

Multilayer Wargames: Lessons from Gaming Intermediate Force Capabilities

Briefing Topics

Recent Use of Wargaming to Support Intermediate Force Capabilities (IFC) Concept Development & Experimentation (CD&E)

Tasking to Supreme Allied Command Transformation-Operational Experimentation Branch (SACT OPEX) and SAS-151

- Wargames and Workshops
 - Approach
 - Design/Development, Execution, & Analysis
 - Top-Level Results from Six Wargames/Three Concept Development Workshops
- Draft NATO IFC Concept
 - High-Level Overview
 - Doctrine Implications

Ongoing Work on M&S-Assisted Wargaming

SAS-MSG-180: M&S-Assisted Wargaming

- Integrating Modelling & Simulation Tools to Enhance Wargaming
 - Detailed Tactical-Level Engagements Informing and Informed by Operational and Strategic Matrix Game Play
 - Quantitative and Qualitative Results
 - Proof-of-Principle Event Completed
- Proposed Use to Test/Validate Doctrine: AJP-3.13, *Allied Joint Doctrine for the Deployment and Redeployment of Forces*

CD&E Tasking

IFC Wargame in 2020
ICDE Conference
followed by

Military Committee-Endorsed 2021 CD&E Initiative

Intermediate Force Capabilities (IFC)	Standalone Experiment
<p>Intermediate Force Capabilities (IFC), notably including Non-Lethal and Directed Energy Weapons, enable mission success across the spectrum of current and future challenges. With wide Warfighting applicability across Domains, IFC are particularly important to address challenges from adversaries undertaking acts of aggression designed to stay below the level that would trigger a conventional military response or engagements in complex terrain where collateral effects, including potential civilian casualties, are an increased risk and concern. This experiment will support the development of a NATO Intermediate Force Capabilities Concept, agreed across communities of interest, which stimulates further development, acquisition, and effective employment of IFC to meet NATO and member Nations' requirements.</p>	
<p>The experiment will be conducted by HQ SACT Operational Experimentation Branch in collaboration with SAS-151</p>	

Concept Development
Wargames/Workshops



Strategic, operational or tactical: How does one choose?

Strategic game:

- Matrix Game (with modifications)
 - What do I do?
 - What I expect to achieve?
 - Why will I succeed?

Operational game:

- How will I do things?
 - Aggregated movement of forces
 - Sustainment
 - Aggregated loss-exchange ratios

Tactical game:

- Individual entities
- Often physics-based or probability-based
- Detailed Action-Reaction-Counteraction



