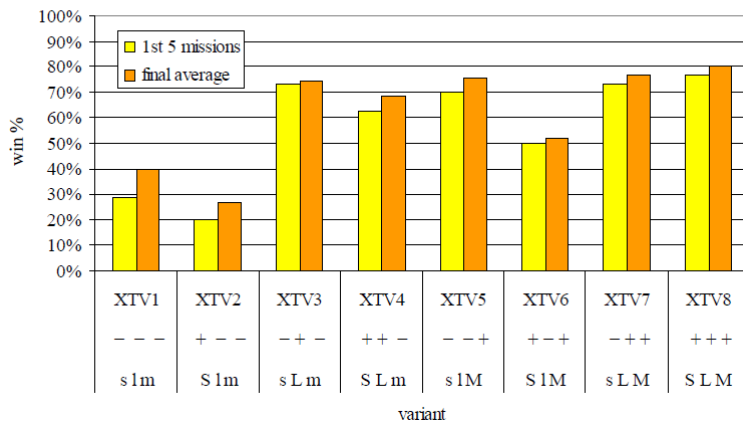
U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Learning Rate Vs. AI

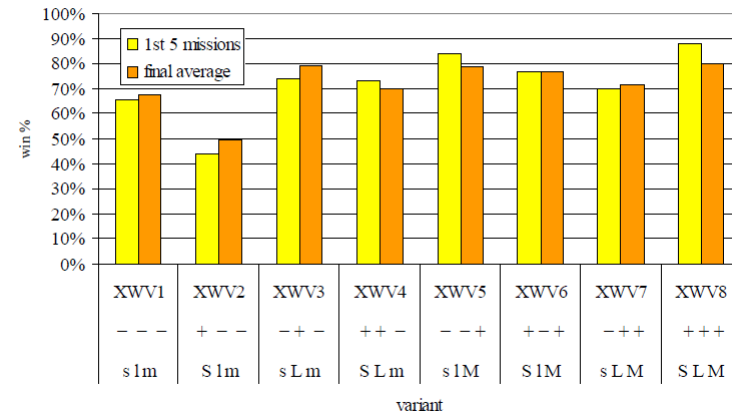


- During training sessions group discussed tactics, techniques, and procedures (TTPs)
- Training missions conducted on tracked and wheeled training vehicle variants (TTV and TWV)
- Operators instructed to move in a clockwise fashion until the enemy vehicle was spotted
- Non-training sessions Win % calculated after just 5 missions versus final average at 15 missions per operator

## TRACKED



## WHEELED



- Enhanced survivability platform had the greatest learning curve
  - Variant had the lowest mobility performance, with no gain in lethality
  - Operators presumably struggled initially to maneuver around the city
- Aside from the baseline variant (XTV1), all other variants had a learning curve less than 3%.

- Enhanced survivability platform had the greatest learning curve
  - Variant had the lowest mobility performance, with no gain in lethality
  - Operators presumably struggled initially to maneuver around the city
- Degradation in performance over time was seen for some variants
  - XWV8 experienced an over 5% drop in win % from first five to final 15 average
  - Possibly elevated baseline mobility enhanced even more for XWV5 and XWV8, caused operators to move in an ineffective or more "sloppy"
  - Suggests that the platform performance is directly effected by operators.

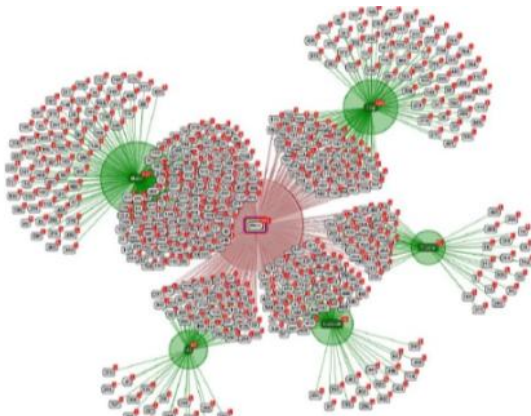
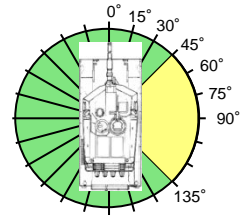


