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FROM THE EDITOR

After a respite from mass-casualty terrorism for more than a decade, the United Kingdom this past spring suffered three such attacks in the space of just 73 days, making clear it faces an unprecedented security challenge from jihadi terrorism. In our cover article, Raffaello Pantucci outlines what investigations have revealed so far about the March attack on Westminster Bridge, the bombing at a pop concert in Manchester in May, and the June attack on London Bridge and Borough Market. The early indications are that the Westminster attacker, Khalid Masood, had no contact with the Islamic State and the Manchester and London Bridge attackers were, at most, loosely connected to the group. The current threat environment, Pantucci writes, continues to be mostly made up of individuals and smaller scattered cells planning lower-tech attacks with very short planning and operational cycles—sometimes remotely guided by the Islamic State—rather than cells trained and dispatched by the Islamic State to launch large-scale, Paris-type attacks, but this could change as more British Islamic State recruits return home.

Our interview this month is with Edward You, a Supervisory Special Agent in the Biological Countermeasures Unit in the FBI's Weapons of Mass Destruction Directorate. While the full liberation of Mosul last month effectively ended the Islamic State's caliphate pretensions, Michael Knights warns the Islamic State and other jihadis are already bouncing back in several parts of Iraq and more strongly and quickly in areas where the security forces are either not strong enough or not politically flexible enough to activate the population as a source of resistance. As the Islamic State transitions from administering territory to a renewed campaign of terrorism and insurgency, Charlie Winter and Devorah Margolin examine the Islamic State's apparent lifting of its moratorium on using women as suicide bombers. In a commentary, Aaron Brantly argues that creating back-doors in encryption, or banning it, would create significant societal costs without stopping terrorists from accessing the technology.

Paul Cruickshank, *Editor in Chief*

Britain on Alert: The Attacks in London and Manchester and the Evolving Threat

By Raffaello Pantucci

After a respite from mass-casualty terrorism for more than a decade, thus far in 2017 the United Kingdom has suffered three such attacks and a higher tempo of jihadi terrorist plotting than ever before. Absent from the threat picture so far are any Paris-style plots in which the Islamic State has dispatched operatives to launch attacks in the United Kingdom. At this early stage of the investigations, it appears that the Westminster attacker had no contact with the Islamic State and that the Manchester and London Bridge attackers were at most loosely connected to the group. The current threat environment is mostly made up of individuals and smaller scattered cells planning lower-tech attacks with very short planning and operational cycles—sometimes remotely guided by the Islamic State—rather than cells trained and dispatched by the group. But this could change as more British Islamic State recruits return home. With over 20,000 British nationals and residents subject to counterterrorism investigations since 9/11, a growing number of 'frustrated travelers,' and a complex and unpredictable set of threats, the United Kingdom faces an unprecedented security challenge.

I t has been a difficult year so far in the United Kingdom. After a period of relative stability, the United Kingdom has abruptly faced a period of deep political turmoil and a series of terrorist strikes that killed 36 people. While the full story around the terrorist plots that rocked the country during the first half of the year is not yet entirely clear—with multiple public and confidential reviews currently underway—the series of cases has led to deep introspection about how the United Kingdom manages the risk posed by the growing number of radicalized individuals at home. In July, Commissioner of the Metropolitan Police Cressida Dick stated that "since March this year, the [threat] tempo has changed. What we are seeing is now being described by the experts as a 'shift' in threat, not a spike."[1]

This article argues this shift has to be understood as a permanent adjustment in the threat. There has been significant continuity in recent years in the nature of the threat faced by the United Kingdom, with a noticeable move away from large-scale plots to smaller scattered cells, with the tempo of plotting increasing no-

ticeably. The article builds on a previous article in this publication in March 2016, which laid out the United Kingdom's threat picture through analysis of a series of disrupted terror plots.[2] The conclusion then was that "the public threat picture has been dominated by lone-actor plots"[3] rather than more ambitious plots directed by the Islamic State like the Paris and Brussels attacks, an assessment that has not been challenged by the attacks in London and Manchester this year. Although only tentative conclusions can be made at this stage, the information that has come to light suggests these plots were significantly less ambitious and complex than some of the conspiracies seen in continental Europe and were carried out by men with at most loose connections to the Islamic State.

This article first outlines what is now known about the March 2017 Westminster Bridge attack, the May 2017 Manchester bombing, and the June 2017 attack on London Bridge and Borough Market. It then assesses what these attacks and other thwarted plots reveal about the broader threat picture in the United Kingdom and the challenges faced by security services.

The return of terrorism to the headlines in the United Kingdom this year was all too predictable. After a period of almost three years with the threat level at the second-highest level of 'severe,' British authorities had long warned that an attack was highly likely. Disruptions took place regularly. In early March 2017, the Metropolitan Police Service's Assistant Commissioner for Specialist Operations Mark Rowley, who is also the National Police Chiefs' Council (NPCC) lead for counterterrorism, stated that since the murder of Lee Rigby in May 2013, authorities had disrupted 13 terrorist plots. In defining the nature of the plots, Rowley stated "some of them have been more sophisticated [in their] planning looking to attack public spaces, or police offices or the military, not that dissimilar to some of the attacks we have seen in Belgium and France and elsewhere. There is a whole range from the simple to the complicated."[4] This built on comments by then-Prime Minister David Cameron in the wake of the Paris attacks of 2015 in which he stated that agencies had disrupted at least seven plots in the previous six months, "albeit attacks planned on a smaller scale."[5]

The Westminster Bridge Attack

Notwithstanding this tempo of disruptions and public statements about the terrorist menace, Khalid Masood's attack on Parliament on March 22, 2017, still shocked the British public. Using a Hyundai Tucson SUV rented in Birmingham a day earlier,[6] Masood drove through the crowds of mostly tourists crossing Westminster Bridge at 2.40 PM. Hitting numerous pedestrians and knocking some into the river, he drove into the gates in front of the Houses of Parliament and then ran at a police officer standing guard, stabbing him with a knife. Masood was then shot dead by the close protection team of Defence Secretary Michael Fallon, who happened to be leaving Parliament at that moment.[7]

In the wake of the attack, which killed five people, authorities

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undertook a number of arrests near locations where Masood had lived, detaining 12 people in total. All were subsequently released.[8] Born Adrian Russell Elms, Masood was a troubled 52-year-old who had lived an itinerant life, married three times, and had four children by two different women. He appears to have converted in prison while serving time for assault.[9] He was twice incarcerated and arrested numerous other times for incidents involving attacking others. His case was of such concern to Sussex Police that in 2009, they filed a report highlighting the escalating nature of his violent behavior.[10]

In addition, Masood had featured in counterterrorism investigations. Prime Minister Theresa May confirmed that he had surfaced on the fringes of previous cases, stating "he was once investigated by MI5 in relation to concerns about violent extremism. He was a peripheral figure. The case is historic. He is not part of the current intelligence picture."[11] He was investigated after his telephone number was found among the contacts of a member of a cell of individuals from Luton who were jailed in 2013 for planning to bomb an Army barracks.[12] But he was not a priority of the investigation, and greater attention has been placed on his further radicalization more recently in Birmingham.[13]

Nevertheless, there has been little evidence produced that Masood was linked to any other co-conspirators or that he had conducted his assault with any external direction. He sent a WhatsApp message shortly before his assault reportedly stating his attack was a response to Western interventions in the Middle East, but the person he sent it to was cleared by authorities of any prior knowledge of the attack or culpability.[14] A claim issued by the Islamic State in the wake of the attack was also dismissed as it showed no evidence of being anything but opportunistic. The group has praised Masood in subsequent publications, including quite specific incitement to people to emulate his attack, but the group has never demonstrated any access to information pertaining to him that was not already in the public domain. Authorities have concluded that Masood most likely acted alone and that the full extent of his motivations may never be known.[15] As Neil Basu, NPCC's senior national coordinator for counterterrorism, put it, while the police "found no evidence of an association with Islamic State or al-Qa`ida, there is clearly an interest in jihad."[16] While it is unlikely that Masood was completely isolated, the lack of any subsequent arrests or any charges issued as well as some fairly telling statements by police that his motivations may never be known highlights that, for authorities, the case is largely closed.

