CITY AND CEMA

DESIGNER'S NOTES

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City and CEMA is my first take on a modern urban wargame set at around Brigade level (i.e. a Brigade level fighting force with counters generally representing company-sized elements). As a result, there are a few caveats that need to be stated up front:

- The inspiration for the game came before my PhD, and to an extent it's a game I needed to get out of my system before embarking on a more formal design process as part of the PhD. As a result, it does not directly reflect the findings of my research to date, although elements are being brought in, but in an unstructured way. Depending on how *City and CEMA* is received I might formalise it more if it's going to form part of the PhD, I may design a "better" game out of it, or I might just leave it fallow – we'll see.
- Likewise, the game does not formally reflect any of the learnings coming out of the Ukraine, although it is naturally informally informed by what is going on there. Just as an indicator of the potential issues in transferring lessons from the Ukraine, the 9+ month battle for Bakhmut is over a city smaller than Redditch, that I've been using in my test scenario where I expect it to be game over in 12-24 hours!
- *City and CEMA* has all the hallmarks of a "kitchen sink" game as I've thrown lots of ideas into it, but so far very few out of it! The cropping, editing and streamlining of the game will all be part of the development and playtest process.

The aim of the game is to educate people and encourage discussion on some of the issues and challenges of modern peer-to-peer urban warfare and in particular on the impact of the fighting on the people and fabric of the city, and the role that modern technology and approaches such as EW, Cyber and Drones might have on the battlefield. As such the game is possibly more education than entertainment and more analytic than training focussed.

Fairly early on when building my list of potential urban games (which currently stands at over 30) I identified that a game based on the NATO Understand-Shape-Engage-Consolidate-Transition (USECT) urban doctrine would be a good thing to do. Whilst primarily developed for asymmetric warfare it appears broadly applicable to any urban battle. Most wargames are really only about the "Engage" phase, and I felt that if wargaming an urban battle then it is important to push the time-window backwards and forwards – understanding what the options and activities were before and after the (largely) kinetic battle. So early on I decided to use USECT to define the main shape of the game. As such *City and CEMA* consists of 4 phases:

- **Understand** – where the players get to grips with the map and their orbats, but can also "buy" information about the city which may impact on their operations later.
- **Shape** – where players spend an initial allocation of Command Points to buy a range of kinetic and non-kinetic actions (including EW, cyber, HUMINT etc), create their plan, deploy their troops, create their field engineering works (for the defender) and then conduct their chosen actions, including any initial bombardments or interdiction strikes.
- **Engage** – where the main battle is fought out in ~2 hr turns.
- **Consolidate/Transition** – where the players jointly discuss what would happen after the battle, not only from a military perspective (consolidating a defence, staging a counter-attack etc) but also crucially from a civilian perspective – getting some sort of handle on how many civilian casualties have been caused, what damage has been done from

rubblisation, and what the reverberating effects have been on the city's services and infrastructure, its hospitals, power and water systems, its food stocks and general hygiene; and just how the city might recover from the battle and what help it might need.

The roots of *City and CEMA* lie in my (still evolving) *FRAGO* rules for miniatures based Brigade-level engagements during the Cold War Gone Hot. That is the source of the simple algorithm used to work out the power of each unit, essentially a base value and then various pluses and minuses for its capabilities – but probably of little else. However, it seemed like a good place to start when I started developing *City and CEMA*.

From the urban games I've played so far it was obvious that *City and CEMA* would be an area-based game. That model of spatial regulation just seems far more appropriate when you've got an urban area made up of a variety of different districts, uses and construction types. The idea of movement being mainly limited by rubble (and other challenges) rather than distance was something that I'd first seen in High Flying Dice Game's *Christmas in Hell* and then used in my own *Festung* and was also something I wanted to bring in - the urban maps were only going to be about 5-10km across, so even with about a 2hr turn rate any modern unit would realistically be able to cross the map unopposed in a turn.

The use of cards to abstract more sophisticated or higher-echelon capabilities is becoming increasingly common in board wargames (e.g. *We Are Coming Nineveh* and *Littoral Commander*), so it seemed to be the sensible way to address Cyber and EW. Talking to Ed McGrady a while ago about urban wargaming he suggested that given my background (Royal Signals, including some EW and early Cyber – CEMA in modern parlance) that I ought to major on those elements in any urban game I developed. And along with UAVs they do seem to be the big difference between WW2 (and even 60s/70s urban) and modern urban. SPI's *NATO Division Commander*, another inspiration, had some basic EW rules, a nice early take on ISR, and some interesting (if complex) C2 and supporting assets rules, but tied into an over-cumbersome combat system, which I wanted to avoid.

