Wargaming 101: A Tale of Two Forces

In September of 1994, Saddam Hussein ordered his Republican Guard to rush the border with Kuwait to test our resolve and reaction time. Inheriting Defense Intelligence Agency's Kuwaiti desk a year later, I studied this exercise and pondered several questions. First, putting together the timelines showed that — in contrast to what the Clinton Administration claimed — Saddam began pulling the RG back before US troops ever landed in theater. This proved that he wasn't contemplating an actual re-invasion unless, perhaps, the US failed to react at all to the provocation.

In the event, the US unilaterally imposed a "no-drive zone," similar to the no-fly zone over southern Iraq. While Iraqi military aircraft were not allowed to fly in the NFZ, only the Republican Guard was prohibited from entering the no-drive zone: The Iraqi Regular Army — not seen as a threat — was allowed to stay and operate in Southern Iraq. While the timelines imposed by the no-drive zone appeared to be sufficient to keep the Republican Guard out of Kuwait until reinforcements could arrive and fall in on prepositioned equipment at Camp Doha in Kuwait City, the question arose in my mind, "could the Regular Army spearhead an invasion and defeat the Kuwaiti Land Forces before we could intervene?"

To explore this question, I needed two things: good intelligence on the forces and plans involved and a way to evaluate their probabilities of success. I was well supplied with excellent reports by observers in theater, so no problem there. The evaluation took a bit more creativity. I decided to use a version of Col. Dupuy's technique he introduced in his book, *The Options of Command*. There, Col. Dupuy scored the armies facing each other in the May 1940 campaign in France and laid them out according to their historic dispositions. He then adjusted the forces by using the relevant terrain, posture and troop quality modifiers. Comparing the resultant power ratios, he surprisingly deduced that the French Army deployed itself exactly as though the Maginot Line fortifications did not exist. Taking the Maginot fortresses into account, he then suggested an alternative deployment that he convincingly portrayed as being capable of stopping the German advance through the Ardennes.

I proposed to do the same for the Kuwaiti Theater of Operations. The first order of business was to establish an order of battle for the two sides. The Kuwaiti Land Forces OOB were fairly easy: they were all in against an existential threat. Where things got complicated was the mish-mash of equipment the KLF was in the middle of procuring and the fact that the KLF was woefully undermanned and undertrained. The Kuwaiti Emir and Parliament believed that it was paramount that they get as many strong allies as possible interested in their survival, so their military procurement plan was to make a significant purchase of top-shelf equipment and weapons from as many different, militarily strong nations as possible. These countries included the United States, the UK, Russia, China and others. It didn't matter that the equipment wasn't necessarily designed to work together, it only mattered that Kuwait had many friends in high places.

At the same time, the KLF had no equivalent to the US military's Uniformed Code of Military Justice. If a KLF soldier failed to show up for training one day, there was no legal recourse to make that happen. Consequently, the KLF wasn't making the progress in soldier training that it should. While their weapons were new and generally very good, they didn't have enough trained soldiers to man them. It was as though the Kuwaitis had one boot on and one boot off.

For the Iraqi side, I chose the Regular Army's southernmost command, III Corps, with a possible reinforcement from IV Corps stationed just to the north. I gave them credit for having their full Table of Organization and Equipment (undoubtedly optimistic, but serving my purposes) and I scored the individual units using Col. Dupuy's methodology and normed the scores to make them easier to work with. This resulted in the following table:

IZ OOB	605		KLF OOB	463
III Corps	381		6th Mech Bde	93
11th Infantry Division	59		BMP-3 Bn	19
23 Inf Bde	9		BMP-3 Bn	19
45 Inf Bde	9		BMP-3 Bn	19
47 Inf Bde	9		M-84 Bn	30
11 Arm Rgt	15		PLZ-45 Bn	6
11 DIVARTY	17		15th Arm Bde	193
51st Mechanized Infantry Division	114		M-1 Bn	57
31 Mech Bde	24		M-1 Bn	57
32 Mech Bde	24		M-1 Bn	57
41 Arm Bde	49		DW Bn	17
51 DIVARTY	17		M-109 Bn	5
6th Armored Division	196		26th Arm Bde	27
25 Mech Bde	58		Lt Recce Bn	9
30 Arm Bde	60		Lt Recce Bn	9
70 Arm Bde	60		Lt Recce Bn	9
6 DIVARTY	18		35th Arm Bde	111
Field Gun Brigade	12		M-84 Bn	30
1 Arty Rgt	4		M-84 Bn	30
2 Arty Rgt	4		M-84 Bn	30
3 Arty Rgt	4		BMP-2 Bn	15
Reinforcement from IV Corps			PLZ-45 Bn	6
10th Armored Division	224		FA Bde	39
17 Arm Bde	60		M-109 Bn	5
24 Mech Bde	58		M-109 Bn	5
42 Arm Bde	88		9A52 Bn	29
10 DIVARTY	18			