The Manchester Bombing

The contrast between the Westminster attack and the bombing exactly two months later on May 22 in Manchester by Salman Abedi is stark. Using a device that he appears to have constructed himself in Manchester using tools that are publicly available,[17] Salman Abedi, a 22-year-old British national of Libyan descent, walked into a crowd of families and children as they left an Ariana Grande concert and detonated a well-built bomb made of TATP and packed with shrapnel.[18] Killing himself and 22 others, Abedi's attack immediately sparked something of a panic among U.K. authorities. Concerned about the sophisticated nature of the device and the fact that Abedi was a known figure with deep extremist contacts, counterterrorism agencies immediately feared that a bomb maker might be on the loose. A wide net was cast, and the terrorist threat level was raised by the Joint Terrorism Analysis Center (JTAC) to its highest level,

'critical,' meaning an "attack is expected imminently."[19]

Nevertheless, while over 20 arrests were carried out, no charges have been issued. In early July, Greater Manchester Police held a press conference at which they highlighted that while they believed Abedi may not have acted alone, he was not part of a larger network. "We don't have evidence of a large network. We do, however, suspect others were either aware [of] or complicit in the knowledge of this attack ... We do believe that there are other people potentially involved in this ... further arrests are possible," Detective Chief Superintendent Russ Jackson, head of the North-West Counter Terrorism Unit (NWCTU), stated.[20]

Abedi is reported to have had significant connections in radical circles in Manchester. Many of Abedi's links tie back to the community of young men from the city going to fight in Syria. He reportedly visited wheelchair-bound (following injuries sustained during his involvement in the 2011 uprising in Libya) Abdal Raouf Abdallah, another Libyan-British national, in jail a number of times in early 2017. Abdallah had been jailed for his role in facilitating the travel of others to Syria.[21] He was also reportedly in close contact with Raphael Hostey, a prominent British Islamic State fighter from nearby in Manchester, who used the kunya Abu Qaqaa and was the sponsor for numerous Britons who joined the group.[22]

It is, however, Abedi's links in Libya that have raised the most scrutiny. His father, Ramadan Abedi, a prominent onetime member of the now-defunct Libyan Islamic Fighting Group (LIFG), reportedly returned to fight—bringing his son Salman with him—in the revolution that overtook the country in 2011.[23] A long-time and committed member of the LIFG, he was well-connected in the community around the jihadi group and was also reportedly seen in Bosnia a number of times during the civil war in that country in the 1990s.[24]

British authorities have made clear they wish to question Abedi's brother Hashem.[25] On May 24, 2017, the Special Deterrence Force, a Tripoli-based militia under the nominal control of the Interior Ministry, released a statement saying it had detained Abedi's father and brother Hashem. The militia claimed that Hashem had confessed while in detention that both he and Salman were members of the Islamic State and that Hashem had admitted he had been in the United Kingdom during the planning phase of the attack, had been aware of the plot, and had been "constantly in touch" with his brother. Hashem also reportedly admitted to helping to purchase the bomb components. On May 25, a spokesperson for the militia stated on Libyan television that the two brothers had been in contact by phone just 15 minutes before the bombing.[26] Questions remain over these confessions, including over whether they were made under duress. Hashem is still in Libya and has not been charged in the United Kingdom. Analysis of his social media accounts show he was in contact with Hostey's brother.[27]

According to the Greater Manchester Police, the two Abedi brothers both left for Libya on April 15, with Salman returning to the United Kingdom on May 18, just four days before the bombing. It was the latest in a number of trips Abedi had made back and forth to Libya. Investigators believe bomb-making materials were obtained *before* the trip to Libya and stored in a car and that when Salman Abedi returned to Manchester, he purchased other materials for the device including nuts as shrapnel and quickly assembled the bomb.[28] The high volatility of TATP—the quick speed at which it evaporates or sublimes and thus becomes useless as an explosive—meant he almost certainly made the explosive substance in the days

Emergency response vehicles parked outside the scene of the terror attack in Manchester, England, on May 23, 2017. (Paul Ellis/AFP/Getty Images)

between his return from Libya and the attack, sources told CNN.[29]

It remains unclear whether Abedi received training while in Libya. Abedi appeared to be single-mindedly focused on building the bomb when he returned to the United Kingdom, suggesting it is possible he received training or final instructions on his last trip.

Similar to Masood's attack, the Islamic State issued a statement praising Abedi's act, but it demonstrated no proof of any prior knowledge.[30] Notwithstanding the alleged declarations by his brother to the Tripoli militia, had Salman been closely linked to the Islamic State in Libya, it would be surprising that he would not have recorded a martyrdom video and left it with the group, or least some photographic evidence showing his connections. At the same time, investigators continue to believe that he had some greater degree of links to terrorist groups abroad than Masood. However, the exact nature of these links remains unclear.

The London Bridge and Borough Market Attack

On June 3, 2017, less than two weeks after the Manchester bombing, London was struck once again. On a balmy evening, Khuram Butt, Rachid Redouane, and Youssef Zaghba drove a van they had rented earlier in the afternoon into the Saturday night crowds gathered near London Bridge. Ramming the van into a fence adjacent to the pavement near the end of the bridge, the trio then leapt out of the vehicle and started attacking passersby in the adjoining Borough Market area with long knives they had bound to their wrists with leather straps. They wore plastic bottles covered in black tape wrapped around their bodies to give the impression of wearing suicide vests and had a number of Molotov cocktails made up in the van.[31] Within eight minutes of police receiving the call, armed response officers arrived and shot and killed the three men, though not before eight revelers had been killed and 48 injured.[32]

One of the attackers was almost immediately identified as a figure well-known to the security services. Butt, who authorities believe was the ringleader of the group, was a prominent and active member of the al Muhajiroun network of extremists that has been at the center of the United Kingdom's violent Islamist terrorist threat for the past two decades. Butt himself had been repeatedly featured at the center of investigations and was most recently on bail for 'low-level' fraud for which he was not ultimately going to be prosecuted.[33] More embarrassingly for British authorities, he had been featured in a widely viewed documentary called *The Jihadis Next Door*, which followed a number of prominent al Muhajiroun members, including Siddartha Dhar, also known as Abu Rumaysah (who fled to Syria with his family soon after filming and was believed to have become a new "Jihadi John" figure in Islamic State films[34]), as well as others who have been convicted of a variety of terrorism and extremism charges.[35]

The other two were less well known to British investigators, though it rapidly emerged that the Moroccan-Italian Zaghba had been flagged to British authorities through a European intelligence sharing system as someone of concern to Italian authorities after he was stopped at Bologna airport in March 2016 on his way to Turkey. Carrying a small bag, little money, a telephone with Islamic State videos on it, and a one-way ticket, he raised suspicions by telling authorities that he wanted to head to Syria.[36] Nevertheless, he was released after being turned back. He subsequently traveled onto his native Morocco and then ultimately London, where he took on part-time work in the services industry.[37] The third attacker, Redouane, appears to have led an equally peripatetic life, alternatively claiming to be Moroccan or Libyan and stating his birthdate was in 1986 and 1991 on different documents.[38] He had married an Irish woman and had a child with her, who he appears to have visited at his estranged partner's home in Barking the night prior to the attack after a lengthy hiatus.[39]