**U.S. ARMY**  
**RDECOM**  
TECHNOLOGY DRIVEN. WARRIOR FOCUSED.

## What Other Useful Metrics Might be Collected From Game Analytics?

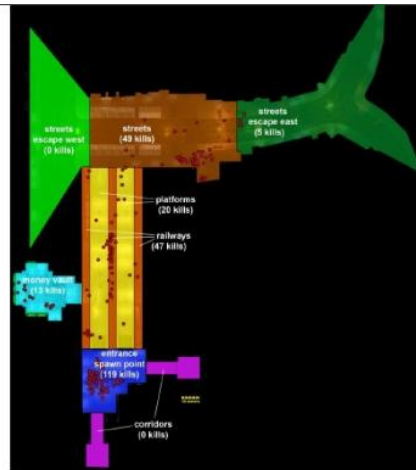


- Replays of winning tactics (directly obtained CONOPS)
- Discussion board chatter
- Sector engaged from in azimuth around vehicle
- Rounds expended
- How much available power and speed actually used



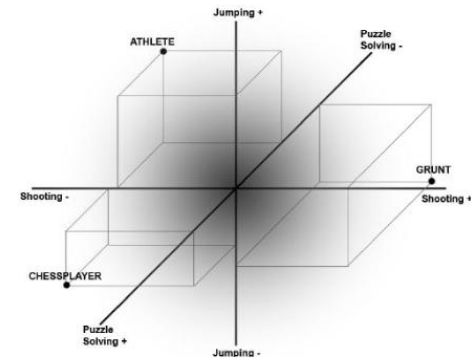
### Flower of Death

Generated by a cluster visualization tool (shows data from *Fragile Alliance*, it relates **role** at death with **cause of death**)



### Deaths in Sectors

### Plotted deaths divided per sub-sector



### Play persona possibility space

## Mapping the possibility space with play-personas



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Enough Game Data Allows The Teasing Apart of Modularity and Customization Needs

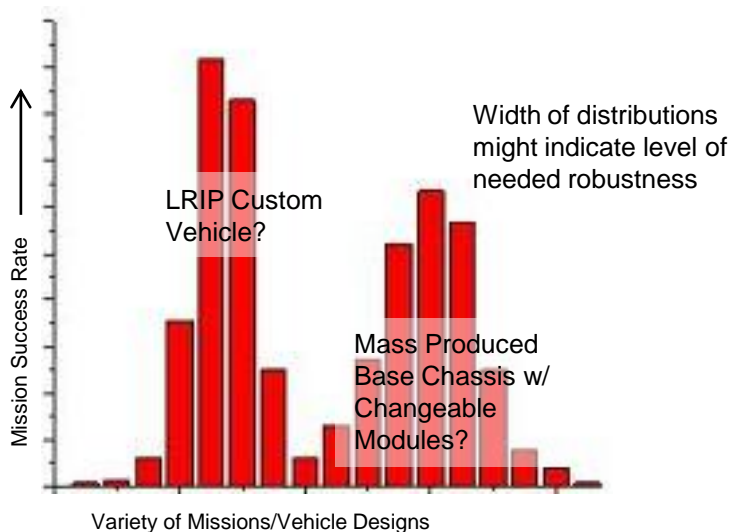
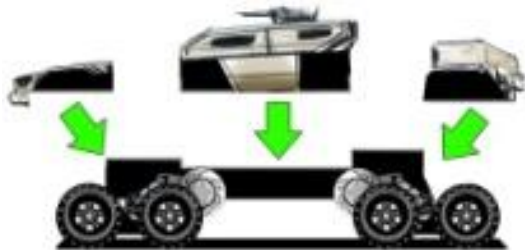


Which configuration elements can remain constant?

