Iraqi special operations forces move through the Old City section of Mosul, Iraq, June 2017 after intense fighting with entrenched Islamic State fighters. The bloody and costly battle for Mosul highlighted aspects of modern urban warfare that will likely be features of foreseeable future urban operations including jihadist extremists who are willing to act as suicide bombers and the increasing use of drones as tools for terrorism. (Photo by Vera Mironova)

Adaptation and Innovation with an Urban Twist
Changes to Suicide Tactics in the Battle for Mosul

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One of the growing trends cited by a 2017 National Intelligence Council report is the increased urbanization of the global population.[1] In an attempt to prepare the force for this future operating environment, the U.S. Army leadership is shifting its focus to improving capabilities to operate in urban settings. With one eye on the future, it would be smart to keep the other on the recent coalition-backed effort to liberate Mosul, Iraq's second largest city, which serves as a valuable window into the strategic, operational, and tactical aspects of modern urban warfare. While the Islamic State (IS) may not be the prototypical foe Army leaders expect to fight in the future, this jihadist group's dogged defense of the city features many tactics that may be copied well into the future by other adversaries.

Of the many innovations observed during the Mosul campaign, an important one to highlight is IS's industrial production and utilization of suicide bombers. For context, in 2016, the group employed over one thousand bombers in three countries.[2] Through experience in Afghanistan and Iraq, U.S. Army soldiers and leaders have become quite familiar with the dangers of suicide bombing and have developed effective techniques to defend against this tactic over time. Yet, like most tactics, adversary use of suicide bombings has continued to evolve rapidly in the battlefield proving grounds of Syria and Iraq.

With the convergence of global urbanization trends and outbreaks of urban conflict, the increased use of suicide bombers in largely conventional fights to liberate Iraqi and Syrian cities provides a valuable case study for examining the basic evolution of whom executes IS suicide bombings, IS targeting methodology, and the diverse supply chain that sustains such a prolific bombing campaign.

Past as Prologue

IS's use of suicide bombers dates back to its very first campaign in the summer of 2003, when it was known as Abu Musab al-Zarqawi's group, or Tawhid wal-Jihad.[3] One operation featured Zarqawi's own father-in-law, Yassin Jarad, who detonated a truck full of explosives in a crowd near the Imam Ali Mosque in Najaf, Iraq, killing Ayatollah Muhammad Bakr al-Hakim, the leader of the largest Shiite political party, along with scores of others.[4] Jarad was a foreign national from Jordan who had been with Zarqawi since Afghanistan. Like Jarad,

many of the early suicide bombers of the IS movement (known as al-Qaida in Iraq [AQI] after 2004, and the Islamic State of Iraq after 2006) were also foreign to Iraq; however, most had not been with the group very long. Researchers from the Combating Terrorism Center at West Point used captured personnel records of the movement from 2006 to show that the majority (56 percent) of foreign fighters entering Iraq volunteered to conduct suicide operations, compared to those who chose instead to be traditional fighters.[5]

Foreigners were not the only ones executing suicide operations in Iraq from 2003 to 2006. But, since the majority of the attackers were unnamed, it is difficult to determine the actual breakdown by nationality.[6] According to a 2005 *Time* magazine interview of a prospective bomber from Fallujah, Iraqi suicide bombers were coming into their own that year, so much so that Zarqawi created a new AQI brigade to manage these volunteers.[7] The group recruited heavily among Iraqis during this period and eventually became dominated by former members of ideologically similar Iraqi insurgent groups.[8]

Research into the types of targets indicates that AQI (and its later designations) consistently targeted Iraqi security forces and civilians over coalition units and bases.[9] While individual foreign fighters and even local Iraqis volunteered to strike out at the occupation, Zarqawi and his successors carefully re-vectored these "smart bombs" toward more strategically impactful targets—namely, the Iraqi security forces who would be in place after coalition forces eventually left.[10] The movement used truck bombs 70 percent of the time in an effort to maximize casualties and damage, particularly against hardened targets, and most of the attacks (52 percent through 2006) occurred in Baghdad.[11] The strategic logic of weakening

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indigenous forces first worked very well for the group, until the coalition and its new Sunni tribal partners (formerly anticoalition insurgents themselves) defeated the Islamic State of Iraq in 2007–2008.[12]

The initial military defeat influenced IS to make several adjustments to its tactic of suicide bombing. Without a sympathetic population to safely harbor the foreign fighters who made up the majority of the early suicide bomber candidates, the IS movement struggled to sustain a consistent campaign. One thirty-eight page after-action review written by a jihadist commander points out the difficulties of operating in Anbar Province after 2007, especially with foreigners subject to easy identification by hostile local citizens.[13] This realization has been a major impetus for IS to control and administer territory as a de facto government, which allows it to secure both the important aspects of its state-building project and control the immigrants and locals who are actively involved in expanding the influence of its ideology.