Planning for the event appears to have taken place over a two- to three-week period prior to the attack.[40] Police believe Redouane's bedsit in Barking was the location where plotting occurred,[41] though the men appear to have also congregated in a number of sporting locations, including an outdoor pool[42] and a gym that was established by a pair of brothers who had previously been identified as being involved in al Muhajiroun activity.[43]

It remains unclear the degree to which the London Bridge attackers may have been directed by the Islamic State or any other extremist group, though the Islamic State did again claim the attack.[44] Given Butt's known association with individuals who have gone on to become prominent figures within the Islamic State, like Abu Rumaysah (who is still suspected to be at large and was featured in the same British television documentary), he would have had ample opportunities to establish contact with the group. Senior leadership figures within al Muhajiroun, like Anjem Choudary and Mizanur Rahman, have been prosecuted for supporting the Islamic State.[45] Others like Abu Rahin Aziz,[46] Shahan Choudhury,[47] Mohammed Reza Haque,[48] and Hamza Yaqub[49] have been publicly identified as having fled to join the group. Many others have tried going to Syria and been caught at various stages of their journeys. Given the close contact the group's members maintain with those back in the United Kingdom even after they have gone over to Syria, it seems likely that Butt would have had at least some contact at some point with Islamic State operatives in Syria.

While the Islamic State's immediate claim contained no information that was not already in the public domain, the group's subsequent mention of the attack in the 10th edition of its magazine Rumiyah did offer battlefield names (kunyas) for the fighters, which had not been discussed in the public domain, identifying them as Abu Sadiq al-Britani, Abu Mujahid al-Britani, and Abu Yusuf al-Britani.[50] The accuracy of this information is unclear, however, with it contrasting with Butt's known kunya of Abu Zeitoun.

Observations on the Three Attacks
One key question for authorities is the degree to which the three cases were connected.[51] Thus far, no evidence has been made public to show any level of connectivity, beyond the potential that the three plotters were somehow inspired in their timing by each other's actions.[a] The available evidence suggests the attacks were carried out by individuals or small cells who, though possibly inspired by the Islamic State's ideology, were either not connected to the group (Westminster) or only loosely connected (Manchester and London Bridge). There is no indication that the Westminster and London Bridge attackers trained overseas. In the London Bridge plot, at least two of the attackers, Butt[52] and Zaghba, were frustrated travelers to Syria. In the Manchester plot, Abedi is known to have traveled to Libya a number of times (though the exact nature of these trips is complicated by his Libyan heritage). Abedi's single-minded focus in constructing a device just a few days after returning from Libya suggests it is possible he traveled to Libya for the purpose of learning how to build a device.[53] The New York Times, citing U.S. and European intelligence sources, reported Abedi met with members of Katiba al-Battar, a Libyan Islamic State brigade, at some point while in Libya and kept in touch with the group on trips back to the United Kingdom, but this has not been confirmed by British authorities.[54] Given that Abedi reportedly participated in fighting against Muammar Qaddafi, one possibility is he received bomb-making training while spending time with a militia group in Libya. There was some public speculation Abedi may have traveled to Syria as well, but this has not been substantiated.[55] No evidence has yet surfaced of external direction, and it cannot be ruled out that Abedi learned to build the bomb off the internet given there is evidence he viewed various online videos on bomb making.[56] But the relative sophistication and effectiveness of the device, and the trickiness of making TATP, points to the possibility of at least some bomb-making training or practice overseas.

Increased Tempo
In the wake of the Westminster attack, there was a noticeable uptick in the tempo of arrests being conducted by police disrupting active attack planning. In June, Commissioner Dick said about one person a day was being arrested in counterterrorism investigations.[57] The reasons for this increase are not totally clear, but it is likely the result of both lower tolerance of risk by British authorities and a growing threat. In the first instance, a successful attack highlighting a failure in intelligence would change counterterrorism agencies' perspectives on ongoing investigations, making them reconsider various subjects of concern. Second, police concerns of copycat attacks likely sped up arrests of subjects of interest who had been under surveillance for some time. A third likely reason is the increasing push and resonance of Islamic State messaging about individuals staying home to launch attacks. This is a phenomenon that has been obvious since Abu Muhammad al-Adnani's speech in May 2016 in which he stated, "The smallest action you do in the heart of their land is dearer to us than the largest action by us, and more effective and more damaging to them … And if one of you wishes and tries hard to reach the Islamic State, then one of us wishes to be in your place to hurt the Crusaders."[58] As it has become harder to travel to Syria and the group has been losing territory, more supporters of the group in the United Kingdom are becoming frustrated travelers who are responding to this messaging.

British police thwarted five plots in between the Westminster Bridge and Manchester attacks.[59] Just over a week after Masood's attack, police in Birmingham arrested brother and sister Ummariyat Mirza and Zainub Mirza, who were accused of planning a beheading attack.[60] Two weeks later, Ummariyat Mirza's wife, Madihah Taheer, was arrested and charged with supporting her husband in his plot.[61] At around the same time, police arrested a 17-year-old girl of Moroccan origin from London for allegedly plotting to launch some sort of attack under direction of a fighter from Coventry who was killed in April by a drone strike in Syria. The teenager, who cannot be named for legal reasons, was apparently married to the fighter through Skype and had sought to obtain guns

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a   This certainly seems to have been the case in the subsequent anti-Muslim terrorist attack launched by Darren Osborne, a 47-year-old who drove a van into the crowd outside Finsbury Park mosque on the morning of June 19, killing one. A long-troubled individual, Osborne was reported by neighbors to have been incensed by the London Bridge attack. No evidence has publicly surfaced that he was linked to extreme right groups. And it is suspected that Osborne may have intended to strike an al-Quds, pro-Palestine march through central London earlier in the day, but had been too late and chose the mosque instead. Osborne was reported to have been raving drunkenly at a local pub the night before the attack and to have been flagged to police as drunk and asleep in his vehicle later the same evening. Martin Evans, Ben Farmer, Hayley Dixon, and Hannah Furness, "Finsbury Park terror suspect 'planned to attack' Muslim march in London but was too late, it is claimed," Telegraph, June 20, 2017.

and grenades to launch an attack in the United Kingdom under explicit direction from the Islamic State.[62]

Even more alarmingly, 27-year-old Khalid Ali was detained in Whitehall, a short month after Khalid Masood's attack on Westminster, in a dramatic mid-afternoon swoop as he walked around with a bag full of knives and shortly after throwing his phone into the river. He was charged with bomb making linked to activity he undertook in Afghanistan years before, as well as the alleged plan he was in the midst of when he was arrested in Whitehall.[63]

The same day that Ali was detained along Whitehall, police in Willesden in northwest London and Kent undertook a series of raids, detaining six people in what they believed was another cell actively plotting attacks. The case was deemed of such concern that authorities stormed the premises using CS gas and guns. One woman was shot during the entry.[64] The initial reporting indicated a cell of six were involved, including an individual who had been stopped in Turkey alongside two teenagers who were reportedly en route to Syria.[65] In the end, however, the failed traveler was not charged, and three women (including a mother and daughter) were presented in court for allegedly planning an unspecified knife attack.[66] Finally, five days prior to Abedi's attack, police in East London arrested four men for planning an alleged car bomb and knife attack in central London reportedly inspired by Masood's actions.[67] The four men were arrested on May 17.[b]

This intense spate of arrests presaged the Manchester and London Bridge attacks and reflected a changed threat assessment by authorities as they sought to roll up a number of cells that had been under surveillance for some time. As noted above, in many cases, authorities feared that Masood's abrupt success might stimulate others to emulate him—something that had been seen historically after successful attacks. The murder of Lee Rigby in May 2013 by two extremists linked to al Muhajiroun helped stimulate others to attack, including an extremist who the very next day attacked a French soldier patrolling in the La Defence area of Paris. More generally, the attack model deployed against Rigby is one that has become a template many British extremists seek to emulate, often themselves making direct reference to that 2013 attack.