Multilayer wargaming framework

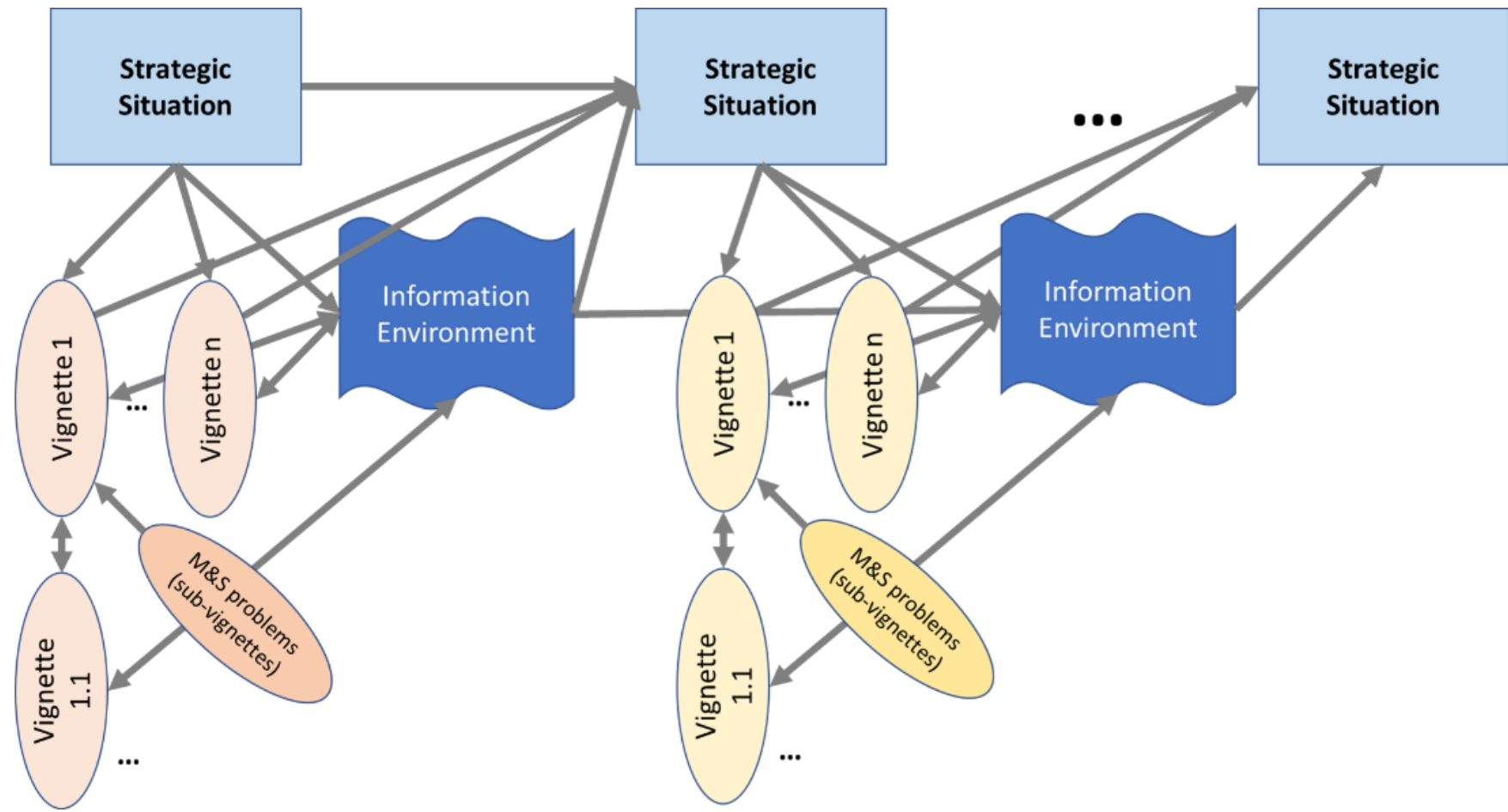
- Strategic game



- When a critical vignette is encountered it could be resolved through another game