Note: DW = Desert Warrior IFV; PLZ-45 = Chinese SP Howitzer; M-84 = Yugoslav T-72 variant; 9A52 = Russian "Smerch" 300mm SP MRL; DIVARTY = Division Artillery; Lt Recce Bn = HMMWV battalion

The next piece of the puzzle was the KLF's deployments. Fortunately, the KLF had been running exercises that attracted much attention from observers, and there were few subtleties to add to what was fairly obvious on a map study. Their rough dispositions looked something like this:
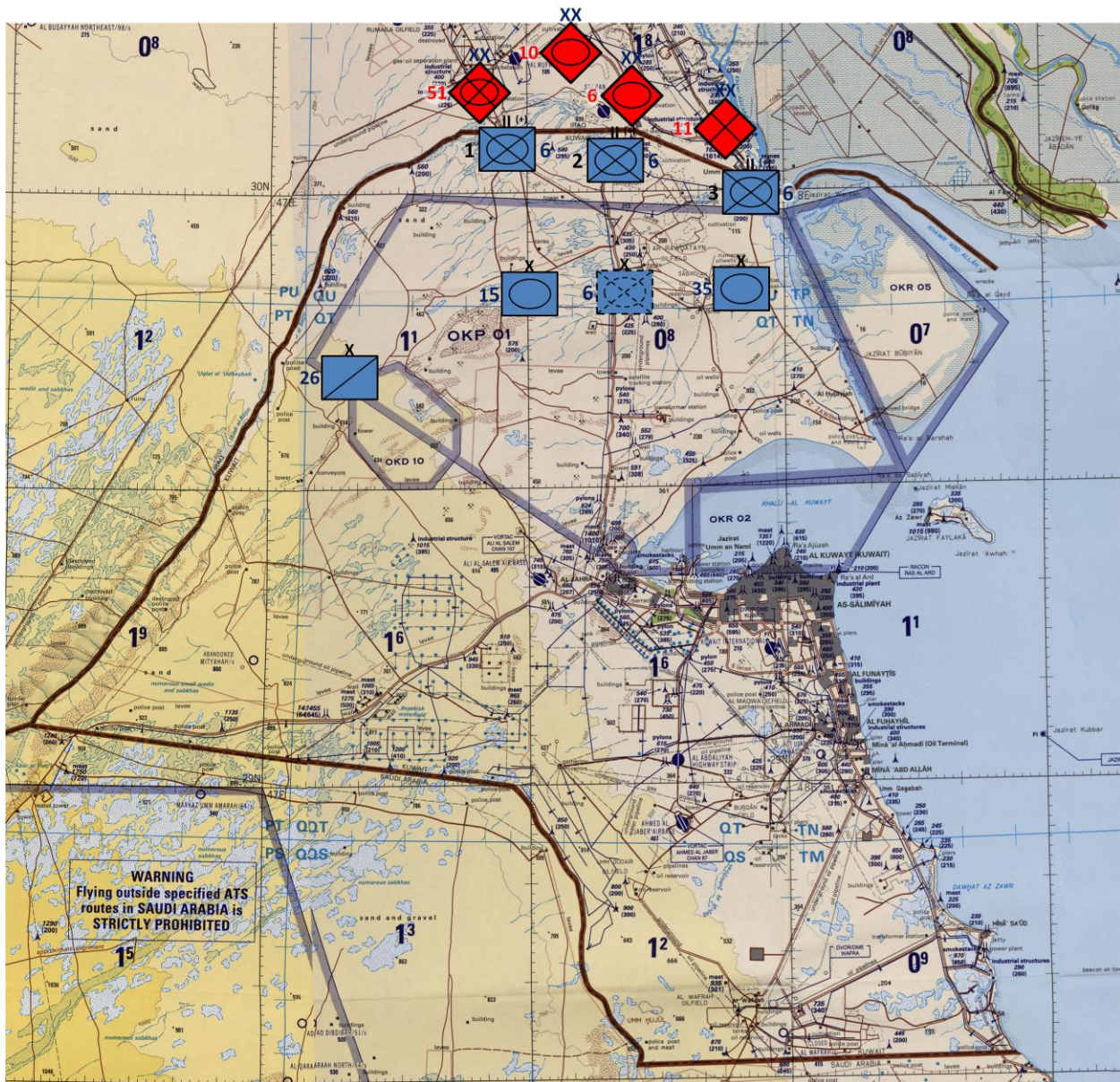
KLF dispositions are in blue, while Iraqi formations are in red. Note that the 6th Brigade's maneuver battalions are on the border, constituting a covering force for the KLF.