Arrests have continued at a high rate in recent weeks. Three men were picked up on the day of the general election, June 8, with one charged on an unspecified plot. The 33-year-old man in question, Irfan Khan, was allegedly a long-time consumer of online radical material and had allegedly recently viewed material linked to the London Bridge attack when he was arrested, demonstrating the potential inspirational effect of that attack.[68] Later in June, police in Birmingham arrested Tarik Chadlioui, a 43-year-old Moroccan cleric who was wanted on terrorism charges in Spain for being the spiritual leader of a cell supporting the Islamic State.[69] One of his followers in Majorca is accused of planning a stabbing attack of pedestrians on the island.[70]

A Constant Threat

None of this, however, points to large-scale attack planning in the United Kingdom. While a number of the disruptions suggest plots approaching the scale of the London Bridge or Manchester attacks, there was little evidence presented in court of conspiracies with the capability to launch larger Paris-style assaults. Unlike disruptions on the continent in Europe, where cells in possession of automatic weapons and with clear evidence of individuals who have been to foreign battlefields are regularly disrupted, so far there is no evidence that has been made public of this model of plot in the United Kingdom.

More typical have been plots similar to that mounted by a cell of individuals from Birmingham who were planning a knife and bomb attack in the United Kingdom before their arrest in late 2016. Although the so-called "three Musketeers" behind this plot were potentially dangerous, and two had, five years previously, very briefly made it to a training camp in Pakistan, there was no evidence presented at the trial that their plot was directed from overseas; it emerged at trial that the conspirators joked about their inadequate skills, with one likened to one of the useless extremist characters from the film *Four Lions*, a satirical movie that pokes fun at some of more inept practices of British jihadis.[c]

The earliest disrupted plot linked to Syria, that of Erol Incedal, included accusations of a planned marauding gunman scenario with some direction from overseas.[71] Incedal was cleared of these charges and ultimately convicted of possession of a bomb-making manual.[72] But beyond this, the attack planning seen in the United Kingdom has been fairly consistently small cells or isolated individuals seeking to launch low-grade attacks on soft targets around the country. While there are often links to known extremists or networks, where there has been direction, it has been in the form of remote guidance by extremists based in Syria and Iraq.[73]

None of this is to say that authorities do not continue to see aspiration and intent by terrorist groups to launch more sophisticated plots in the United Kingdom. Thus far, however, the threat has mainly consisted of small-scale unsophisticated plots. While this suggests terrorist groups like the Islamic State have been facing difficulties in infiltrating directed cells into the United Kingdom, authorities are still confronted by a challenging threat picture and one that is in many ways more complicated with these scattered and disparate cells, which are difficult to track. Adding to the challenge is the unpredictability of individuals or small cells autonomously deciding to act using very low-tech methods and weapons, which

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b   The four were charged on May 25. One was not charged with terror offenses but instead for seeking to "possess any firearm or imitation firearm with intent to cause fear of violence." "Update: Four charged following Counter Terrorism investigation," Metropolitan Police press release, May 25, 2017.

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c   The most disturbing aspect of the plot was that three of the plotters had been convicted and served time for previous terrorism offenses. Two of those convicted, Naweed Ali and Khobaib Hussain, had been previously arrested for going to training camps in Pakistan. They were also linked to a cell arrested in 2011 in Birmingham that was seeking to launch an al-Qa`ida-directed attack in the United Kingdom and helping others get to training camps in Pakistan. Mohibur Rahman, the third convicted "Musketeer," had been previously convicted for possession of extremist material. He was initially arrested as part of a cell that pleaded guilty of plotting in 2010 to bomb the London Stock Exchange. The three "Musketeers" had met and re-radicalized during their prison sentences, raising questions around prison radicalization. "Operation Pitsford: The 11 men," BBC News, April 26, 2013; "Terrorism gang jailed for plotting to blow up London Stock Exchange," *Telegraph*, February 9, 2012; "Three Musketeers' guilty of planning UK terror plot," BBC News, August 2, 2017; Dominic Casciani, "Birmingham terror plot: Inside the sting that caught four jihadis," BBC News, August 2, 2017.

makes it a very difficult to manage and prioritize threats accurately.

Managing Risk

The question of prioritization is the key issue at the heart of considerations about how to manage the current U.K. threat picture.[d] In all three of the cases featured in this article, attackers were known and had been investigated—to varying degrees—by authorities. In at least two cases, Abedi and Butt, they had been a focus of investigations, but no prosecutable case had materialized, leading investigators to move on to other cases that appeared to be of higher priority. With limited resources, such choices have to be made.

The volume of activity that U.K. security services are currently focused on was illustrated most clearly in the wake of the Manchester bombing when Security Minister Ben Wallace revealed on the BBC's flagship Today program that authorities had 500 investigations underway, involving some 3,000 subjects of interest. In addition, he revealed, there were a further 20,000 former subjects of interest (i.e. former targets of counterterrorism investigations in the post-9/11 period) who remained of peripheral interest to the security services. The numbers have since grown even higher, according to British police. Butt, the London Bridge ringleader, was among the 3,000 current subjects of interest. But it was from the 20,000 considered to be only a residual risk that the Manchester and Westminster attackers had come.[74] This larger pool includes individuals who have featured in investigations over the past almost two decades of counterterrorism cases in the United Kingdom. Some are individuals who were on the fringes of plots; others are those who have been charged, convicted, served their sentences, and are now free once again. However, due to their observed activity, they are not deemed to be current priorities and have therefore been relegated by security services who instead focus their attention on those who have been demonstrating a higher level of alarming activity or potential attack planning. Given limitations in security services resources, only about 3,000 individuals can be focused on, and while the others are not forgotten, they are allocated a lower prioritization.[75]

In the wake of the two London and Manchester attacks, questions are being raised about whether this prioritization has been accurately calibrated.[76] After the London Bridge attack, Prime Minister May stressed police and the Security Service MI5 would be reviewing their methods and more generally "how the terror threat is evolving, the way that terrorism is breeding terrorism and the increased tempo of attacks ... in a way we haven't seen before."[77] It

has been reported that after the Manchester bombings, Britain's security services began reevaluating the risk level of individuals categorized as former subjects of interest. One idea reportedly under consideration is to create systems for counterterrorism agencies to share information about former subjects of interest with the broader police force, taking advantage of the general police's greater numbers of eyes and ears inside local communities. "It's that wider cohort [of 20,000] that we have to keep an eye on as well; to see if any of them that reactivate, so to speak, and become dangerous again," Mark Rowley, head of National Counter Terrorism Policing, stated in an interview earlier this month. "We're going to have to improve what we do, but it is going to take a whole system effect— not simply counter terrorist specialists and MI5, but local policing, councils, and the public—to be able to deal with something which is becoming more of a cultish movement and less of a small terrorist organisation."[78]

The U.K. threat picture is populated with seemingly disparate cells of individuals or clusters who are in some cases receiving direction from abroad through encrypted applications or social media, but in many cases are made up of perpetrators, as Prime Minister May stated, "inspired to attack not only on the basis of carefully constructed plots after years of planning and training—and not even as lone attackers radicalized online—but by copying one another and often using the crudest of means of attack."[79] The fact that the United Kingdom is also grappling with a threat from right-wing and anti-Muslim extremism risks provoking the sort of social tensions the Islamic State has long hoped would boost its appeal in the West.

