21st NATO CA2X2 FORUM · M&S COE / ACT · ROME, 29 SEP – 1 OCT 2026

Mapping the Civilian Space

Volatility as a planning variable

Why the civilian environment is not only a space of confrontation, but a determinant of which resources can be reliably integrated into a plan.

Tiarnach Mooney · BEAR Analytics · BHA Advisors

BACKGROUND

Where this comes from

Twenty years working the civilian side of crisis — and the frustration that drove this work.

- **The field —** humanitarian crisis response, protection and early warning in Yemen, Syria, Mali, Somalia and the Sahel: the civilian environment as it actually behaves under stress.
- **The pattern —** the same failure everywhere: the analysis was available, and it never reached the plan in a form the plan could use.
- **The build —** BEAR: a cascade and tipping-point platform that models the civilian domain as a system, so it becomes an input rather than a caveat.
- **Today —** BHA Advisors and BEAR Analytics, working with NATO COEs, the World Bank, OECD and UN training partners.

BACKGROUND

Why I'm in a modelling and simulation room

I am not a modeller by training. That is precisely the argument.

WHAT THE FIELD KNOWS

How civilian systems fail: which institutions erode first, how a legitimacy loss becomes mobilisation, why populations move before analysts predict it. Rich, hard-won, and almost entirely unformalised.

WHAT M&S CAN DO WITH IT

Nothing — until it is expressed as variables, relationships and thresholds a model can carry. My interest is in that translation: turning field knowledge of civilian behaviour into something you can simulate, test and integrate.

The gap I want to close is between what the civilian side knows and what the plan can actually use.

THE NEXT TWENTY MINUTES

One gap, one reframe, one proposal.

The gap: our models carry a hollow civilian layer. The reframe: that layer is not just where confrontation happens — it governs the reliability of everything we plan with. The proposal: map it properly, and it becomes testable.

20 minutes

We model terrain to the metre and adversaries to the platform.
The civilian environment we model as wallpaper.

In most architectures the civilian layer is static background — a fixed assumption, populated once and left alone. It does not behave, adapt, degrade or surprise. Everything else in the model is dynamic; the part where most of the pressure now lands is not.

WHY THAT USED TO BE ACCEPTABLE

The assumption held — until it didn't

A static civilian layer was a reasonable simplification when conflict was force-on-force and the civilian space was genuinely peripheral. Three things changed.

Coercion went sub-threshold

Advantage is now sought below the threshold of open force — so effects are delivered into the civilian system by design, not by accident.

The population became the objective

Trust, cohesion and legitimacy are the targets. A campaign can succeed without a single engagement.

Dependency deepened

Operations now run on civilian infrastructure, civilian logistics and civilian labour to a degree that makes their behaviour a military variable.

The civilian layer stopped being background at the same moment our models kept treating it as such.

Two different reasons to map the civilian space.

Everyone in this field accepts the first. Almost nobody plans for the second — and the second is where the operational consequence lives.

Confrontation space — and volatility factor

Two distinct analytical roles, two entirely different sets of consequences.

1 · THE CONFRONTATION SPACE

Where the contest happens: influence, legitimacy, coercion, subversion. Well understood in principle. This is what people mean when they say the civilian domain matters.

2 · THE VOLATILITY FACTOR

The civilian system also determines whether the resources your plan assumes will actually be there. It is not only a place you fight over — it is a variable governing the reliability of your own inputs.

The first shapes what you are trying to achieve. The second shapes whether you can do anything at all.

SAY IT PLAINLY

Every plan silently assumes a civilian system that keeps working.

That assumption is a variable — and it is volatile.

Host-nation support, dual-use infrastructure, local labour, medical surge, fuel, road access, port throughput: these appear in plans as capacity. They are actually the aggregate of thousands of civilian decisions taken under stress — and those decisions change fast.

SEE IT CONCRETELY

What volatility does to planning assumptions

Same physical asset, same nominal capacity, radically different reliability under stress.

The port

Physically intact and formally available. But an operator facing threat, insurance withdrawal or a strike reprioritises berths — and sealift timelines move.