- Strategic game

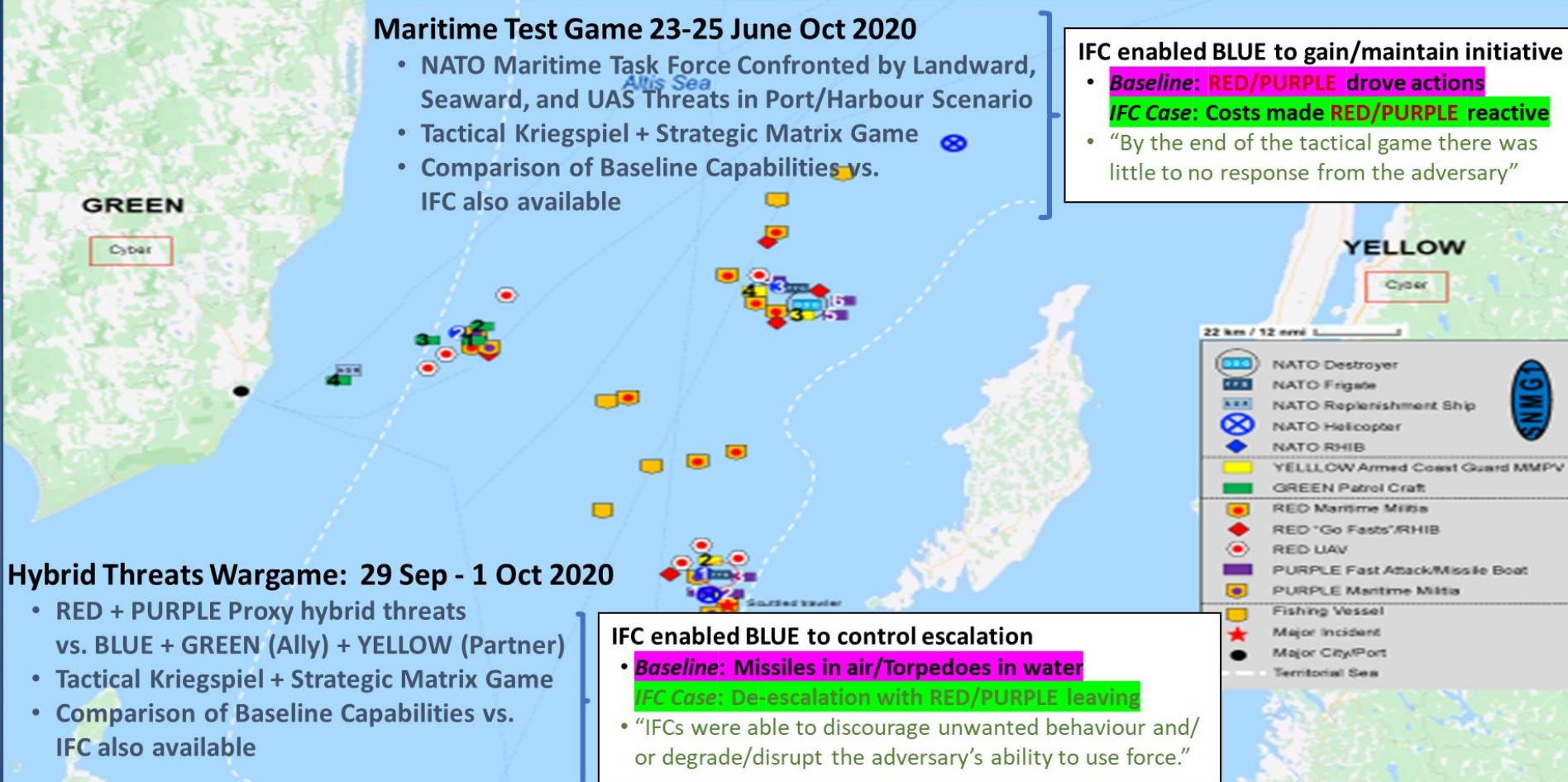


IFC CD&E Participating Communities of Interest

Operational/Technical Experts	Additional Technical Experts	Legal Experts	Wargame/Analytical Experts
SACT <ul style="list-style-type: none"> • OPEX • CNDV 	SAS-151: Solutions Enabling IFC/Non-Lethal Weapon Contributions to Mission Success	SACT <ul style="list-style-type: none"> • Assistant Legal Advisor 	Led by Defence Research & Development Canada (DRDC)
National <ul style="list-style-type: none"> • Allies • Partners 	SAS-140: Directed Energy Concepts	USA <ul style="list-style-type: none"> • Joint Staff Legal • Headquarters Marine Corps 	SACT <ul style="list-style-type: none"> • OPEX • CNDV
Centres of Excellence: <ul style="list-style-type: none"> • Operations in Confined and Shallow Waters (CSW) • Combined Joint Operations from the Sea (CJOS) • Modelling & Simulation (M&S) • Stability Policing (SP) • Strategic Communications (STRATCOM) • Cooperative Cyber Defence (CCD) • Military Police (MP) • Military Engineering (MILENG) • Security Force Assistance (SFA) • Hybrid CoE 	NATO Army Armaments Group's Joint Non-Lethal Weapons Capabilities Group	NLD	USA <ul style="list-style-type: none"> • Joint Staff J7 • Joint Staff J8 • RAND • Demonstration & Assessment Team
	NIAG SG270: Scalable Directed Energy from Aircraft		M&S CoE
			SAS-140

Intermediate Force Capabilities Drivers

Maritime Wargame Insights



Maritime Test Game 23-25 June Oct 2020

- NATO Maritime Task Force Confronted by Landward, Seaward, and UAS Threats in Port/Harbour Scenario
- Tactical Kriegspiel + Strategic Matrix Game
- Comparison of Baseline Capabilities vs. IFC also available

IFC enabled BLUE to gain/maintain initiative

- Baseline:** RED/PURPLE drove actions
- IFC Case:** Costs made RED/PURPLE reactive
- "By the end of the tactical game there was little to no response from the adversary"

Hybrid Threats Wargame: 29 Sep - 1 Oct 2020

- RED + PURPLE Proxy hybrid threats vs. BLUE + GREEN (Ally) + YELLOW (Partner)
- Tactical Kriegspiel + Strategic Matrix Game
- Comparison of Baseline Capabilities vs. IFC also available

IFC enabled BLUE to control escalation

- Baseline:** Missiles in air/Torpedoes in water
- IFC Case:** De-escalation with RED/PURPLE leaving
- "IFCs were able to discourage unwanted behaviour and/or degrade/disrupt the adversary's ability to use force."

	NATO Destroyer
	NATO Frigate
	NATO Replenishment Ship
	NATO Helicopter
	NATO RHIB
	YELLOW Armed Coast Guard MMPV
	GREEN Patrol Craft
	RED Maritime Militia
	RED "Go Fast" RHIB
	RED UAV
	PURPLE Fast Attack Missile Boat
	PURPLE Maritime Militia
	Fishing Vessel
	Major Incident
	Major City/Port
	Territorial Sea

Intermediate Force Capabilities Drivers

Maritime Wargame Insights



Key Results/Findings/Conclusions

- ✓ **The presence of IFCs had an impact on tactical and strategic level play:** Without IFCs, RED was able to generally control the situation and maintain the strategic initiative. With IFCs, BLUE addressed and contained the strategic dilemmas RED wished to create, gained the strategic initiative, and forced RED to be reactive.
- ✓ **Escalation Control versus Adversary and Proxy:** Being in control of escalation allowed RED/PURPLE to set the conditions for if, when, and where they used force with the Proxy (PURPLE) undertaking the most aggressive actions. Use of IFCs greatly challenged RED/PURPLE and kinetic course of action choices.
- ✓ **IFCs allowed the Naval Task Force to preserve its power and its freedom of action/maneuver:** IFCs reduced RED/PURPLE ability to engage as well as the level of damage inflicted on BLUE. IFCs also provided the NATO Naval Task Force Commander with increased time and space to make decisions, with the time and space to plan ahead, and the time and space to take the initiative.