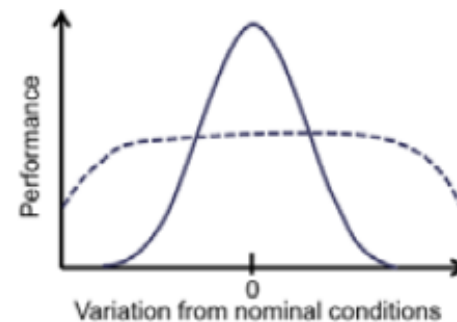
Which things need to be made modular?

Can a whole custom system be fabricated less expensively than a changeable system?

How robust is the solution in different scenarios?



Fitness: Optimality vs. Resilience



# Defense Acquisition University's DRAGONFLY Screenshots



- Dragonfly simplifies the “wiring requirements” and tunes for teaching
- Gives some clues as to complexity in a game for acquisitions





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN INNOVATION FOCUSED

# DragonFly ScreenShots (Formerly MindRover)



UNCLASSIFIED



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Parameters Tracked in Dragonfly



Chassis	FRACU	Scorpion	Mole
Vehicle Type	Hover	Tracked	Wheeled
Vehicle Size	Small	Medium	Large
Engine Size	Small	Medium	Large
Frame	Aluminum	Aluminum	Titanium
Armor	None	None	Steel

Power	Qty	Type	Qty	Type	Qty	Type
	3	Mk-III Batteries	1	Mk-V Battery	2	Mk-IV Generators
			1	Mk-III Fuel Cell	1	Mk-I Battery
			1	Mk-IV Generator		

Electronic Components	Qty	Type	Qty	Type	Qty	Type
	1	Mk-I Targeting Laser	1	Mk-IV Targeting Laser	1	Mk-IV Targeting Laser
	1	Mk-I Radio Transmitter	1	Mk-IV Radio Transmitter	1	Mk-IV Radio Transmitter
	1	Mk-I Linear Mine Detector	1	Mk-V Linear Mine Detector	1	Mk-IV Hemispherical Mine Detector
	1	Mk-I Radar	1	Mk-I Radar	1	Mk-IV Radar
	1	Mk-I Targeting Computer	1	Mk-I Targeting Computer	1	Mk-IV Targeting Computer
			1	Mk-IV Electronic Countermeasure	1	Mk-IV Electronic Countermeasure

Weapons	Qty	Type	Qty	Type	Qty	Type
	1	Mk-I Mini Gun	1	Mk-I Machine Gun	2	Mk-IV Mini Guns
	1	Mk-I Laser Guided Missile	1	Mk-I Laser Guided Missile	1	Mk-IV Free Rocket
			1	Mk-I Multi-Shot Free Rocket	1	Mk-IV Multi-Shot Free Rocket

Properties	FRACU	Scorpion	Mole
Weight (kg)	1266	1485	2029
Combat Survivability	230	275	410
Idle Power (watts)	35	58	59
Active Power (watts)	97	135	142
Produced Power (watts)	105	135	125
Acceleration (m/sec <sup>2</sup> )	8	7	9
Top Speed (kph)	25	14	30
Length (m)	2.25	3	3
Logistics Supportability Index (LSI)	2866	3085	3629
Deployability Index (DI)	1741	1960	2504
Producibility Index (PI)	830	875	1010

Costs	FRACU	Scorpion	Mole
Development	\$41M	\$60.5M	\$86.5M
O&S	\$1230M	\$1710M	\$2370M
Procurement	\$615M	\$855M	\$1185M
Unit Procurement	\$0.41M	\$0.57M	\$0.79M
Disposal	\$61.5M	\$85.5M	\$118.5M
MILPERS	\$184.5M	\$256.5M	\$355.5M
Total	\$2132M	\$2967.5M	\$4115.5M