It is, of course, still early days in the investigations into the London Bridge and Manchester attacks. It is possible more will be uncovered to show their connectivity to wider networks and plots. The plotting activity observed so far in 2017 points to a deeply diffuse and complicated threat picture in the United Kingdom, which is causing security services to revisit their methodologies and leading to arrests at increasingly early stages of the attack cycle. This can complicate subsequent convictions, but it is an imperative at a time when many plots are being carried out through low-tech means already in most citizens' possession—cars and knives—and at a time when the flash-to-bang in plots can be counted in days rather than years.

Atop this complex domestic picture is the potential threat posed by the growing number of British jihadis who are expected to be returning home from Syria and Iraq. Exact numbers are impossible to know, but with hundreds already back,[e] authorities are already bracing themselves for an even more challenging threat environment when these battle-hardened veterans and their families return.   **CTC**

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d   The issue of prioritization is also key in several other Western countries facing a significant threat, including the United States. For example, Orlando nightclub shooter Omar Mateen had been the subject of an FBI counterterrorism investigation, but the case was closed before he carried out the attack. Matt Apuzzo and Eric Lichtblau, "After FBI's Enquiry into Omar Mateen, A Focus on What Else Could Be Done," *New York Times,* June 14, 2016.

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A View from the CT Foxhole: Edward You, FBI Weapons of Mass Destruction Directorate, Biological Countermeasures Unit

By Kristina Hummel

Edward You is a Supervisory Special Agent in the FBI's Weapons of Mass Destruction Directorate, Biological Countermeasures Unit. Mr. You is responsible for creating programs and activities to coordinate and improve FBI and interagency efforts to identify, assess, and respond to biological threats or incidents. These efforts include expanding FBI outreach to the life sciences community to address biosecurity. Before being promoted to the Weapons of Mass Destruction Directorate, Mr. You was a member of the FBI Los Angeles Field Office Joint Terrorism Task Force and served on the FBI Hazardous Evidence Response Team.

CTC: Can you describe the directorate where you work and the team that supports its mission?

You: The WMD directorate was established as a result of 9/11, upon the recommendation of the WMD Commission and the 9/11 Commission, and it was basically to consolidate the missions about countering WMDs. In the Biological Countermeasures Unit, our focus is on the prevention, detection, interdiction, and response to potential misuse of biological materials or expertise. The true cornerstone of our program is the FBI WMD Coordinator. These are special agents—men and women—that are trained in CBRNE [Chemical, Biological, Radiological, Nuclear, and Explosives] matters. They undergo rigorous training and certification, and the key to them is there's at least one Coordinator stationed in each of our 56 field offices across the U.S. We also have some stationed overseas as well. Their primary mission is to link up with state and local law enforcement, with the first responder community, with other federal agencies and assets, including National Guard. If there ever was a CBRNE event, they would be the tip-of-the-spear in providing the response as well as heading the investigation.

They proactively reach out and establish partnerships and liaisons with universities, companies, and other institutions within their jurisdiction. They act as a resource to provide these institutions with security awareness so that [if] there ever was a security issue, particularly one necessitating a response, then members of the private sector, academia, and even amateur DIY [do-it-yourself] biological researchers know that there's a specific individual in the FBI, in the form of the Coordinator, that understands who they are, what they're doing, and what the context is.

I'm here at headquarters, and my primary mission is to support outreach and engagement, but probably most importantly it is to backstop the WMD Coordinators who are positioned in the field. They have to cover the whole broad range of modalities—chem, bio, nuke, explosives. They do the initial engagements, the partnerships, the initial response, but they can always call back to headquarters where we leverage all of our expertise as subject matter experts. We can bring in the laboratory division; we can bring in Centers for Disease Control and Prevention (CDC), if necessary, the Depart-

ment of Homeland Security to support them when they run into an incident out in the field.

CTC: Can you talk about the level of coordination that you have with private sector entities? Have these relationships been easy to forge?

You: Yes, indeed, because we have a shared interest in preventing the exploitation, abuse, and misuse of science. The scientific community is a vital partner in this. We raise their level of consciousness about security problems. By approaching the challenge in this way—rather than from a top-bottom, security-handed way—we've garnered more buy-in, and as a result, it's allowed our Coordinators to expand their contacts list extensively.

We've created a network of sentinels to safeguard biology, who trip the wire when they see something suspicious. They've even invited Coordinators to participate in training exercises for educational events. I go out and push out security awareness in the scientific community, and then once I've got their understanding, I introduce them to their local WMD Coordinator to continue the discussions [and] the relationship. That's been the most successful part of our program. Over time what we've seen is not just suspicious activity reporting but continued engagement, information sharing, and in those instances where there has been a potential criminal act, you see very rapid reporting, which then immediately supports a rapid and robust response.

CTC: Are you satisfied with the volume and depth of these types of partnerships that the FBI has established? Or are there areas where you would like to see greater collaboration?

You: I think in a post-9/11 world, we're doing really well. If there's any challenge, it's probably going to be bandwidth in that the scientific community is so vast. The numbers of scientists involved in the life sciences are large and growing, and the field is becoming more multi-disciplinary in areas such as bioengineering. The good news is that our partnership efforts have been gaining momentum not only because of the FBI's understanding and the buy-in from the scientific community, creating helpful word-of-mouth for our efforts. We're increasingly seeing the scientific community incorporating security into their research projects and technologies, which is fantastic because you're addressing security on the front end.

The other challenge is that life sciences and advances in biotechnology are inherently open source and global. The goodwill and good word-of-mouth we've garnered domestically has resulted in scientists overseas expressing interest in developing the same type of partnership with their own internal law enforcement agencies. The challenge is that there isn't any other position in international law enforcement like the WMD Coordinator. So we've been trying to help our foreign partners to establish a WMD Coordinator-type

of capability.

CTC: What international partners do you work with?

You: We work with the United Nations, Interpol, and Europol. We've engaged with the European Commission and the Association of Southeast Asian Nations. We have a formal partnership with the United Nations Interregional Crime and Justice Research Institute (UNICRI), and that's powerful because they have centers of excellence in academia all over the world. We're pressing a message about security awareness—about biosecurity, prevention, and misuse of the life sciences—internationally, either bilaterally with foreign governments or jointly with our partners in the Department of Defense or the Department of State through their respective cooperative biological engagement efforts.

CTC: Can you discuss your level of cooperation with public health facilities?

You: In the wake of the anthrax mailings that followed 9/11, we established a formal partnership with the CDC, and through the CDC, the WMD Coordinators have established partnerships with state and local public health agencies. [If] there is an unusual outbreak of some kind somewhere in the U.S., then through our partnerships, we work in real-time alongside public health agencies so that there's a joint criminal and epidemiological investigation, and we quickly work to determine whether or not this is a freak natural occurrence or a potential intentional release. That partnership has been very powerful.

CTC: In the United States, we're increasingly seeing entrepreneurs and amateur scientists set up "DIY" biological labs. What challenges does this present?

You: The FBI has been aware of these DIY bio labs since they started emerging in a big way almost a decade ago, and we've been engaging them through the Coordinators since then. We look at these community labs as a big positive force in the economy and engines of innovation. That has helped us overcome the natural tendency for such outfits to be a little bit anti-establishment. By engaging with them, we're helping them to raise their level of awareness that they could potentially be targeted by malicious actors seeking to subvert their work, steal their technology, or recruit insiders on their staff. By helping them establish a form of "neighborhood watch," they will be best positioned to identify and report on instances of suspicious activity both internal and external to their community. Who better to identify threats than the community members themselves?

Through our engagements, the amateur community developed their own sense of civic responsibility and went on to develop their own international code of ethics.[a] This is key since the amateur biology community at large is still in its nascent stage and has limited capabilities; however, with rapid advances in biotechnology and concomitant drops in cost, the state of play could change significantly in the near future. Therefore, it is incumbent upon agencies

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a   Editor's note: The code of ethics is available at https://diybio.org/codes/.