Intermediate Force Capabilities Drivers

Land Wargame Insights

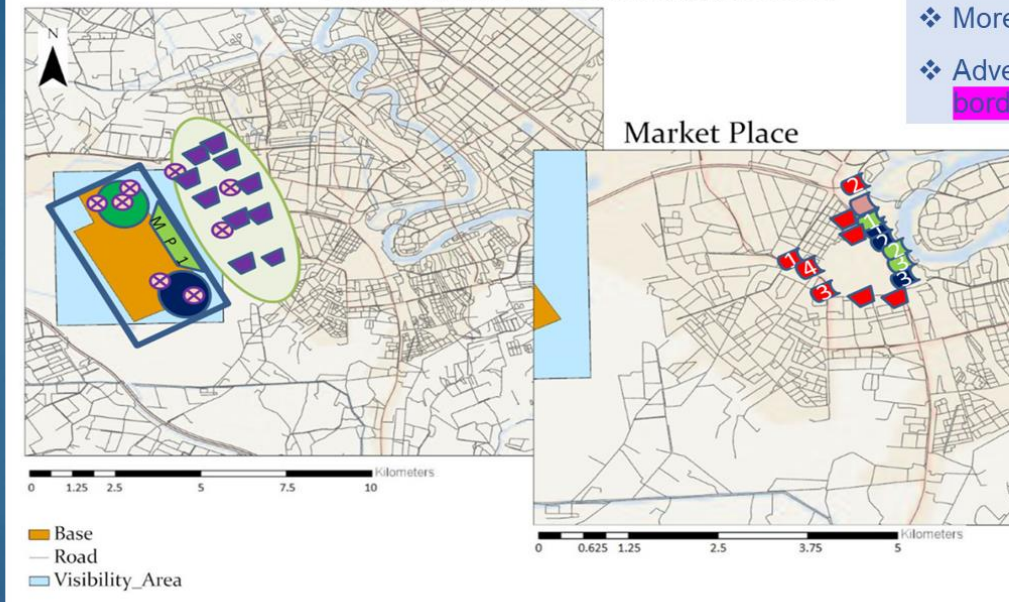
Land Wargame in conjunction with IFC Concept Development Workshop April 2021

- BLUE (NATO)/GREEN (Host Nation) convoy operation involved in an ambush by clandestine hostile militia forces, and local proxy forces involved in inciting riots and creating civil disorder to block access to and from the joint GREEN/BLUE base.
- Tactical Kriegspiel + Strategic Matrix Game
- Comparison of Baseline Capabilities vs. IFC also available

Baseline Capabilities Only

- ❖ RED and PURPLE able to inflict more damage/casualties on BLUE and GREEN (Host Nation)
- ❖ More civilian casualties
- ❖ Adverse consequences – RED moved forces across the border and fired missiles toward joint Host Nation-NATO base

Tactical Situation



IFC Also Available

- ❖ Access/Mobility Maintained
 - Able to prevent Base gate blockage
 - Able to open line of communications (road serving as major supply route)
- ❖ Force Protection improved
 - Suppressed engagements vs. convoy
 - Improved C-UAS
 - Able to thwart snatch and grab attempts
- ❖ Strategic Benefits
 - RED/PURPLE aims frustrated
 - RED/PURPLE narrative and Info Ops suffered

Intermediate Force Capabilities Drivers

Land Wargame Insights

Key Results/Findings/Conclusions

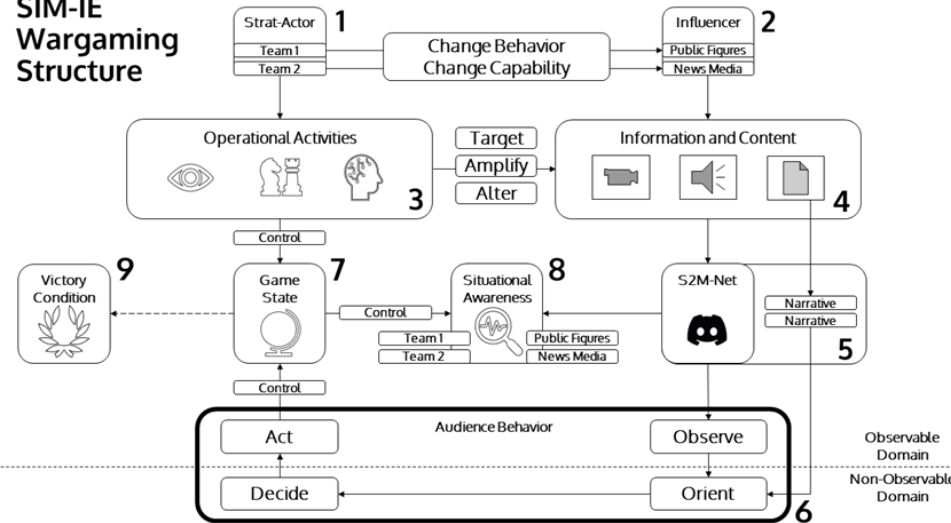
- ✓ **Escalation Mitigation and Control:** Without IFCs, RED pressured BLUE/GREEN and decided if, when, and where they used force. With IFCs, however, BLUE gained the strategic initiative and forced RED into a reactive mode. IFCs also appeared to take away the pretext/justification for RED/PURPLE to use force or escalate.
- ✓ **Increased Decision Space and Time:** Without IFCs PURPLE was able to build “roadblocks in depth”. The use of IFCs created an IFC umbrella out from the gate that provided a safe zone for the QRF to operate and deploy from effectively.
- ✓ **Gain/Maintain the Initiative:** Without IFCs, friendly forces were either limited to doing nothing or reacting to hostile actions with lethal force. With IFCs they were able to take the initiative.
- ✓ **Reduced Undesired Outcomes:** With IFCs, NATO and Host Nation reduced CIVCAS and ability of RED/PURPLE to exploit as part of their Information Operations Campaign.

Wargaming Information Environment (IE)

Challenge: how to assess effectiveness of operations in the IE in the wargaming context?