At the time, the KLF 26th brigade was awaiting its compliment of M-1A2 tanks and Bradley Fighting Vehicles, so was relegated to observing the western approach to Kuwait City with its lightly armed HMMWVs. In a throwback to Patton's 1944 XIX Tactical Air Command, they shared responsibility for stopping any Iraqi thrust down that road with the Kuwaiti Air Force.

Overall, the two sides' force ratios don't look promising for the attacking Iraqis.

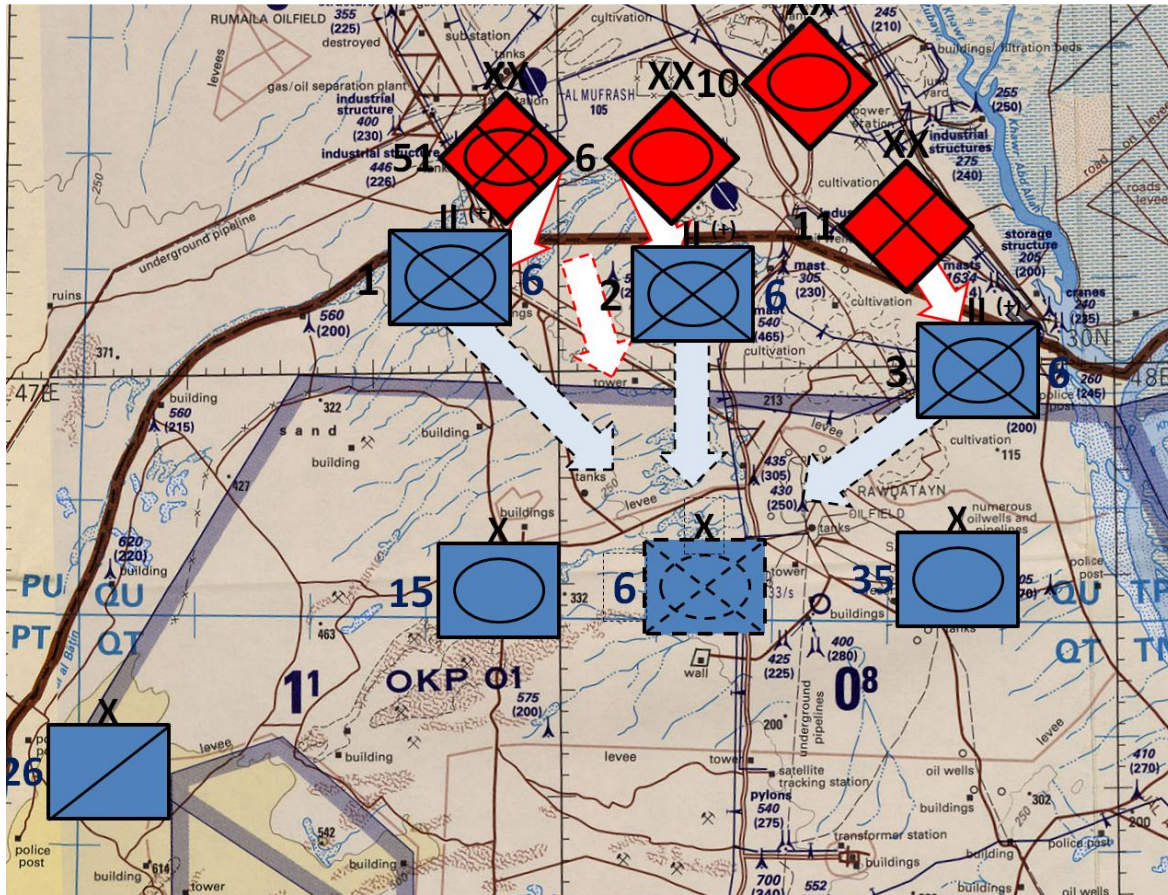|			Posture		Terrain		CEV		
IZ III Corps	605	x	1	x	1	x	1	=	605
KLF	463	x	1.3	x	1.05	x	1	=	632