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# DragonFly ScreenShots



## DRAGONfly STUDENT VERSION

### MAIN MENU

NEW VEHICLE

EDIT VEHICLE

FIELD TEST

MULTIPLAYER

SETTINGS

EXIT PROGRAM





# DragonFly ScreenShots



## DESIGN MODE: VEHICLE CREATION



NOTE: CLICK AND DRAG TO ROTATE VEHICLE

### CHOOSE VEHICLE TYPE



WHEELED



TRACKED



HOVER

### CHOOSE VEHICLE SIZE

SMALL

MEDIUM

LARGE

### VEHICLE DATA

#### COMPONENT SLOT CONFIGURATION



FRONT

#### == Chassis Performance Statistics ==

Weight: 890 kgs  
Survivability: 230  
Idle Power: 25 Watts  
Active Power: 32 Watts  
Produced Power: 0 Watts  
Acceleration: 8 m/s<sup>2</sup>  
Top Speed: 25 kph  
Length: 2.25 m  
Logistics Index: 1600  
Deployability Index: 475  
Producibility Index: 600

#### == Vehicle Cost Statistics ==

Development Cost: \$18M  
Operations And Support Cost: \$480M  
Procurement Cost: \$240M  
Unit Procurement Cost: \$0.48M  
Disposal Cost: \$24M  
MIL PERS Cost: \$72M  
-----  
Total Cost: \$834M

#### == Chosen Chassis Options ==

Vehicle: Small Hover  
Engine: Small Engine  
Frame: Aluminum Frame

MAIN MENU

PRINT

✓ CREATE VEHICLE





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# DragonFly ScreenShots



## DESIGN MODE: CHASSIS OPTIONS

### ENGINE SIZE



SMALL



MEDIUM



LARGE

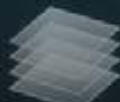
Small Engine Statistics:  
Weight: 715 lbs  
Survivability: 180  
Idle Power: 10 Watts  
Active Power: 12 Watts  
Max Speed: 12 m/s  
Acceleration: 6 m/s<sup>2</sup>

Development Cost: \$10.5M  
Operations And Support Cost: \$280M  
Procurement Cost: \$140M  
Unit Procurement Cost: \$0.20M  
Planned Cost: \$1.12M

### FRAME MATERIAL



ALUMINUM



COMPOSITE



TITANIUM

Aluminum Frame Statistics:  
Weight: 210 lbs  
Survivability: 75  
Max Weight: 5000 lbs

Development Cost: \$13.5M  
Operations And Support Cost: \$380M  
Procurement Cost: \$180M  
Unit Procurement Cost: \$0.35M  
Disposal Cost: \$18M  
MIL PERS Cost: \$54M  
Total Cost: \$1.12M

### ARMOR TYPE



NONE



STEEL



TUNGSTEN

No Armor Statistics:  
Weight: 0 lbs  
Survivability: 0

Development Cost: \$0M  
Operations And Support Cost: \$0M  
Procurement Cost: \$0M  
Unit Procurement Cost: \$0M  
Disposal Cost: \$0M  
MIL PERS Cost: \$0M  
Total Cost: \$0M

## VEHICLE DATA

■ IDLE POWER ■ MAX POWER

POWER AVAIL.

WEIGHT LIMIT

### Chassis Performance Statistics

Weight: 925 lbs  
Survivability: 255  
Idle Power: 32 Watts  
Active Power: 38 Watts  
Produced Power: 0 Watts  
Acceleration: 6 m/s<sup>2</sup>  
Top Speed: 12 kph  
Length: 3 m  
Logistics Index: 1600  
Deployability Index: 475  
Producibility Index: 600

### Vehicle Cost Statistics

Development Cost: \$24M  
Operations And Support Cost: \$640M  
Procurement Cost: \$320M  
Unit Procurement Cost: \$0.64M  
Disposal Cost: \$32M  
MIL PERS Cost: \$96M  
Total Cost: \$1112M

MAIN MENU

PRINT

SAVE VEHICLE

CUSTOMIZE CONTROLS

▶ SELECT COMPONENTS

⏻ LAUNCH TEST



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOR BOLDNESS.