In the interim period between the comprehensive defeat of IS in 2008 and its return to significance in 2013, the group heavily relied on suicide bombing as a tactic to prove its relevance to supporters and prospective recruits alike. Eschewing foreign fighters, the group relied on locals to perform a less frequent, but still significant, campaign of suicide bombings against important Sunni tribal leaders allied with the government as well as against key government ministries in the capital.[14]

The added focus on Sunni targets, in addition to Iraqi security forces and Shia pilgrims, should come as no surprise for a group whose long-term strategy is probably best described by the aptly titled *The Management of Savagery: The Most Critical Stage Through Which the Umma Will Pass*, which was written by a non-group member yet acknowledged by the group as largely accurate.[15] Since the summer of 2003, insurgents targeted Iraqis with suicide bombings almost 83 percent of the time, and these attacks caused 19 percent of all Iraqi civilian casualties by 2010.[16] In 2010 there were more than seventy-five suicide bombings in Iraq; while down from 353 in 2007, only Afghanistan had more that year.[17]

A Modern Caliphate of Questionable Methodology

There are many factors that facilitated the return of IS. However, among such factors, the disintegration of Syria has been an especially significant one. Foreign fighters, inspired by the increasingly sectarian tones of the Syrian civil war and fueled by the perception of massive Sunni persecution by the Assad regime, began to arrive again in Syria in large numbers, facilitated once again by the creation of a hospitable location to shelter fighters. Although suicide bombings began to increase dramatically in both Syria and Iraq again, there were indications that by 2014 the majority of foreign fighters intended to work or live in the caliphate, or even fight on the front lines, and were not interested in conducting suicide operations. A 2016 analysis of IS captured records found that in contrast with the 2006 time period, only 11 percent of immigrants volunteered for suicide operations of any kind.[18]

This dynamic, whatever the cause, is reflected in who volunteers for suicide bombings and how IS directs them in its operational planning. Researcher Charlie Winter analyzed one year's worth (late 2015 to late 2016) of suicide bombings (923) and concluded that these attacks were "primarily perpetrated by *local* operatives against *military* targets … a tactical shift with strategic implications that will change the insurgent and terrorist landscape for years to come."[19]

According to the analysis, 76 percent of all suicide operations took place in Iraq as part of a coordinated counterattack against the effort to liberate major cities, with a surge capability of fifty-eight suicide bombings in one week alone during the Mosul campaign.[20] In contrast, this corresponds closely to the highest *monthly* total (in early 2007) during the coalition surge campaign.[21] Examining the entire population of IS suicide bombings, 70 percent were truck or up-armored vehicle bombs, and foreigners perpetrated just 20 percent of all attacks.[22] Military targets were hit 84 percent of the time, and these were often part of a larger series, or were a wave of bombings in limited offensive operations (Ramadi, 2015) or counterattacks in urban areas (Mosul, 2016–2017).[23]

Therefore, the analysis indicated a significant change in the tactics and operational execution of suicide operations from previous practices. The key factor resulting in the change was a new emphasis on IS seeking to control territory for significant periods of time.

To peel back further some of the factors behind this evolution, we looked deeper into human aspects of recruiting and managing suicide bombers, as well

Islamic State (IS) militants used drones, such as the one shown in this IS-released photo, with limited success, to attack civilians in Mosul during the battle for that city in 2017. An 18 February 2017 drone attack on the popular market Hay al-Intsar killed three and wounded ten civilians. The authors of this article suggest that drones may gradually replace suicide bombers as weapons of terror as global jihadist forces gain experience and increase their sophistication in drone use. (Photo courtesy of Iraqi News)

as the logistics of sustaining this industrial capacity of launching human bombs.

The Harvesting of Human Bombs

As of 2016, IS draws from two categories of suicide operators: volunteers and impressed fighters, and civilians. The majority are volunteers and feature prominently in most propaganda videos—delivering farewell speeches and then driving off in their up-armored vehicle fitted out with a large improvised explosive device. Later in these videos, an explosion is shown, accompanied with promises of future victory due to the operators' sacrifice. In the early days of the IS movement, volunteers were strictly segregated from the regular fighters, and their interaction limited to serving as a logistical supply item—often matched with the vehicle carrying the improvised explosive device minutes before their final act. In contrast, today's volunteers are often experienced fighters familiar with the organizational values of IS and are willing to sacrifice for its collective goals.[24]