$$= \quad 1.0 : 1$$

However, looks can be deceiving. While the conventional wisdom that the attacker requires a 3:1 superiority to succeed, the Soviet/Russian Correlation of Forces Methodology is more sophisticated and recognizes that as long as a commander can do economy of force operations in some sectors to enable concentration in others sufficient to overcome the defender, even an *overall inferiority* of combat power can be made to work. In this case, a 1:1 will serve the purpose. Consider the following CoFM formula:

Find Width of Main Thrust Axis:

$$V \times \frac{S - W}{P - W} = U$$

V	Overall Frontage in area of operations
S	Overall CoF throughout area of operations
P	CoF on Main Thrust Axis
W	Minimum permissible CoF on other axes
U	Frontage of Main Thrust Axis

$$80 \times \frac{1.0 - 0.5}{3.0 - 0.5} = 16$$

Thus, on an overall frontage of 80km, the attacker can array his forces such that he can achieve a 3:1 superiority in a 16km wide strike sector. In this case, he has to allow a defender superiority of 2:1 outside the strike sector, but this isn't a problem as the defender is not likely to recognize an opportunity to attack until it is too late, and even if he did, he would make little headway (the line of contact doesn't begin to move rapidly until one side achieves a 3:1 superiority) while his forces inside the strike sector are frantically calling for help.

I set up the covering force battle like this:

			Posture		Terrain		CEV			
11 ID	63	x	1	x	1	x	1	=	63	
										= 1.2 : 1
3/6 Mech	40	x	1.2	x	1.05	x	1	=	51	

			Posture		Terrain		CEV			
6 Arm Div	200	x	1	x	1	x	1	=	200	
										= 3.9 : 1
2/6 Mech	40	x	1.2	x	1.05	x	1	=	51	

			Posture		Terrain		CEV			
51 MID	118	x	1	x	1	x	1	=	118	
										= 2.3 : 1
1/6 Mech	40	x	1.2	x	1.05	x	1	=	51	

The IZ 6th Armored Division can get a fairly overwhelming force ratio over the entire width of his zone of attack, and by loading up on its shared border with the 6th AD, the Iraqi 51st Mech Division can add a further 19km — for a total breakthrough zone of 46km, right in the middle of the line. The KLF's 6th

Mech Bde would have to move fast to keep from being cut in two and swept away from its MLR positions.

Find Width of Main Thrust Axis:

V	x	$\dfrac{S}{P}$	$\dfrac{-}{-}$	$\dfrac{W}{W}$	=	U		V	Overall Frontage in area of operations
								S	Overall CoF throughout area of operations
								P	CoF on Main Thrust Axis
								W	Minimum permissible CoF on other axes
27	x	$\dfrac{2.3}{3.0}$	$\dfrac{-}{-}$	$\dfrac{0.5}{0.5}$	=	19		U	Frontage of Main Thrust Axis

The IZ 51st MID's frontage in the Covering Force Battle

The Iraqi 11th ID is the weak sister of the force, but it merely has to keep the battalion opposite them occupied while the other two divisions blow through the center of the covering force area.