The initial card set included quite a lot of "influence" type cards, but the more I thought about it the less realistic it seemed that local influence would change significantly (or be able to have an impact) whilst the bullets and bombs were flying, so many of those have been parked, possibly pending a Divisional version. Having a budget of Command Points (CPs) to "buy" the cards with is a common trope, and I like things randomised so making it a base number plus dice roll seemed sensible. This then gave me a nice in for representing EW and Cyber, since attacks could be made to reduce the number of dice that the player throws for CPs – and hence their ability to do things. The more I tested the game the more I added things into this emerging "C2" phase, and adding cards for tasks like orders changes, changing HQs and tasking sappers all helped ensure that these activities didn't get forgotten in the run of the battle.

Being an ex Brigade Signal Squadron officer I've always been keen to see some elements of how a Bde HQ works incorporated into a game – and particularly since modern doctrine tends to have a focus on destroying enemy C2 nodes. So, in this game you have a Main, Step-Up and Tac HQ, and need to be ready to change command if detected. There's also a comms check each turn at Bn level since comms in the urban seems to be another key challenge – one then exacerbated by enemy EW. A related, critical, element of modern warfare is Emissions Control (EMCON). The prevalence of EW assets means that using voice just invites artillery strikes, so forces tend to try and stay in a data only mode as long as possible, or even move to a complete black-out state. *City and CEMA* makes players define their EMCON state each turn, and, as ever, there is a trade-off in each choice between how much they want to maximise their fighting ability verses minimising their vulnerability to enemy Fires.

Intelligence, Surveillance and Reconnaissance (ISR), and the resulting fog of war, is another key element of modern warfare that I wanted to incorporate. Whereas *NATO Division Commander* was

really designed for duplicate map play I wanted *City and CEMA* to be playable on one map, so blocks facing the owning player are used for hidden units (although you could use inverted counters), and blocks are placed face up once unhidden. *NATO Division Commander* also does ISR quite nicely with “Intelligence Levels” achieved by EW and aviation assets, as well as local tactical intel. For *City and CEMA* I went for a vaguely similar system, with ISR assets (including a variety of UAV types/roles) represented by capability cards, and successful detects enabling enemy units to be first unhidden, and then have INT+1 counters added as better information is obtained. One aspect I wanted to reflect were the relative affordances of the different ISR systems, in terms of their range, area, how they are effected by buildings and EMCON measures, the ability for DF based EW to only give you rough locations, the ability for cyber to contribute, and how the local population – directly or thru social media might also be able to help. The target dice rolls and DMs for each system/card are hopefully designed to reflect these, and other, factors.

As a result of all of the above there is a lot packed into the C2 sub-phase of each turn – but in terms of the focus of a Brigade headquarters that is probably just as it should be. The rules assume that once a battlegroup has been given its orders (another CP cost) then it can be left to get on with it – there are no CPs costs associated with the operations of its sub-units.

Turning to the kinetic side of the game, *FRAGO* used a miniatures-style combat system, combat factor + dice + DMs and a basic 1D look-up table. However, that does have the downside that the dice and DMs and in direct competition - so good tactical positioning can be wiped out by bad dice. I often moderate that by using Fate/Nudge dice instead of D6, but on the basis that if *City and CEMA* worked out I’d like it to be easily playable by anyone then I wanted to avoid strange dice. For a while I thought about D10 given their natural link to probability (and so hopefully more explainable to military types), then I thought D6, but that gave too few outcome options for the CRT I wanted, so I eventually settled on 2D6 (and also extensive use of the easily convertible D3).