While IS has thoughtfully avoided using experienced fighters in the past, the establishment of the caliphate and the intervention of countries such as France and the United States are part of a high-risk strategy that now requires maximum sacrifice. As such, the group has invested in building up the skills of its welders and mechanics in order to up-armor civilian vehicles now that its supply of captured military vehicles is low. Originally making vehicles that looked like something out of the *Mad Max* series, IS designers now produce vehicles that are subtly armored or disguised in order to minimize detection between launch and detonation in order to maximize effects on the target.[25]

The strategic impact of large suicide campaigns has in the past been reliant upon the human element—both operators and leaders—as well as equipment. The correlation of manpower to equipment means that the better equipment used, the less qualified the operator may be and vice versa. On one hand, the group's objective is to increase the

As demonstrated in this December 2016 photo, armor added to a vehicle is camouflaged by painting it the same color as the rest of vehicle. This was the first stage of a three-stage Islamic State process to prepare vehicles for use as suicide vehicle-borne improvised explosive devices against Iraqi forces in Eastern Mosul, Iraq. (Photo by Hugo Kaaman)

quality of suicide bombers and equipment used for the missions. On the other, since human operators for suicide missions are a finite resource, the group needs to try to increase the use of expendable members for this mission and limit the sacrifice of more valuable members. This leads to the question, how can IS achieve these goals?

A Unique Human Resource Management Problem

A reliance on qualified, dedicated volunteers for such a prolific campaign is going to be a limiting factor in an industrial suicide bombing campaign regardless of the efficacy of any local IS recruiting efforts. This problem has been compounded by the coalition's reduction of IS's border access from Turkey, which squeezed the flow of foreign fighters into the so-called caliphate. While the control of territory has been the key driver of IS end strength, IS has been reluctant to tap into the pool of dedicated local fighters because they are needed to fight the multi-front war that IS has instigated against all of its neighbors, as well as against interventionists. IS, therefore, has had

a strong motive to modify its suicide-bomber human resourcing policies.

An interview with a former IS fighter established that IS commanders in the Mosul campaign preferred dedicated, but low-ranking, members with no special skills for suicide bomber employment. However, once the tempo and pace of the Mosul battle accelerated, the group began to use more coercive means to produce operators for its suicide machinery. One pool of candidates IS mined was their internally disciplined and subsequently incarcerated fighters. It seems logical that by sending a person who is a liability or continually fails to adhere to in-group values, the group is killing two birds with one stone by utilizing the problem fighters in a suicide mission. Accordingly, when IS fighters were convicted of a serious crime, some were allegedly given two

options: execution or the opportunity to "volunteer" for a suicide mission with the potential for achieving spiritual redemption and possibly even lasting worldly fame in a martyrdom video. According to the defector mentioned above, the majority of people in this position chose the suicide mission, either out of a desire to repent and help the group, or because they saw in such an assignment the slim possibility for escape.[26]

One theoretical problem with using reluctant suicide bombers is that they would require more supervision and probably be less successful than true volunteers. In this case, this type of shirking would waste valuable organizational resources; this is a particular concern when using local fighters who could easily escape during a mission and then hide amongst families or tribes. More importantly, according to one Iraqi legal authority we spoke to, these fighters realize that if they surrender to Iraqi authorities, according to the law, they can receive shorter prison sentences if they are low-level members or have been forced to join IS. There is also the possibility that due to the extensive corruption within the legal system, they will be able to buy their way out of prison after they are sentenced.[27]

An example of this dynamic happened in October 2016, when an Iraqi woman working within the IS religious police—the *hisbah*—was involuntarily sent to infiltrate enemy lines near Hawija while wearing an explosive belt. According to Iraqi soldiers who witnessed the incident, the woman threw away her belt prior to reaching her target and tried to blend in with the civilians. As a member of the hisbah working among the population of Mosul in a policing role, she was well-known to some of the civilians who then notified the soldiers at the checkpoint, leading to her arrest.[28]

All of these factors make forced, local suicide bombers much less effective than foreigners. Foreign fighters believe they have no other option than to execute the mission, making them much more effective and trusted bombers. Were these bombers to surrender, they would likely receive capital punishment, and because they would be killed either way, they perceive it as better to execute the mission so their deaths are not in vain. In contrast, "Iraqi militants mostly throw away their explosive belts and try to melt away, but I have never seen a story about foreign fighter doing the same. They usually blow themselves up," said Mudhhar Hamad, an officer from Hashd al-Ashayari, the Arab Sunni militia in Hawija.[29]

In addition to normal recruiting from the ranks, IS's control of territory produced a large pool of local civilians to solicit, or if necessary, coerce into conducting suicide operations. These were people, possibly women and children, who could blend in with refugees and internally displaced persons to get deep inside enemy territory. Although these proved to be very effective bombers in many cases, IS's utilization of civilians does have some limitations. Though similar to the problem of using forced group members, using coerced civilians leads to a higher risk of mission failure due to a lack of discipline, training, and experience. As locals, they have the opportunity to abandon their missions and run away, with low chances of IS prosecution if caught. So how does IS ensure these suicide candidates complete their missions? They sometimes do so by using unorthodox methods such as drugging the operators, which prevents them from thinking and compels them to lose whatever aversion they might have to executing the mission.