As this modified version of the Dupuy model does not assess casualties, the KLF 6th Mechanized Brigade is assumed to have broken contact and occupied their positions on the MLR without damage — a best case scenario for the Kuwaitis, to be sure.
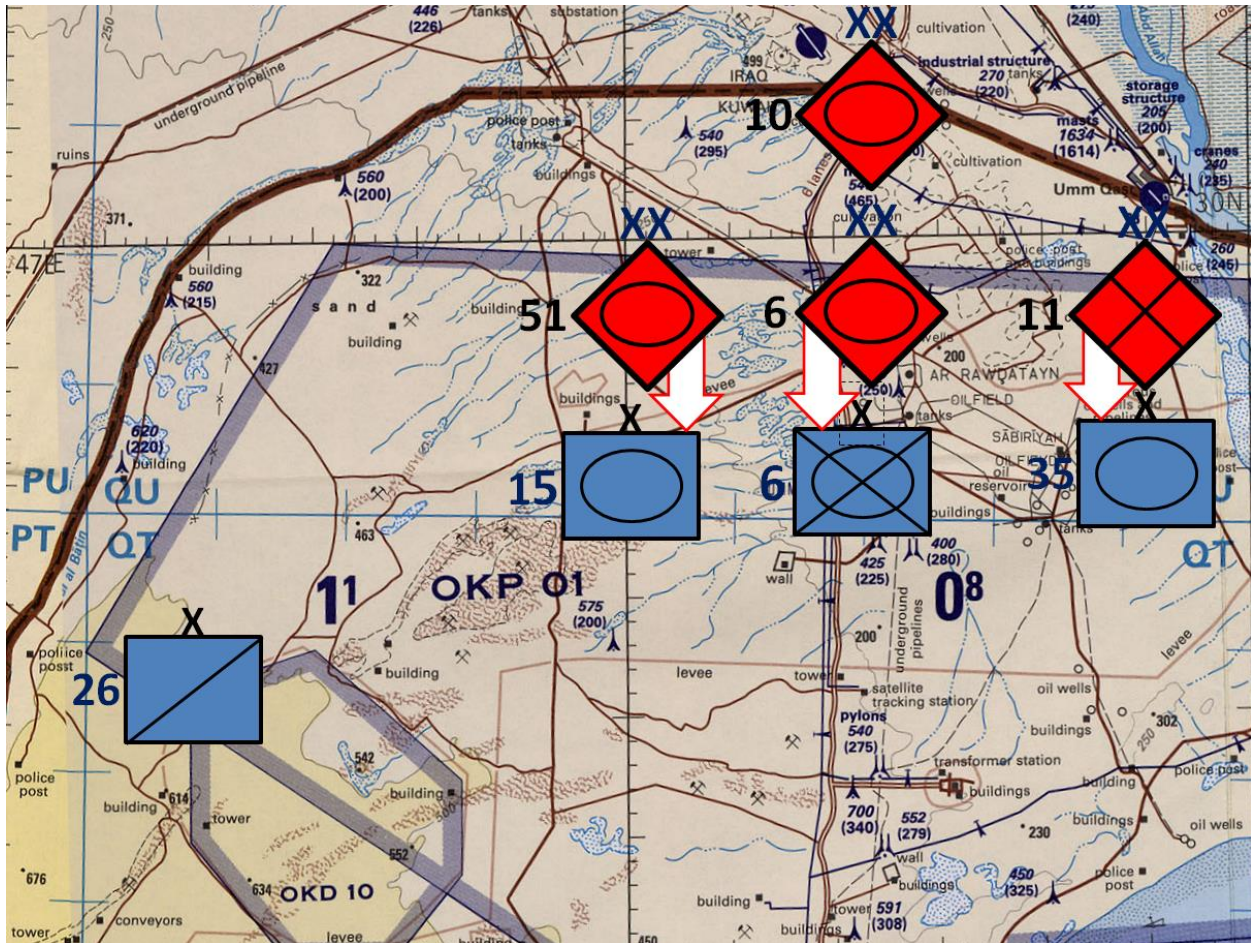
			Posture		Terrain		CEV					
11 ID	63	x	1	x	1	x	1	=	63			
											=	0.4 : 1
35 Arm Bde	121	x	1.2	x	1.05	x	1	=	152			

			Posture		Terrain		CEV					
6 Arm Div	200	x	1	x	1	x	1	=	200			
											=	1.5 : 1
6 Mech Bde	108	x	1.2	x	1.05	x	1	=	136			

			Posture		Terrain		CEV					
51 MID	118	x	1	x	1	x	1	=	118			
											=	0.5 : 1
15 Arm Bde	208	x	1.2	x	1.05	x	1	=	262			

Clearly, the assault on the main Kuwaiti defense positions will take some creative planning. However, all the Iraqis need is a breakthrough in one zone as there is virtually nothing behind it. The IZ 10th Armored Division has so far been held back as an exploitation force. If a normative breakthrough is achieved, the 10th AD will slip through the hole in the KLF lines and it will be game over. If the 10th is forced to assist in the breakthrough, things will be less certain for the Iraqis.