Whilst I know that a lot of “military” Wargames use ratio CRTs (e.g. *RCAT*) there does seem to be a move towards differential CRTs even in professional games (e.g. USMC’s *OWS*) - and for me differential CRTs largely avoid the unnatural behaviours that ratio CRTs seem to generate. A key design decision was to use column shifts rather than DMs for tactical factors and to try and keep the overall result of each column of the CRT the same, just with slight shifts at the extremes of the dice roll, and using the other rows to represent the range of indirect results of the combat - including quite specifically all of the reverberating effects of combat in an urban area, such as rubble, impact on civilians, and things like fire, toxic chemicals and infrastructure effects. One lesson from *Christmas in Hell* was that extra rolls for collateral damage tend to get forgotten. So, I built all of these elements into the iconography of the CRT. I really liked the small calibre/large calibre mechanic for rubble in *Festung*, and toyed with bringing that across, but given the need to create cognitive space for all the C2/CEMA elements I decided to keep things simple and just shape the CRT so that the more firepower a player brought to bear on a target the more likely they are to generate reverberating effects. The first draft had different combat factors for close/urban, longer range/rural direct fire, and for assault, but I found it hard to differentiate between the first and last, and it made the counter (more) crowded, so for now I’ve just settled on an urban & assault factor and a long range/rural factor.

I originally wanted movement to be only limited by rubble and the presence of the enemy (as in *Christmas in Hell),* but since the playtest map (Redditch) included both rural and urban areas this meant that a unit could (and did) race down the side of the map and try and pick off the Bde HQ. So as to give some protection against more extreme moves I therefore introduced per-area movement costs, based on their size. Since rural areas tended to be bigger this would slow large sweeps, and since urban areas tend to be smaller and soon have rubble at least equal to their size this would mean that rubble would still be the main limiting factor on urban movement.

One related question was how to deal with major thoroughfares. In *Festung* I used normal areas to define each major segment of road – but this leads to lots of thin areas which are hard to manage

physically. In *We Are Coming Nineveh* highways are not areas but lines allowing faster movement along them, but movement is stopped by neighbouring troops. This seemed to be a better solution, although I did go through a phase of thinking about having the highways run through areas rather than along them. I might still allow this, but a visit to Redditch soon showed that its highways are almost completely isolated by tree borders or embankments from the neighbouring areas, so it seemed reasonable that the highways were plotted along the edge of areas. Sapper tasks are available to block routes with craters, mines, barricades or abatis, but if left open the fact that they are not obstructed by rubble makes them fast highways into the heart of the urban area – as should be the case.

I wanted the game to reflect the differences in the underlying urban terrain. The military tends to use the concept of "Urban Terrain Zones" (UTZs) to define different area types (e.g. residential, commercial, industrial, old city etc) – although this is a debated topic. However, most of the UTZ models I've found so far are quite subjective and US centric. For *City and CEMA* I developed a 4 parameter model which classed each area by the following:

- Density of buildings, on a low/medium/high type scale
- Height of buildings, also on a low/medium/high type scale
- Construction material, including wood, brick, stone, metal, concrete
- Usage, including residential, commercial, light and heavy industrial, retail etc

The first three factors are then combined (with any other relevant information) to create a Protection Value (PV) for the area – which is used to reduce the effects of fire of all types on the defender. The PV is also then used to derive a maximum rubble value for each area.

Of course, a city is about people as well as structures, and I was keen from the outset that the civilians living in the city were represented in the game. My research to date has yielded figures of around 10-20% of a population remaining in place during a battle – so 8-16,000 people for somewhere like Redditch (although the lack of cellars in modern houses might reduce that). Again, initial research suggests that people don't tend to come onto the street whilst the actual fighting is happening, but rather wait for post-bombardment or post-firefight lulls. So, whilst people need to be there, having big crowds moving around is probably realistic. I originally thought about giving each area a "population allowance" and using that to limit how many civilian blocks each area could generate, but that was going to be hard to manage, research and practically implement. In the end I decided on a simple dice roll against a target number to show whether civilians emerge – and the trigger for their emergence (or immediate death) to be relatively infrequent icons on the CRT (but more common for Fires than for firefights or assaults). A simple dice roll and logic then controls the movement of the civilian block to get to the map edge, where the receiving player has the task of arranging for a displaced persons camp (defaulted at the moment, but may expand in future versions). The die roll required is low in modern residential areas, but higher in industrial, commercial and older and more affluent residential areas. All the time that a civilian block is on the map it will slow movement and reduce combat effectiveness around it, and will have a probability of being killed by combat effects. Other icons on the CRT also drive tests for damage to infrastructure (more from Fires than fighting) and to protected sites, and the possibility of fires breaking out or of there being Toxic Industrial Chemicals/Materials (TIC/TIM) being released into the atmosphere – with further rules controlling how those evolve turn by turn.