- ❖ Novel approach: introduce a parallel audience that will provide feedback on the information events without knowing the true state of affairs or the intentions of the players
- ❖ The audience interacts with the information and further shapes it in a fashion identical to social networks
- ❖ The audience is surveyed regularly for their perceptions and preferences
- ❖ Players are forced to consider the audience perceptions

SIM-IE Wargaming Structure



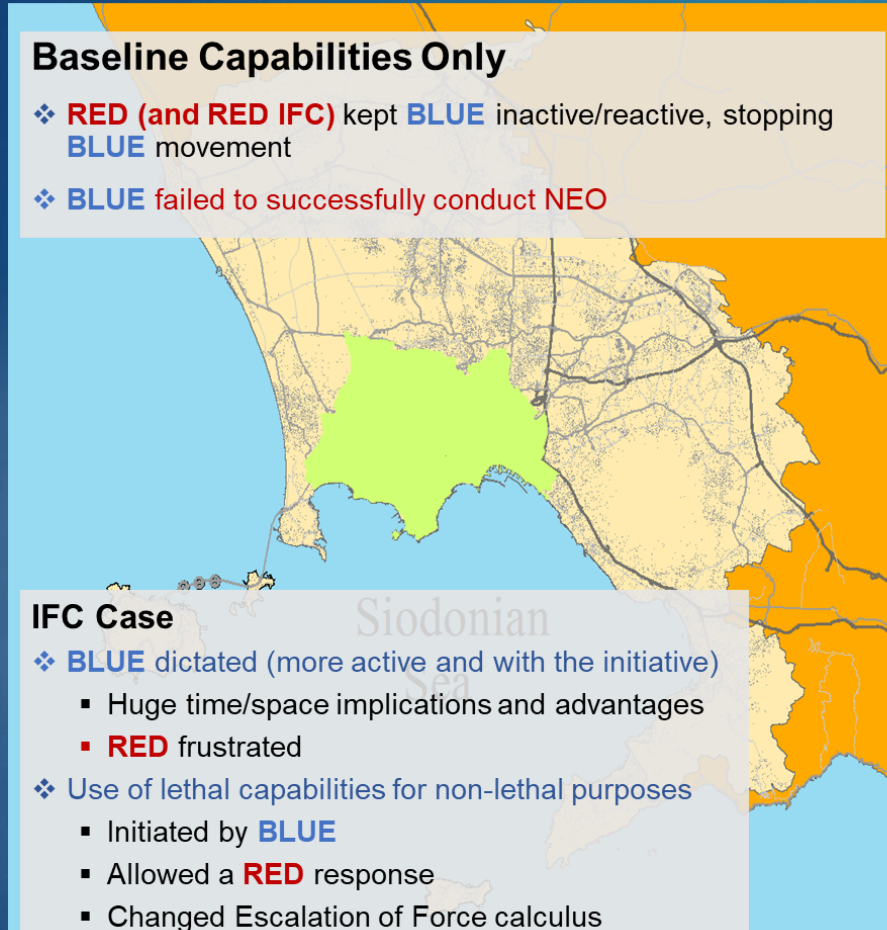
There was **Reluctance and Risk of Using Offensive IFCs** such as general adversarial networks (GANs) to develop DeepFakes. IFCs were only used when the audience was conditioned enough to not believe claims of their implementation.

- ❖ Low-cost **Unsophisticated Capabilities and Tactics** proved to be more effective
- ❖ **Targeting Audiences** was more successful than generating effects across the entire audience
- ❖ Achieving **Consistent positive psychological conditions** in the IE allowed greater freedom of action to teams in conducting military operations.

Joint Wargame and IFC Concept Development Workshop

Baseline Capabilities Only

- ❖ **RED (and RED IFC)** kept **BLUE** inactive/reactive, stopping **BLUE** movement
- ❖ **BLUE** failed to successfully conduct **NEO**



IFC Case

- ❖ **BLUE** dictated (more active and with the initiative)
 - Huge time/space implications and advantages
 - **RED** frustrated
- ❖ Use of lethal capabilities for non-lethal purposes
 - Initiated by **BLUE**
 - Allowed a **RED** response
 - Changed Escalation of Force calculus

Joint Wargame

❖ 1-4 November 2021

❖ Weekly wargame development/pre-test meetings

- Developed the scenario, mission, orders of battle, etc.
- Pre-tested the wargame, WISDOM tool and ARCHARIA terrain provided by the M&S CoE, DISCORD platform, intra- and inter-Team communications, etc.
- Engaged across communities of interest including relevant CoEs

❖ Preceded and informed by preparatory Information Operations and Countering Disinformation Games

❖ Wargame data capture, analysis, and reporting supported by CAN (DRDC), USA (D&A Team and RAND), and SAS-140