"We look at the entire modality—the whole world of bio—when looking for potential security challenges. We're almost agnostic as to who the threat actor is likely to be. In that way, we're less likely to be caught blindsided."

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like the FBI to engage with the communities in the early stages to raise awareness and, most importantly, establish the partnerships to showcase how both the FBI and the DIY bio members have a shared responsibility to safeguard their work, community, and innovations.

CTC: Have any leads come out of these DIY labs?

You: There have been no identified threats; however, as a result of our partnership, the DIY bio community has provided information on where biological technology is currently heading, allowing us to prepare and think about future vulnerabilities and threats. The thing about bio is that it's open-source. Unlike the rad/nuc realm or even the chemical realm, where you're talking about very specific materials of concern and very specific levels of expertise, bio is completely the opposite, which inherently makes it a challenge to identify and address some of the security issues.

We're also facing the fact that as bio is now converging with the digital-cyber realm, scientific progress is moving even faster. One of the reasons why, from a strategic standpoint, we've been doing outreach and engagement is that a top-down approach does not work well in this space. It's very difficult for the U.S. government and its different components to forecast where the sciences are going, what the potential vulnerabilities are going to be, but if you have established a relationship with the scientific community, the experts themselves can identify potential security challenges, which is really beneficial. As a result of our engagement, the scientific community had flagged gene editing as a potential area of concern more than two years ago and, in partnership with us, has stepped up measures to protect this space.

CTC: As you know, terrorists defy easy categorization, in terms of their backgrounds and even their motivations. But is there a particular individual that is interested in using WMD technology for nefarious purposes?

You: That's a tough question. We look at the entire modality—the whole world of bio—when looking for potential security challenges. We're almost agnostic as to who the threat actor is likely to be. In that way, we're less likely to be caught blindsided.

Let me give you an example of something that was brought to our attention by the scientific community a few years back—synthetic biology, the engineering of biology, an area in which gene editing is going to become a tool. About two years ago, there was a research group that was able to use synthetic biology to modify baker's yeast. This new, modified yeast can take sugar as the precursor, process it, and ferment out opioid-based products. This is great

because there's a huge need by the medical field for pain-control medication. But if you think about it, if that particular genie got out of the bottle, now you have this modified organism that you can get freeze-dried, bring it back to your home, put into a fermenter, add sugar, and distill your narcotic of choice: heroin, oxycodone, or codeine. We're not there yet, but if that technology got out, it could almost have as damaging an impact on society as a terrorist attack. Just as an aside, significant questions flow from this for the country as a whole, including whether U.S. law enforcement agencies, including the FBI and the Drug Enforcement Administration (DEA), would need to find a way to regulate sugar. How would you be able to do that?

We're already in the midst of a huge heroin and fentanyl epidemic in this country. So this is an aspect of biotechnology that would absolutely be attractive [for] exploitation by drug cartels or criminal enterprises. When it comes to bio security, this necessitates expanding the lens through which we view the threat picture beyond the traditional terrorist, counterproliferation concerns that we've had—and our long-running concern about biological weapons—to also focus on criminal groups who could exploit powerful manufacturing processes that are coming on-line in synthetic biology and other areas in order to make a profit.

CTC: You came to the FBI with a science background. So I imagine you have a very nuanced understanding of the importance of scientific discovery. How much has that appreciation helped, in fact, your ability to achieve the balance between security and scientific freedom?

You: Quite a bit because I speak their language. The FBI is a very different organization post-9/11 than before that terrible incident. They probably would not have been interested in hiring somebody like me [before 9/11]. The priorities back then was going after organized crime or public corruption. The higher priority would have been people with legal backgrounds or former military or law enforcement or accountants to follow the money. But post-9/11, the Bureau has actively tried to diversify its workforce. So now there's a high priority in hiring individuals with foreign language skills, computer science skills, or experience in the natural sciences like myself.

CTC: In late 2016, Europol warned "there are indications [the Islamic State] is experimenting with biological weapons."[b] What level of concern do you have about the bio threat from the group?

You: With ISIS, al-Qa`ida, or any other threat actor for that matter, we are faced with two significant challenges. The first is ideology. What happens if that lone individual that becomes persuaded by their ideology happens to be a microbiologist or a biochemist? The

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b   Editor's note: Europol stated that in February 2016, Moroccan authorities dismantled an Islamic State cell planning attacks in the country. Investigators, according to Europol, seized toxic chemical and biological substances that included "three jars ... containing a substance that could be transformed into a deadly tetanus toxin." The Moroccan Interior Ministry, according to Europol, confirmed that some of the seized substances are classified as "biological weapons." See "Changes in Modus Operandi of Islamic State (IS) Revisited," Europol European Counter Terrorism Centre, November 2016, p. 11.

FBI Supervisory Special Agent Edward You engages participants in the International Genetically Engineered Machine Competition (iGEM), an international synthetic biology competition. (FBI)

counter WMD mission has always proceeded by identifying the actors expressing the intent to acquire, develop, or use WMDs (e.g., counterproliferation efforts). And historically, significant effort and investments have been made to counter the biological weapon threat ranging from state/non-state actors to individual level biological crimes (e.g., attempted ricin poisonings). But this introduces the second challenge. Unlike the chemical and radiological/nuclear realms where materials of concern are highly regulated and the expertise is almost arcane, biology could be classified as dual use or multi-use. The strength of the field is based on the fact that it is inherently open in nature (e.g., peer-reviewed scientific journals), which has led to significant advances in areas such as healthcare. The materials are readily available throughout the world where some of the most hazardous agents are endemic to the area, and the majority of equipment can be purchased outright and do not fall under any regulatory regime. Previous attempts to impose controls typically used in the nuclear realm have shown limited success and showcased that overly burdensome security/compliance structures could hamper progress and innovation in countermeasure and biodefense development, thus posing a different form of security risk. Therefore, the strategy has been to look at the modality and identify points of exploitation or vulnerability while being almost agnostic to the threat actor.

So, in order to counter things like ISIS, like al-Qa`ida, like your drug cartels, it really is important to get a citizenry out there that is well-informed, aware, and educated so that threatening individuals can be flagged. If you're a scientist or a clinician, you're familiar with the Hippocratic Oath of "do no harm." What we're trying to do with our messaging and outreach is how do we evolve "do no harm" into "not on my watch." Where now you're an active contributor to be on the look-out, be willing to take that extra step if you see something suspect, and then taking some action, reporting it to somebody. If you happen to see somebody who's going to become radicalized, if you see some weird activity going on, some weird inquiries about your research, or suspicious orders of material or equipment, don't let it slide. If it doesn't seem right to you, then take action, and ultimately what we hope for is that people in the field should call up their local WMD Coordinator and say "it may not mean much but this doesn't look right, and I just want to make sure you're aware of this." That's where we want to be, to [have] this culture of security

awareness and then build up this network of sentinels out there to help the FBI in its mission and help the scientific community to better protect themselves.

CTC: From your perspective, what do you see as the greatest bio security threat facing the United States?

You: We obviously need to continue to be vigilant over the threats that biology could be harnessed by state or non-state actors that wish us harm. But biosecurity is not just looking at dangerous bacteria, viruses, or toxins, where naturally a lot of the attention is. It is also key to the strength of our economy and our geopolitical standing.

Let me explain. Things like gene editing and other bio technologies are going to be, in the very near future, completely dependent upon data, whether it be your DNA sequence information, your health records, your family history, all that is going to become incredibly relevant and valuable. And I don't think as a country we are where we need to be yet on realizing the national security implications of such data. At the end of the day, the entity that has the largest, most diverse datasets when it comes to biologically relevant data will be at a big advantage when it comes to harnessing the power of biology to grow the economy.