Many Iraqi senior officers attended Soviet academies where they learned CoFM calculations. The norms they would have learned to look for were a division breakthrough zone of 4km for a division and 2km for a brigade. So the question becomes, could they achieve at least one attack zone with a force ratio of at least 3:1 and at least 4km in width?

Find Width of Main Thrust Axis:

$$V \times \left(\frac{S}{P} - \frac{W}{W} \right) = U$$

V	Overall Frontage in area of operations
S	Overall CoF throughout area of operations
P	CoF on Main Thrust Axis
W	Minimum permissible CoF on other axes
U	Frontage of Main Thrust Axis

$$27 \times \left(\frac{0.4}{3.0} - \frac{0.5}{0.5} \right) = \boxed{-1}$$

The negative number circled above indicates that the IZ 11th Inf Div cannot achieve a breakthrough.

Find Width of Main Thrust Axis:

$$V \times \left(\frac{S}{P} - \frac{W}{W} \right) = U$$

V	Overall Frontage in area of operations
S	Overall CoF throughout area of operations
P	CoF on Main Thrust Axis
W	Minimum permissible CoF on other axes
U	Frontage of Main Thrust Axis

$$27 \times \left(\frac{1.5}{4.0} - \frac{0.5}{0.5} \right) = 8$$

Calculations for the IZ 6th Arm Div. Note that it achieves a 4:1 ratio in the breakthrough sector and is twice the necessary width.

Find Width of Main Thrust Axis:

V	$\times$	$\dfrac{S - W}{P - W}$			$=$		U

			Overall Frontage in area of operations
V			Overall Frontage in area of operations
S			Overall CoF throughout area of operations
P			CoF on Main Thrust Axis
W			Minimum permissible CoF on other axes
U			Frontage of Main Thrust Axis

$$27 \quad \times \quad \frac{0.5 - 0.5}{3.0 - 0.5} \quad = \quad \boxed{0}$$

Again, the IZ 51st Mech Div cannot achieve a breakthrough. The best the 51st can do is to make a fixing attack on the KLF 15th Arm Bde and keep them from interfering with the 6th AD's breakthrough.

This constitutes a win for the Iraqis as 6th AD has achieved a breakthrough on twice the frontage required and can pass 10th AD through as an exploitation force. Further, this was done with a superiority of 4:1 as insurance to protect their vital main effort. While the breakthrough frontage may seem somewhat narrow to those with NATO army perspectives, the Iraqi units are somewhat smaller than their Soviet/Russian counterparts. Iraqi doctrine was a mix of east and west, but if they had applied CoFM calculations to this situation, the breakthrough frontage would have seemed somewhat spacious to their eyes.

Feeling somewhat satisfied with my results, I tried several other variations, including one with the KLF 15th Brigade deployed with its ultimate TO&E of Abrams MBTs and Bradley IFVs, and others with equipment substitutions and expansion. However, the most interesting scenario concerned with the training and manning issues within the KLF. I posited that if the Kuwaiti Government instituted a form of UCMJ and could then get its soldiers to show up for training, a 50% troop quality superiority could probably be justified when fighting the Iraqi Regular Army. The Kuwaiti Air Force had received its full compliment of F-18 fighters and its pilots had been trained up to excellent standards by the best trainers the US Navy had to offer. They literally went from zero to the best air force in the Gulf region in the matter of a few short years. Perhaps some good discipline and training would have a similar effect on the KLF.

I set up the battle exactly as I had before, except that I included a 1.5 modifier for the KLF to represent a 50% superiority over the Iraqi Regular Army in training. This, I believed, was not excessive given the mass surrenders by the Regular Army in 1991 and (in retrospect) their non-appearance in 2003. We didn't know until later that Saddam had essentially stripped the RA of useful equipment and soldiers to keep up the Republican Guard. In any event, the overall force ratios looked like this:

			Posture		Terrain		CEV					
IZ III Corps	605	$\times$	1	$\times$	1	$\times$	1	$=$	605			
KLF	463	$\times$	1.3	$\times$	1.05	$\times$	1.5	$=$	948	$=$	0.6 : 1

Starting out, this looks to be a much bigger challenge than in the base case. The covering force battle was still a likely win for the Iraqis, but again, not as easy as before.