IFC Concept Development Workshop

❖ 8-10 November 2021

❖ Additional wargame insights for IFC Concept

❖ Content revisions based on additional sources and expert inputs

❖ Conclusions/recommendations focused on implementation actions

Joint Wargame and IFC Concept Development Workshop

Key Results/Findings/Conclusions

- ✓ **Cost of Doing Nothing:** Without IFCs, BLUE was frustrated and unable to mount an effective response to RED actions. The lack of options had a somewhat paralyzing effect on their decision-making. Trying to avoid escalation, BLUE mostly chose passive actions unless they were directly threatened. With IFC, BLUE had options other than “heroic restraint”. With advanced IFCs, BLUE became proactive, creative (including formulation of integrated lethal and non-lethal TTPs), and able to seize the initiative.
- ✓ **Mobility/Counter-Mobility:** Without IFCs, BLUE faced challenges on key lines of communication, some from RED/PURPLE actions and some from civilians (including civilians acting on behalf of RED). IFCs proved extremely valuable particularly in regaining mobility.
- ✓ **IFC and the Strategic Initiative:** Once NATO forces were able to shift the initiative in their favor at the tactical level through the employment of IFCs, it was reflected in the strategic narrative.
- ✓ **Must Be Prepared for Adversary Use of IFC:** The adversary made effective use of IFC to pursue their objectives and frustrate BLUE’s.

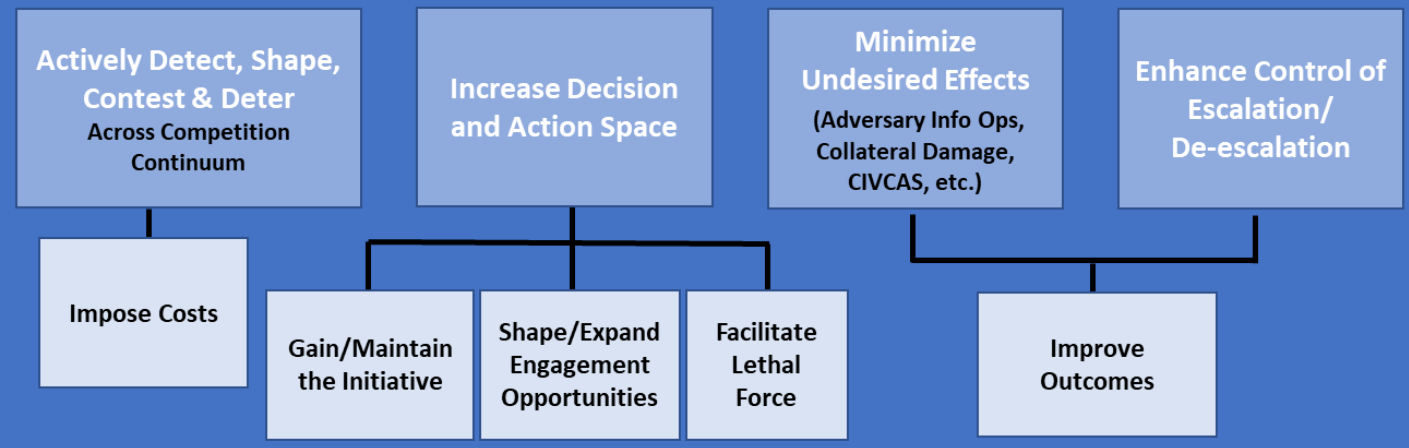
IFC Concept Ends, Ways, & Means



IFC Ends

Win Across the Entire Continuum

Intermediate Force Capabilities (IFC) Ways



IFC Means

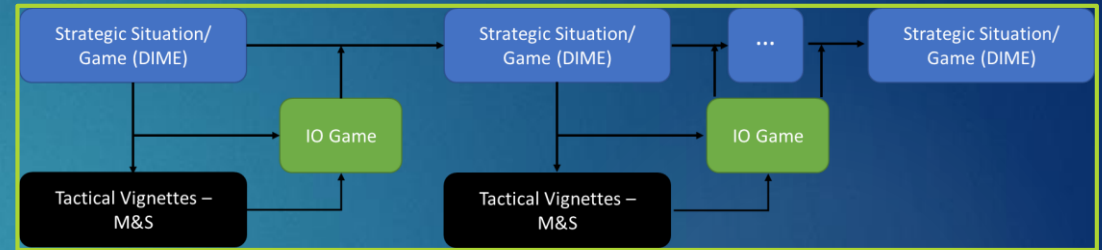
- Non-Lethal Weapons (especially Directed Energy)
- Cyber
- Electronic Warfare
- Information Operations
- Other Means, e.g.:
 - Stability Policing
 - Non-Lethal use of Lethal capabilities



SAS-MSG-180 M&S-Assisted Wargaming

PURPOSE AND OBJECTIVES

- ✓ Improve ability to support evaluation and assessment of capability effectiveness across Domains, across the continuum, and across levels (tactical through strategic)
- ✓ Develop and enhance M&S tools to facilitate wargaming through data layering, visualization, and adjudication support tools as well as potential use of constructive simulation – supporting sidebar analyses, addressing additional cases, etc. – whose results can be incorporated into wargames
- ✓ Ensure wargaming spans friendly (NATO, Host Nation, and Partners) and adversary (plus proxy) actions and outcomes across the tactical, operational, and strategic levels; across multiple Domains; and across the Competition Continuum