As a result of that, we may have been short-sighted. Most of our legal frameworks have been focused on privacy and not on security. China has become a prime player and is collecting massive amounts of data from within the United States. Chinese entities are buying up biotech companies, companies that have access to DNA sequence technologies. They have positioned themselves to be the lowest cost out there, so they outbid everybody else. Also they're buying up companies that do not fall under export control or ITAR considerations because at the end of the day, it's just bio. It's just data. Who cares about DNA sequencers? It's not like you're buying an arm of Boeing or Northrop Grumman.

But because there's a lack of understanding about where bio is going, we're in danger of falling behind, and my biggest concern is that for lack of our foresight and being strategic in this space, I think China is going to become a potential biological superpower. They're

not hindered by some of the limitations that we are internally in the U.S. For example, HIPAA [Health Insurance Portability and Accountability Act], the regulation that prevents sharing of patient information between two U.S. institutions without the explicit consent of the patient, doesn't apply if that same information gets sent overseas. There's one Shanghai-based DNA sequencing company that got all the appropriate accreditations and certifications, and as a result, the entire state of California is looking at outsourcing patient genetic testing to China.

From a biological standpoint, gene editing is pretty messy. And the reason why you have low efficiency is because you need more genetic data. So if you want to be really good at gene editing, then it's incumbent upon you to collect as much genetic data as possible, to help with your efficiency. This incentivizes the acquisition of data. When President Obama launched the Precision Medicine Initiative a few years ago—this is a U.S. government initiative to basically leverage as much data as possible to come up with specific, customized therapies for disease, for cancer—the initial U.S. investment was $215 million. China announced their own Precision Medicine Initiative as well as big data analytics in their 13th five-year strategy, and their initial investment is $9.2 billion over the next 15 years. So they recognize the benefit and the promise of biotechnology when it comes to data. They're all in.

CTC: Who else are you engaging about this need to protect bio data?

You: I'm engaging software designers. I'm engaging the cyber professionals, who never would have thought they would have had something to do with biosecurity. It really is incumbent upon us to revisit what constitutes biosecurity. We probably have to expand the definition and then tie the biosecurity to the health of the U.S. economy and our national security in a significant way. It's a matter of how we ensure that we adequately address the possibility of falling behind in the biological domain. Do our existing policies, even our trade agreements and treaties, address this? This is something that even the Biological Weapons Convention doesn't even touch.   **CTC**

Predicting the Shape of Iraq's Next Sunni Insurgencies

By Michael Knights

All politics and security is local in Iraq. Therefore, the analytical framework for predicting the shape and intensity of Iraq's next Sunni insurgencies should also be based on the unique characteristics of each part of Iraq. The Islamic State and other insurgents are bouncing back strongest and quickest in the areas where the security forces are either not strong enough or not politically flexible enough to activate the population as a source of resistance against insurgents.

New insurgent attacks by the Islamic State were springing up in Mosul before the ashes were even cold from the climax of the liberation battle in June 2017. With the Islamic State holding just one square mile of western Mosul, the group marked the start of the Eid religious festival by launching a wave of suicide-vest and car-bomb attacks in liberated east Mosul on June 23-24.[1] As their last inner city defensive pocket was crumbling, Islamic State forces at the edges of the city launched a 40-man raid into the Tanak and Yarmuk districts on the outer western edge of Mosul city on June 26, panicking citizens into leaving the ostensibly liberated area.[2]

These incidents, and others like them, underline the manner in which Islamic State fighters have transitioned fairly smoothly and quickly from open occupation of territory back to the terrorism and insurgency tactics that they utilized prior to 2014. All eyes are now on how the Islamic State and other Sunni militants in Iraq will adapt to the loss of terrain, but there is no need to guess. A great deal of evidence is already available in the areas that have been liberated since 2014, a theme that this author and Alexander Mello developed in an October 2016 article in this publication on threat trends in Diyala province.[3] This piece proposes an analytical framework for assessing the future strength and shape of Iraq's Sunni insurgencies and will draw some lessons from the pre-2014 era.

Assumptions about Sunni Insurgencies in Iraq

Nearly a decade after the surge of U.S. forces in Iraq[4] and the Sunni "Awakening,"[5] there is still no consensus view on the factors that led to the steep reduction in Sunni insurgent attacks between 2006 and 2008.[6] This article proposes three factors that the author has

observed to be significant in determining the level of Sunni insurgent activity in different provinces and districts within Iraq.[a] In particular, this piece will focus on the factors that strengthened or constrained the growth of the Islamic State and former Baathist insurgents[b] after the U.S. withdrawal from Sunni areas between 2009 and 2011. This focus is appropriate for a forward-looking assessment because it appears likely that U.S. and coalition forces will not have a large presence on the ground and will only provide future support "by, with and through"[c] the Iraqi government forces.

In this author's experience, the most important factor in the intensification of Sunni insurgency in Iraq during and after the U.S. withdrawal was the effectiveness (or lack thereof) of the Iraqi security forces (ISF).[7] Effectiveness is a sum of the unit's leadership, experience and training, its manpower levels relative to the tasks set for it, its logistical and mobility capabilities relative to the terrain it must operate across, plus "enablers" such as intelligence and air support. It can be strongly argued that a lack of basic effectiveness and capacity in the security forces opened the door to the Islamic State more than any other single factor.

When the Islamic State and its predecessor organizations gained ascendency in the Sunni majority districts of Iraq between 2012 and 2014, they largely did so by incrementally demonstrating to the population that the security forces could not or would not protect the people.[d] In particular, the government failed to protect the Sunni tribal leaders and fighters who had supported the Awakening.[8] Some Sunni citizens may have been receptive to the Islamic

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a   As an obvious caveat, this attribution of causality is an opinion, albeit one formed by more than a decade of monitoring security in Iraq on a daily basis and the systematic accessing and warehousing of on-the-ground SIGACT (Significant Action) data by the author. As noted above, the exact causality of increases and decreases in insurgent activity is still being actively debated.

b   For example, there may be resurgence in former Baathist and nationalist groups like Jaysh Rijal al-Tariqa al-Naqshbandia (JRTN). See Michael Knights, "The JRTN Movement and Iraq's Next Insurgency," *CTC Sentinel* 4:7 (2011).

c   This is the phrase used by coalition leaders to describe the supporting role of Combined Joint Task Force Operation Inherent Resolve (CJTF-OIR) forces in the current war against the Islamic State in Iraq. See "Operation Inherent Resolve - Targeted Operations to Defeat ISIS," U.S. Department of Defense, available at https://www.defense.gov/OIR/