			Posture		Terrain		CEV					
11 ID	63	x	1	x	1	x	1	=	63		=	0.8 : 1
3/6 Mech Bde	40	x	1.2	x	1.05	x	1.5	=	76			

			Posture		Terrain		CEV					
6 Arm Div	200	x	1	x	1	x	1	=	200		=	2.6 : 1
2/6 Mech Bde	40	x	1.2	x	1.05	x	1.5	=	76			

			Posture		Terrain		CEV					
51 MID	118	x	1	x	1	x	1	=	118		=	1.5 : 1
1/6 Mech Bde	40	x	1.2	x	1.05	x	1.5	=	76			

The 6th Armored and 51st Mech can still breach the covering force area, albeit on a smaller but still sufficient frontage, than in the base case. However, it's the fight for the KLF's primary defensive positions that will tell the tale.

			Posture		Terrain		CEV					
11 ID	63	x	1	x	1	x	1	=	63		=	0.3 : 1
35 Arm Bde	121	x	1.2	x	1.05	x	1.5	=	228			

The 11th Infantry Division is, not surprisingly, a lost cause and no amount of adjusting frontage can give them any possibility of stopping the KLF's 35th from mounting a counterattack with a 2.3:1 force superiority, generating a 6:1 superiority on a breakthrough frontage of 9km. Or better yet, shifting half its combat power to bolster 6th Mech Bde.

Continuing with the IZ 6th Armored Div/KLF 6th Mech Brigade's sector, the Iraqi force can generate a 4:1 ratio over the minimum required 4km. As in the base case, a 4:1 ratio was chosen to add a pad for insurance on the main effort axis. However, if the Kuwaiti 35th Brigade extended its left-flank boundary far enough to the west to allow half of its combat power to defend against the 6th Arm Div, as suggested, above.

			Posture		Terrain		CEV					
6 Arm Div	200	x	1	x	1	x	1	=	200		=	0.6 : 1
6 Mech Bde (+)	163	x	1.2	x	1.05	x	1.5	=	308			

Find Width of Main Thrust Axis:

							V	Overall Frontage in area of operations	=	27 km
		S	-	W			S	Overall CoF throughout area of operations	=	0.6
V	x	P	-	W	=	U	P	CoF on Main Thrust Axis	=	3.0
							W	Minimum permissible CoF on other axes	=	0.5
		0.6	-	0.5			U	Frontage of Main Thrust Axis		
27	x	3.0	-	0.5	=	1				

As can be seen, this case drives the breakthrough frontage to an insufficient 1km, even while only requiring a 3:1 superiority. With the IZ 51st Mech Div starting out with a .3:1 inferiority opposite the KLF 15th Armored, it's clear that they won't be able to stop a shift of forces to eliminate any possibility of a breakthrough in the center sector, or better yet, a left-hook counterattack at a superiority of 6:1 with the possibility of rolling up IZ III Corps in its entirety.