The hospital

Bed count is in the plan. Staff absenteeism under threat is not — and it is the staff, not the beds, that set actual surge capacity.

Trucking & fuel

Contracted capacity assumes drivers will drive. Route rumour, extortion risk or a single incident can remove most of it overnight.

Power & water

Engineering-rated. But technicians, spares and payment systems are civilian — and each is its own point of failure.

Labour & skills

Available until people evacuate, are conscripted, or simply stop coming. Skilled labour is the least substitutable input.

Local governance

The partner your plan coordinates through — whose authority may be the first thing an adversary erodes.

None of these fail because the asset was destroyed. They fail because a civilian decision changed.

WHY THIS MATTERS FOR ANALYSIS SPECIFICALLY

An unmodelled variable becomes a hidden assumption

If volatility is not represented, it does not disappear from the analysis. It is silently set to zero.

- **Plans inherit false confidence —** capacity that is assumed available is treated as certain, because the model offers no way to express doubt.
- **Exercises rehearse the easy case —** if the civilian layer never degrades, players never practise the situation that actually arises.
- **Failure looks like surprise —** when the assumption breaks in reality, it reads as an unforeseeable event rather than an unmodelled variable.
- **And the lesson isn't learned —** because the after-action review has no category for “the civilian system behaved differently than assumed.”

So: how do you map it properly?

Not more data about the civilian space. A different structure — one that carries behaviour, propagation and thresholds, and produces something a plan can consume.

Ten domains, read as one system

BEAR maps the civilian environment across ten interacting human-security domains — not ten indicator sets, but a system in which each conditions the others.

- **Governance & institutions**
  Legitimacy, capacity, recognised authority
- **Social cohesion**
  Intergroup trust, grievance, fault lines
- **Security & justice**
  Protection, policing, dispute resolution
- **Public trust & information**
  Confidence, and the information environment
- **Economic activity**
  Livelihoods, markets, prices, employment
- **Population dynamics**
  Displacement, movement, absorption capacity
- **Essential services**
  Health, water, power, education
- **Environment & climate**
  Resource stress, hazard, seasonal pressure
- **Infrastructure**
  Physical systems — and who operates them
- **External influence**
  Foreign actors, financing, interference

Mapped as a system because coercion travels between domains — which is precisely how it evades single-domain analysis.

Grown from whole-of-society practice, not force-on-force

This structure comes from somewhere specific, and that provenance is what makes it different.

WHERE IT CAME FROM

Twenty years of whole-of-society resilience work: the analytic traditions built to understand why societies destabilise — structural violence, institutional erosion, exclusion — rather than to count adversary platforms.

WHY THAT MATTERS HERE

It carries the structural origins of violence as first-class variables. Instability that begins in legitimacy erosion or economic exclusion is visible in the model long before it becomes kinetic — and so are the remedies.

A model built to see structural violence can also test the non-kinetic response to it.

What the engine actually does

Three mechanisms, all of which the static layer lacks.

- **Cascade —** a shock in one domain propagates into others with lag and amplification. Institutional-legitimacy erosion amplifies economic shock; degraded dispute resolution accelerates mobilisation.

- **Tipping points —** domains do not degrade linearly. The model carries thresholds beyond which recovery behaves differently — and sequencing of collapse matters more than aggregate scores.

- **Volatility bands —** every output carries a confidence range, not a point estimate. That range is the planning product: how reliable is this input, under what stress.

BEAR ANALYTICS

BEAR · WHOLE-OF-SOCIETY · ESCALATION MODEL

How violence moves through society

One shared entry, many pathways. A continuum, not single acts — the columns are aligned on a shared rung scale, so you can read across a row and see *where* each pathway crosses each threshold — and where one terminates early.

THRESHOLDS
- Non-kinetic
- Adversarial (grey-zone)
- Violence (kinetic)
- Replaces a state function

THE SHARED TRUNK — EVERY PATHWAY STARTS HERE, IN THE CIVILIAN SPACE, BEFORE OPEN FORCE

STEP 1	STEP 2	STEP 3	STEP 4
Narrative / grievance	**Embedding**	**Recruit & fund**	**Probe the response**
Seed an idea, or activate a real grievance	Ally with locals, root in the social fabric	Propaganda builds people and money	Test where the system does and doesn't react

▼ BRANCH POINT Which branch is taken depends on where the system is already weak. A strong system stalls the pathway here; an eroded one lets it climb.