Another civilian aspect of the urban which needs to be reflected is the services infrastructure. Given the scope of the game and timescale I think its warranted not to get too much into flows – but I probably will do that in a higher echelon game. For simplicity I've divided the city into about 4 districts, and a city dashboard shows the state of the fixed and mobile comms, power, water and smart city/CCTV in that district. As well as being damaged by fighting the defender can just switch services off, and the attacker can also try and disable them by sabotage or cyber attack. Where applicable both sides can also use the smart city/CCTV network to try and identify enemy

movement. The inter-relationship of the services are also modelled, albeit in a fairly simple way – so killing mobile stops most useful social media and some cyber, killing fixed comms kills mobile comms and CCTV, killing power kills fixed comms etc. As well as the Engage phase effects, the implications of any of these actions on the civilian population is reflected on the Adverse Opinions tracks, and in the Transition Phase analysis and discussion at the end of the game.

The Adverse Opinions track is the rump that is left in terms of how I handle influence and sentiment in the game. Initially I had fancy plans for all sort of effects and tracks, but, as mentioned above, I increasingly felt that real influence and sentiment operations should be handled at a higher echelon, and so I could go for a simpler approach in this game – but one which still reflected the potential power of the "strategic corporal". The Adverse Opinion track is therefore a fairly abstract representation of how each side's actions are playing out in any international media and amongst international stakeholders. Generally, opinion just gets worse for the players as they create rubble, force civilians to flee their homes, kill civilians in the cross-fire and generally wreck infrastructure. At the moment, the only thing that players can do to mitigate this (apart from avoiding the destruction) is to deploy civil affairs teams to rapidly remove civilian blocks from the map – but that's something that future Capability Cards could expand on.

Initially I'd planned to have (and had started writing) Random Event cards, as found in many similar games, but the more I developed the Capability Cards and the iconography of the CRTs the more it felt like I'd covered most of the things I'd had planned for the Random Events – and now they were tightly integrated into the game logic. There may still be the case for some Random Event cards, but I think that is now very much a scenario by scenario choice.

What else have I left out? Early versions had the anti-aircraft rules from *FRAGO*, but I've now abstracted that to AA effects on the sortie cards themselves, and future capability cards could enhance AA defences against particular types of target. Logistics at the moment is focussed on the items which are likely to be most limited during a 12-24 hr urban fight, so field engineering stores, UAVs and artillery fire missions are limited, but other ammunition, food and water aren't. There are no mouseholing or top-down attack rules since it is assumed that the company elements know how to do this – and training could be reflected in their combat factor. I haven't yet incorporated more specialist urban equipment, like large calibre weapons in direct fire mode, thermobarics or CS gas, but these could be added by either adjusting combat values or as capability cards. The use of larger subterranean tunnels for infiltration is covered by scenario rules, but there are no rules yet for fighting in those tunnels (although you can deny them). Likewise, there are no rules yet for night fighting, weather or casevac.

And where do I think things aren't yet quite right. Representing company groups as single counters has some real issues, especially in urban. You want to reflect combined arms, but how do you also reflect the differential casualties between leg infantry and its supporting tanks, or how do you push the leg infantry forward whilst the tanks wait for the rubble to be cleared. Splitting the types out would mean at least doubling (infantry+tanks) or tripling (leg infantry + transports + tanks) the number of blocks on the map. First sight of the big A0 map also caused me to wish that I'd used transparent shading more. At present only woods are shaded, but using a paler green to also shade rural and scrub areas, and then perhaps two grey shades for heavy and light industrial/commercial would have really helped the shape of the terrain to stand out – the small area information panels are shaded sort of in this way, but not so obviously. I'm also tempted to put height first my UTZ code as that is the first thing people seem to want to know – and even some iconography around height might be useful as long as it doesn't clutter the map too much. Apart from that I think I'm pretty happy with what is in there and how it looks and plays.

So, that's where the game stands after its initial development and my own solo playtesting. I think its still playing a bit "long" for what I was originally after, but in every play I'm still making changes. It will be interesting to see how it goes as COW – where it's likely to play even longer – but it will give me some valuable feedback to work on the 0.2 version and hopefully open up to a wider

audience, whilst all the time feeding in the findings from my PhD research,