# Vehicle Configuration



## DESIGN MODE: COMPONENT SELECTION



NOTE: RIGHT CLICK TO CHANGE MARK NUMBER

POWER

ELECTRONICS

WEAPONS



### VEHICLE DATA

### PREVIEW

☐ IDLE POWER ☒ MAX POWER

POWER  AVAIL.

WEIGHT  LIMIT

Vehicle Description:  
The hovercraft is able to traverse water, giving it a distinct terrain advantage over the other vehicles. However, it has a low durability and cannot carry as much weight as the other vehicles. The hovercraft has the most component slots of the chassis types and is capable of rapid rotation and agile movement, making it ideally suited to recon missions or when you need to dodge incoming fire.

### SELECTED COMPONENT



Laser-Guided Missile

Weight 44 lbs  
Active Power 8 Watts  
Idle Power 1 Watts  
Damage 80  
Ammo 35 rounds  
Development Cost \$10,000

MAIN MENU

PRINT

SAVE VEHICLE

CUSTOMIZE CONTROLS

◀ CHASSIS OPTIONS

⏻ LAUNCH TEST





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Virtual Field Test



HEALTH

POWER

Press 'M' to toggle Map  
Press 'TAB' to return to  
design mode.

Button 3

Button 2

Button 8

OFF ON

Button 1

OFF ON

Button 6

OFF ON

Button 5

OFF ON

Button 7

OFF ON

NNE

NE

ENE

E

MISSION TIME  
07:01

Vehicle Test

INTEROP ACTIVE

INTEROP PASSIVE

MINE DETECTION

SEEK AND DESTROY PASSIVE

SEEK AND DESTROY ACTIVE

UNCLASSIFIED



U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# "Mission Load" screen for "Field Test" test mode



## MISSION LOAD



### BRIEFING

Seek & Destroy (Passive)

The students must locate and destroy 3 moving AI and 1 target building. The AI would not be hostile.

### SELECT MISSION

SUCCESS/ ATTEMPTS	MISSION TYPE
0/0	SEEK & DESTROY (PASSIVE)
0/0	SEEK & DESTROY (ACTIVE)
0/0	INTEROPERABILITY (PASSIVE)
	SINGLE FIREBIRD
	AC-130
	MULTIPLE FIREBIRDS
0/0	INTEROPERABILITY (ACTIVE)
	SINGLE FIREBIRD
	AC-130
	MULTIPLE FIREBIRDS
0/0	MINE DETECTION

[MAIN MENU](#)[VIEW REPORTS](#)

[Start the selected Mission](#)  
**START MISSION**





U.S. ARMY  
**RDECOM**  
TECHNOLOGY DRIVEN. INNOVATION FOCUSED.

# Field Reports



## REPORT LIST

Mine Detection

Seek and Destroy - Passive

05-23-2010, 12:22:56

05-23-2010, 12:26:06

Seek and Destroy - Active

Interoperability - Passive

Interoperability - Active

PRINT SELECTED

PRINT ALL

◀ BACK

## FIELD REPORTS

Seek and Destroy - Passive 05-23-2010, 12:26:06

Start Time:	05-23-2010, 12:26:06
Elapsed Time:	07:40
Remaining Time:	07:20
Successfully Completed:	yes
Player Health:	100%
Enemy Vehicle 1 Health:	0%
Enemy Vehicle 2 Health:	0%
Enemy Vehicle 3 Health:	0%
Enemy Building Health:	0%

## SUMMARY

The students must locate and destroy 3 moving AI and 1 target building. The AI would not be hostile.



# Conclusions



- Pilot studies indicate it is possible to get useful data from virtual combat (i.e. games)
  - Have only scratched the surface on true utility of this
- 21<sup>st</sup> Century Blitzkrieg requires tactics and materiel be tightly coordinated
  - Alternative is 21<sup>st</sup> century Maginot Line
- Crowdsourced gaming might provide enough data to allow acquisitions to understand growth, modularity, and maybe custom vehicle needs
  - Maximize tooth, minimize tail