	CONSOLIDATION they aim to become the state — a ★ rung is a state function taken over				DISSOLUTION they paralyse, never replace — no ★	
RUNG	**Territorial / VEO** Sahel · Al-Shabaab	**Ethno-nationalist** Balkans · secession	**Insurgency** protracted people's war	**Criminal-governance** cartels · gangs	**Hybrid / grey-zone** state-backed · Baltic case	**Networked / lone-actor** online-inspired
01	Extortion & hostages	Parallel institutions	Clandestine cells	Protection racket	Disinformation	Grievance & exposure
02	CROSSES INTO VIOLENCE Strike infrastructure & schools	Boycotts & segregation	CROSSES INTO VIOLENCE Guerrilla hit-and-run	Monopolise violence	Cultivate proxies	Radicalisation
03	Target minorities	Communal intimidation	Assassinate officials	Co-opt police (plata o plomo)	ENTERS GREY-ZONE Economic & energy coercion	Echo-chamber immersion
04	Kill influential voices	Militia formation	★ REPLACES A STATE FUNCTION Liberated / base areas	Control markets	Cyber & infrastructure probing	Small cell self-forms
05	Seize territory briefly	CROSSES INTO VIOLENCE Communal violence / pogroms	Mobile warfare	CROSSES INTO VIOLENCE Fight the state	Deniable sabotage	Seek capability
06	Hold ground, take resources	Claim ethnic territory	Conventional offensive	★ REPLACES A STATE FUNCTION Tax & provide order	Lawfare & institutional capture	JUMPS STRAIGHT TO VIOLENCE Inspired attack
07	★ REPLACES A STATE FUNCTION Tax & run services	★ REPLACES A STATE FUNCTION Cleanse & govern	Take the cities	END STATE — ONE RUNG SHORT Criminal statelet	Manufactured crisis	END STATE — NEVER SEEKS THE STATE Copycat contagion
08	Parallel state & expansion	Ethno-state / secession	Replace the state	TERMINATES AT 07	NEVER CROSSES TO VIOLENCE Coerced outcome	TERMINATES AT 07

Read across, not down. Rung 02 already means bombings for a territorial group, but only boycotts for an ethno-nationalist one. Same altitude, different threat.

Hybrid never turns red. The grey-zone pathway wins without open force — so a violence-triggered response never fires at all.

Lone actors skip the ladder. Four non-kinetic rungs, then a jump straight to attack — the reason early rungs, not late ones, are where intervention pays.

The crossover: when the shaping window closes

Two trajectories on one axis — and the month they cross.

- **System health —** the civilian system's aggregate resilience, falling as the pillars erode.
- **Violence intensity —** the adversary's pressure, rising as it climbs the progression — plotted on the same axis.
- **The crossover —** the month the two lines meet is when non-kinetic instruments stop being the dominant lever. Before it the shaping window is open; after it, collapse dynamics.

BEAR ANALYTICS

From capacity to reliability

The single most useful thing a mapped civilian layer produces is not a richer picture. It is a reliability judgement a planner can act on.

RELIABLE

Integrate into the plan

Stable across the modelled stress range. Treat as available.

CONDITIONAL

Integrate with a trigger

Holds unless a named condition breaks. Plan the branch now.

VOLATILE

Do not plan on it

Swings widely under plausible stress. Hold a substitute.

Same question every planner already asks — answered with a modelled basis instead of an assumption.

Four ways civilian mapping fails

Mapping badly is worse than not mapping, because it produces false confidence with a data trail behind it.

Snapshot as baseline

A one-off assessment treated as a standing truth. The civilian environment moves; a fixed baseline decays into fiction.

Indicators without links

Rich data, no relationships. You can see every domain and still not know what one does to another.