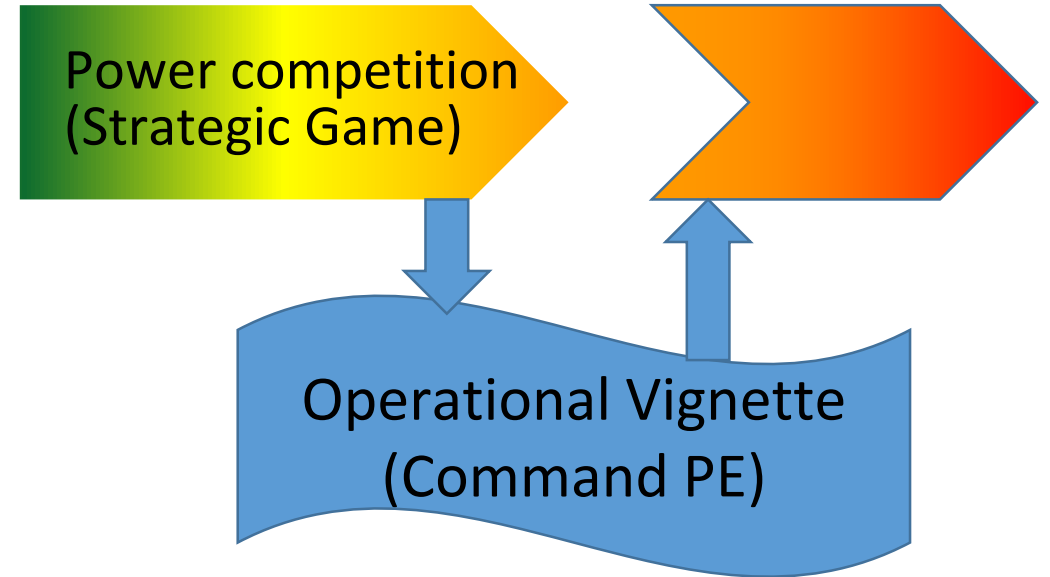
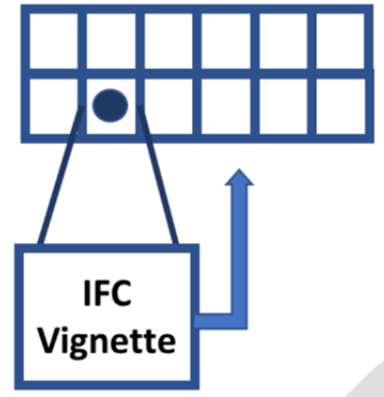
	Competition	Crisis	Conflict
Year 1:	Maritime militias harassing commercial YELLOW and GREEN traffic (access to ports/navigation channels)	RED weaponizing refugees; using proxies and civilians to disrupt BLUE troop/supply/equipment transports by rail/road	Countering A2/A2 in the vicinity of strategically sensitive locations*
Year 2:	RED/ORANGE threat to airports/ports (UAS, laser, other means) – non-attributable	Use of fishing boats/civilian vessels to block key ports/maritime access areas to disrupt BLUE/YELLOW freedom of movement	Protecting remote critical infrastructure / early warning systems
	Possible use of maritime militias/UAS to disrupt mil exercises**		Countering A2/A2 in the vicinity of strategically sensitive locations
Year 3: (TBD)			

* Time permitting/Using agent-based modeling
 ** Could be incorporated in the airport/port threat



M&S – Wargaming Integration: Exploratory Team

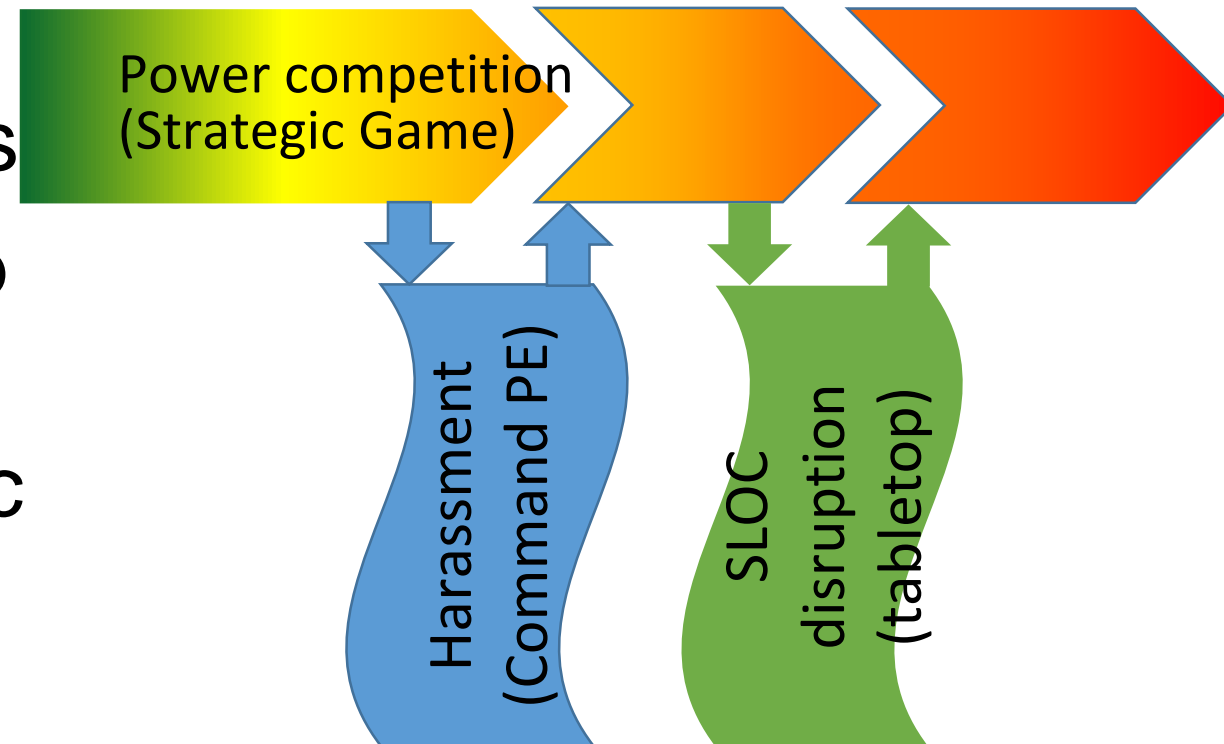
- Use of M&S (constructive sims, computer-assisted wargames)
 - Better fidelity
 - Better representation of time flow
 - But, for the integration to work must stay limited in scope
 - Linkages weakened by complexity