This seems to prove fairly definitively that III Corps has no chance of winning the battle for the KLF's main line of resistance without reinforcement from IV Corps' 10th Armored Division. Even at that, the Kuwaitis could likely make an orderly withdrawal to positions west of Ali al Salem Air Base extending to Wadi al Batin, where the terrain is still favorable for armored warfare, while leaving small forces to block any advance down Kuwait City-Safwan highway (the infamous "highway of death") where the road comes down off the Jal Az-Zor escarpment, and the coastal road at the base of the escarpment.
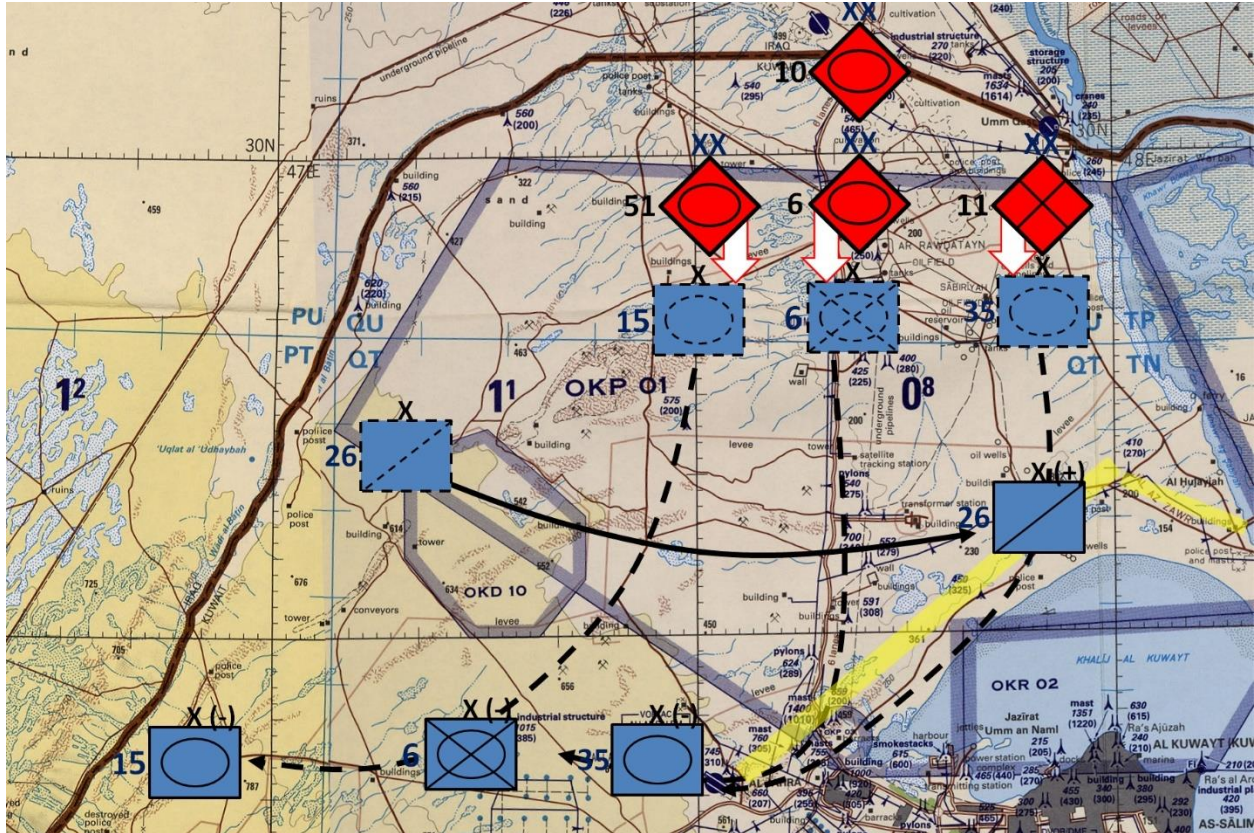
The KLF redeploys to its 2nd MLR. The 26th Bde picks up reinforcements from the other three brigades and picks up the mission to delay or block any Iraqi attempt to come down off the Jal Az-Zor escarpment (approximate location shaded in yellow).

None of this analysis has included the role of the Kuwaiti Air Force. Without turning this into an air forces analysis piece, 40 well-flown F-18s would have made quick work of the Iraqi Air Force. These fighters and the KAF's 16 Apache Longbow attack helicopters would have added a powerful layer of interdiction and Close Air Support firepower to the mix.

Satisfied that I was onto something with this initial cut, I wanted to involve the Iraqi senior analyst and others in the process. I had seen the pitfalls of doing a study like this with no one to play Red Force or even give advice on how the other side would really play in such a scenario. However, my pitch fell flat: no one could conceive of a situation in which the Republican Guard would not lead such an operation, and that rendered this study moot. No matter how I argued for the need to study this scenario, or some of the interesting things I had pulled from the initial run, I got no interest. So, the project collected dust in a filing cabinet.

All was not lost. I had learned a great deal on how to do such a project and some of the information did make it into a report for which I received a handwritten note of commendation from Defense Secretary William Perry. I had wanted to introduce wargaming into the analytical process as a tool for those who saw a use for it. We had some great success in training new analysts with wargames and earned high praise from students who didn't understand how military forces worked until they had to learn their force capabilities and make decisions of consequence in a dynamic simulation. However, when those same analysts graduated and dispersed to their various desks, most never gave another thought to wargaming. I suspect they didn't have confidence in the utility of our simulations in the real world where lives are on the line. That's on me — I obviously did not explain sufficiently where this model came from and how well it had performed in real situations.

Still, if this effort was to get anywhere, I needed management buy-in. And for a brief moment at the end of the 1990s, I thought I had that. But that's a topic for another post.