Capital-city bias

Data density follows accessibility. The best-mapped area is often the least representative of where the operation runs.

Point estimates

A single number implies precision the underlying reality does not support — and hides exactly the volatility that matters.

Each of these produces a confident model of a civilian environment that does not exist.

For analysis, exercise and experimentation.

A populated civilian layer is not an academic improvement. It changes what your analysts can test — which is this Forum's business.

WHAT IT UNLOCKS

Four things you can do that you can't today

Each of these is currently either impossible or done by expert judgement without a modelled basis.

Test non-kinetic options

With structural drivers represented, you can test a legitimacy, service-delivery or economic intervention against a kinetic one — and compare.

Represent grey-zone pressure

Sub-threshold coercion has somewhere to land. Campaigns that never cross the threshold can finally be modelled as campaigns.

Stress your own assumptions

Run the plan against a degrading civilian layer and see which assumed resources survive contact.

Populate exercises honestly

Players face a civilian environment that reacts, degrades and surprises — instead of a compliant backdrop.

The common thread: options that currently sit outside the model become things you can actually compare.

THE POINT ABOUT NON-KINETIC REMEDY

You cannot test a remedy for a cause your model doesn't represent.

Represent the cause, and the remedy becomes comparable.

If instability originates in structural factors — exclusion, legitimacy erosion, collapsed dispute resolution — then a model carrying only capability and terrain can only ever evaluate kinetic responses. Making structural drivers explicit is what puts social and non-kinetic options on the same table, measured the same way.

Adversary-driven, or structural?

The same deterioration has two very different causes — and they need opposite responses.

VEO-DRIVEN

Security-first response

Deterioration the adversary causes directly. Degrade the adversary and it recovers.

STRUCTURAL

Invest in the pillar

Pre-existing fragility the adversary exploits. Kinetic action changes nothing here.

ENTANGLED

Widen the uncertainty

Near the tipping point the two are co-produced and cannot be split — confidence bands widen.

Which cause dominates tells the planner whether to sequence security or structural investment first.

INTEGRATION

How this plugs into what you already have

The proposal is a baseline layer, not a replacement architecture. Nobody needs to rebuild anything.

- **As a layer —** BEAR outputs feed existing models as an empirical civilian baseline, alongside terrain and adversary layers rather than competing with them.
- **Interfaces —** domain state, cascade relationships, threshold flags and confidence bands, exposed in a form a federated model can consume.
- **Cadence —** the layer updates. Refresh rate is a design decision, but a static civilian layer is the failure mode we started with.
- **Validation —** backtested against known cases, and honest about the fidelity difference between a well-mapped and a thinly-mapped context.

BEAR ANALYTICS

BEING HONEST ABOUT LIMITS

What this does not do

Overclaiming here would be fatal to the argument, so let me be precise.

IT IS NOT PREDICTION

It does not forecast events or dates. It maps how pressure propagates and where thresholds sit — the structure of the risk, not its timing.

IT IS DATA-DEPENDENT

Fidelity follows the quality of the underlying picture. In thinly-mapped contexts the honest output is wider confidence bands — and sometimes a collection requirement rather than an answer.

Sometimes the most useful output is a stated uncertainty rather than a number that pretends otherwise.

TO CLOSE

The civilian layer is the one part of the model still set to “assume it holds.”

That assumption is now the biggest one we make.

Map it as a system — with cascade, thresholds and honest confidence — and it stops being background. It becomes what it already is operationally: the variable that governs which resources you can rely on, and the space where non-kinetic options can finally be tested.

THE ASK

Where I'd like to take this next

Three concrete steps — all small, all testable.

- **A pilot integration —** take one existing model or exercise and populate its civilian layer from a BEAR baseline. Compare outcomes with and without.
- **A vignette in an exercise —** inject a degrading civilian environment into a scheduled event and see what it does to planning assumptions.
- **A standards conversation —** what would a civilian-layer interface need to look like to be federatable across the Alliance's models?

Questions.

Mapping the Civilian Space — volatility as a planning variable

Tiarnach Mooney · BEAR Analytics · BHA Advisors · 21st NATO CA2X2 Forum, Rome