In the fall of 2016, a sixteen-year-old boy was found asleep wearing a suicide belt near Hawija. The boy stated that an IS leader gave him an energy pill to help him resist hunger and thirst on the mission, but instead, it incapacitated him. According to his Iraqi captors, he was discovered and jailed, and then woke up some time later with little knowledge of what happened.[30]

Equipment

Since the group's growing manpower issues are a limiting factor on sustaining the intensity of its suicide bombing campaign, IS has sought to compensate by increasing the quality of equipment used to increase chances of mission success. The urban environment in Mosul also required some serious adjustments to earlier IS campaigns post-2014. It was no longer enough to take a civilian sedan, load it with explosives, marry it up with a driver, and then drive it to a target. Several problems emerged with this scenario. IS found that unimproved cars could not reach their intended targets due to bad roads, roadblocks, and targeting by a much more aware Iraqi security force who developed better counters to suicide car and truck bombs. Since such failures are extremely costly for an armed group, the group adapted.

First, they gravitated toward four-wheel-drive cars instead of sedans, as such cars are more likely to navigate the obstacles in the urban combat environment. Second,

they continued their use of improvised armor to keep them from being easily neutralized by a counterterrorism force. Armor was typically added to the front of the car (with a window left to see) in order to deflect incoming direct fire. Metal plates were are also typically added to the wheel wells to protect them from incoming rounds. However, in an effort to camouflage the improvements, IS used paint and other visual modifications to make these cars look normal, especially from the air. Third, the group worked on individual modifications for vehicles to enable disabled fighters to operate the vehicles against incoming fire until reaching the designated targets.[31] In the end, IS control of territory facilitated the development of an in-house capability for these modifications, which were completed close enough to the front lines to allow unfettered employment of these vehicles.

The Future of the Suicide Mission

As is common with extended periods of combat, the speed with which tactics adapt is dependent on the quality of forces, amount of experience, and prevailing culture of innovation that allows the development of effective counters. Regarding the tactic of using suicide bombers in urban combat, IS made an extensive effort to adapt its tactics to achieve some operational results that matched its tremendous investment of human resources and capital. While at first suicide vehicles were effective in both rural and urban settings, the increase in surveillance techniques caused overt suicide vehicles to lose their effectiveness in rural areas due to the greater possibilities of aerial detection. Subsequently, IS was compelled to limit suicide operations to within a very short range due to the high risk of early detection.

Because the main goal was to reduce the number of operator casualties while increasing the success of missions, IS experimented with automation to eventually remove humans from suicide missions. One example of such attempted transformation was the increased use of remotely operated and weaponized drones.

Currently, in those areas remaining under IS control, the use of such drones has not been effective enough to replace the tactic of suicide bombers completely, but the use of remotely piloted drones as bombs could become the dominant reality in a very short period of time. Several problems currently inhibit use of this relatively new weapon. First, there is a current shortage of drones for them to be used in a disposable manner. Drones have been used to drop small amounts of explosives and return to base, but drones are mainly prioritized for intelligence, surveillance, and reconnaissance purposes. Second, the drones do not yet have the capability to carry the same amount of explosives as cars. Once IS or other armed groups are able to overcome these limitations, we could expect to see drones employed as guided missiles that can directly hit an important target, such as a high-ranking commander, with a substantial amount of killing power.

Conclusion

For those charged with thinking about adaptations for future warfare, the battle of Mosul is an excellent opportunity to catch glimpses of the emerging character of future urban combat. A dominant feature of the fight for Mosul was the use of suicide bombers. However, use of suicide bombers has always been an asymmetric response to one side's lack of precision weapons in modern warfare, and once a suitable replacement is developed, we can expect traditional human suicide bombing to recede as an effective tool—despite its serving as a signaling function for the ideology of a cause by demonstrating the determination and sacrifice by select fighters. Instead, the development of large and capable suicidal drones needs to be considered as the next probable successor to suicide bombing and an indication of the increased lethality of the battlefield resulting from applications of new, cheap, and available technologies. ■

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