M&S – Wargaming Integration: Present Work SAS-MSG-180

- A complex competition scenario (from a competition to a crisis)
- Maritime and land concerns
 - Two distinct limited vignettes
- Computer assisted and tabletop tactical wargame
- Closely connected with strategic mobility and deterrence



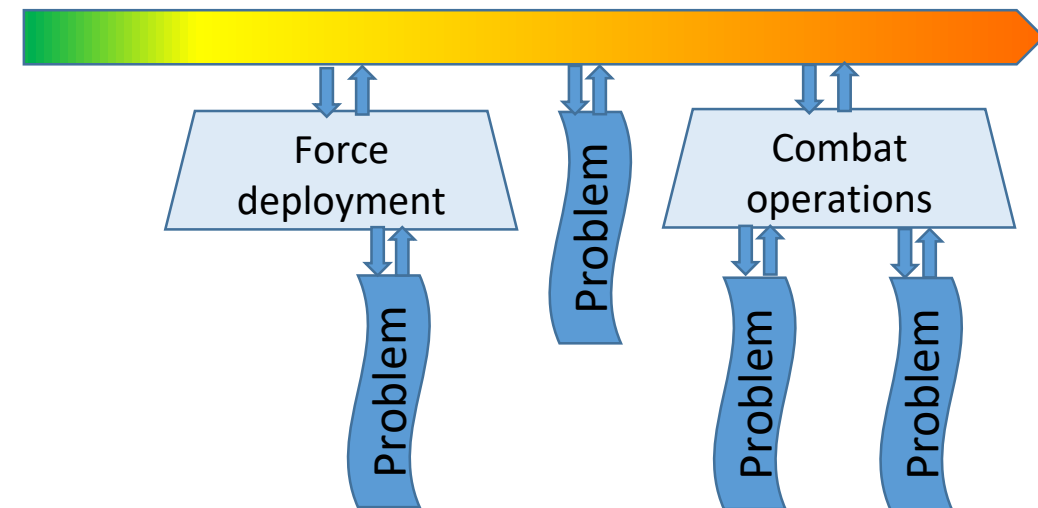


Future Work (Aspirational): strategic planning and multilayer wargames

Large scale military operations (multiple divisions, aerial, naval task groups across large geographical area) – from a crisis to a conflict

For Instance:

- Key importance of sustainment and troop movement for credibility
 - Countering troop and supply movement using hybrid tactics
 - Protecting ports and other critical infrastructure
- Countering A2AD
 - Time, force structure requirements
- Demining operations
 - Time, force structure, risks



Current SAS-MSG-180 Participation

MEMBER/PARTNER NATIONS AND ORGANIZATIONS

- ✓ CANADA (Lead Nation/Chair)
- ✓ UNITED STATES (Vice Chair)
- ✓ BELGIUM
- ✓ CZECHIA
- ✓ ESTONIA
- ✓ GERMANY
- ✓ NETHERLANDS
- ✓ SPAIN
- ✓ UNITED KINGDOM
- ✓ Partner Nations: SWEDEN and AUSTRALIA (IRELAND/SWITZERLAND just approved)
- ✓ Strategic Commands: SACT and SHAPE
- ✓ MULTIPLE CENTRES OF EXCELLENCE (CoEs)

AJP-3.13, Allied Joint Doctrine for the Deployment and Redeployment of Forces

RATIONALE FOR SELECTING AJP-3.13 AS AN IDEAL USE CASE

- ✓ Excellent alignment with previous wargaming that addressed mobility/ counter-mobility, ports/harbours, lines of communications, etc.
- ✓ Key issue in recent NATO wargames
- ✓ Fits with AJP-3.13 Timeline
- ✓ Strong interest from SAS-MSG-180 team, NAAG JNLWCG (in particular the Concepts & Doctrine Support Sub-Group), and a possible new initiative on Protection of Critical Infrastructure (including Remote Infrastructure) in the Defence Against Terrorism Programme of Work (DAT PoW)