d   Since 2010, the author has built a body of work arguing that the regrowth of the Islamic State in Iraq has been primarily driven by the Islamic State's superior operational and tactical proficiency at local level compared to the ISF. See 2010-2014 entries at http://www.washingtoninstitute.org/experts/view/knights-michael. These themes are drawn together in Michael Knights, "The Resurgence of Al-Qaeda in Iraq," Testimony to the House Committee on Foreign Affairs, December 12, 2013, and in Michael Knights, "The Future of Iraq's Armed Forces," Al-Bayan Center for Planning and Studies, 2016, available at https://www.washingtoninstitute.org/uploads/The-future.pdf.
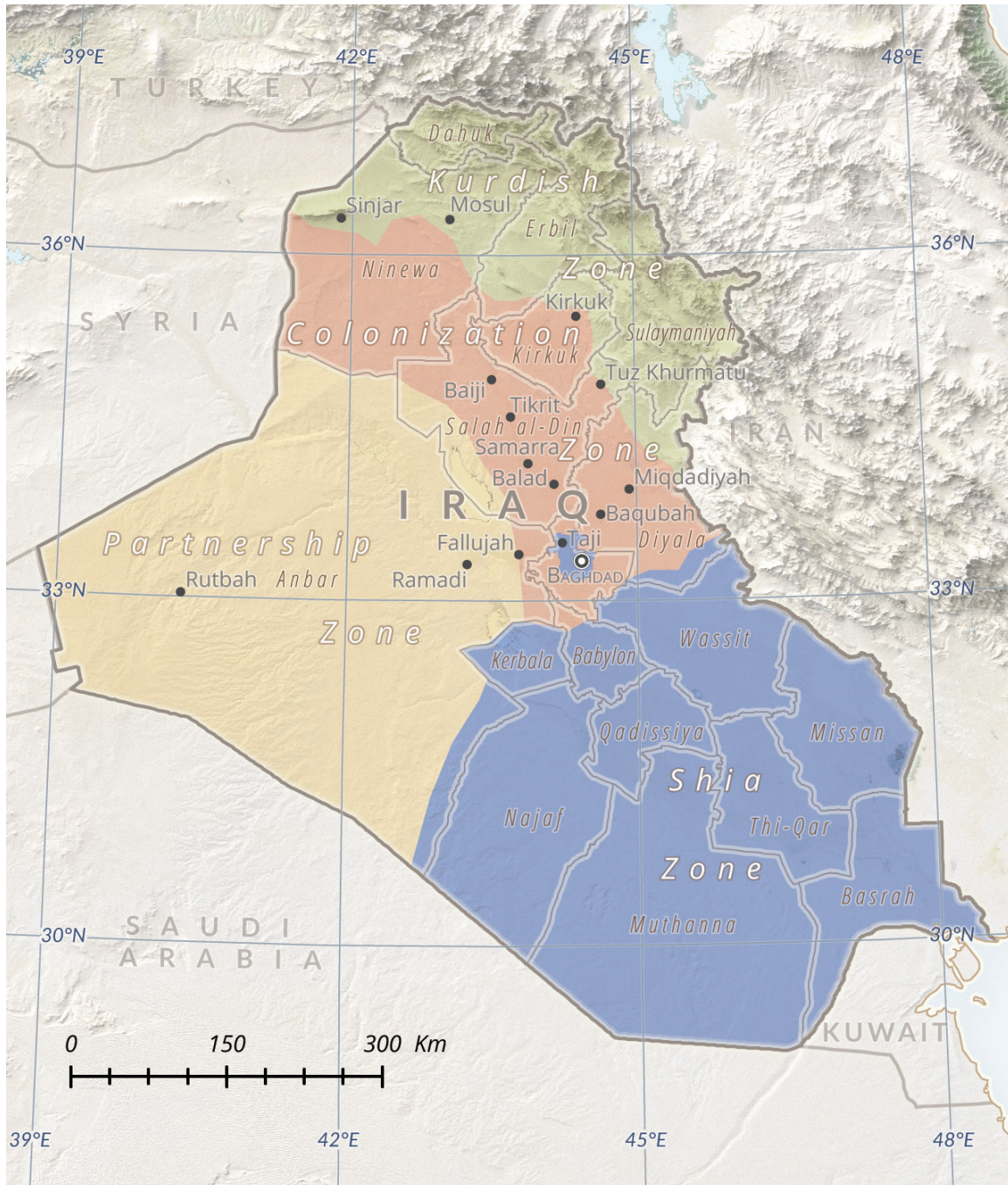
Iraq Zones (Rowan Technology)

State's ideology and vision, and others may have been invigorated and intrigued by its ability to displace the Iraqi government. But it can be strongly argued that many Iraqi Sunnis passively or actively supported the Islamic State occupation because, lacking the protection of the government, they had little choice, unless they wished to surrender their homes and livelihoods and become refugees.[e]

A second potential driver or restrainer on the regrowth of Sunni insurgency in Iraq is the support (or lack thereof) of the population for militant resistance activities. This does not refer to "Sunni

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e   Munqith al-Dagher, one of Iraq's most credible pollsters, has performed some of the most thoughtful work on why Sunni communities actively or passively supported the Islamic State, and he tends to stress Sunni fears surrounding security and justice. See Munqith al-Dagher, "How Iraqi Sunnis really feel about the Islamic State," *Washington Post*, March 24, 2015.

disenfranchisement"[f] in a generic sense as a major driver for year-on-year intensification of insurgency, such as occurred in 2012-2014. The Islamic State was close to defeat in 2008 at a time when there were no national or constitutional reforms regarding the role of the Baath party, no amnesty law for former Baathists, no mass amnesties of Sunni prisoners, and no major amendment of arrest and detention practices by the government.[9] That being said, it is important to highlight some Sunni community-related factors that seem to have demonstrable impact on insurgency. The demographic balance in each part of Iraq shapes whether local Sunnis feel more or less secure. In some areas, they are demographically dominant and lead local governance and policing; in others, they are clearly a subordinate minority; and in some areas, the ethno-sectarian balance in unclear or shifting, fostering extreme identity politics within local government and security forces. Tangible local grievances[g] and leadership choices can be powerful drivers and restrainers of Sunni participation in insurgency. Local Sunni leadership can drive their communities toward[h] or away from[i] militancy.

A final determinant of the local level of Sunni insurgency is arguably the proximity of ungoverned spaces[10] that are beyond the control of the Iraqi government, particularly battle zones where military munitions can be readily sourced. The civil war in Syria is clearly the biggest concern in this regard, and it can be viewed as a major causal factor in the intensification of insurgency in Iraq since 2012.[11] Areas of the Iran-Iraq border also provide a degree of sanctuary for al-Qa`ida and Islamic State affiliates[12] operating in eastern Iraqi districts like Halabja, Khanaqin, and Balad Ruz. Domestic areas are also of concern. The internal ungoverned space between the Tigris and Diyala rivers (including the Hawija area, the Hamrin Mountains, and the Jallam desert) is a massive area of challenging terrain. The western deserts bordering Syria in Anbar and Ninawa, plus swathes of the Iran-Iraq border northeast of Baghdad, are also large and difficult to police.

These three factors—ISF effectiveness, local Sunni support for insurgency, and access to insurgent sanctuaries—will vary greatly across the provinces and districts of Iraq. In general terms, Iraq can be broken into three "micro-climates" in terms of their attractiveness as a setting for Sunni insurgent activities.

Strategic Terrorism Versus the Shi`a and Kurdish Domination Zones

In sizeable parts of Iraq, there is very little prospect of even a weak Sunni insurgency due to demographic and geographic realities. This might be termed "the domination zone"[j] as since the intense sectarian purging of 2006-2007, Sunni communities have learned to live under Shi`a or Kurdish domination within this zone.

In Baghdad city and most of the areas south of the capital (totaling 40 of Iraq's 102 districts), the Sunnis are a demographic minority, the control of Shi`a-led security forces is significant, and the areas are often distant enough from ungoverned spaces (inside Iraq and in Syria) that Sunni insurgents would be forced to mount long-distance "reach attacks"[k] on the Shi`a heartlands. In June 2014, the Islamic State advance ran out of steam as soon as the domination zone was reached at the outskirts of Baghdad.[13] Large Sunni populations in Baghdad did not rise up to support the Islamic State. The rapid muster of the Hashd al-Sha'abi (Popular Mobilization Forces, or PMF)[14] was strong proof of the ultimate stability of the Shi`a domination zone.

There is also a Kurdish domination zone in which it is ethnic (rather than sectarian) polarity that matters, spanning 36 of Iraq's 102 districts. Though the Iraqi Kurds are mostly Sunni (and do include some adherents to salafi jihadism), their political parties and intelligence agencies maintain tight control of their demographic domination zone. A hard border—complete with ditches, berms, fences, and checkpoints—separates much of the Kurdistan Region from Arab Sunni-majority areas.[15] (Areas where the Kurdistan Region blends into Arab Sunni-majority areas are much less secure and will be dealt with in subsequent sections.) U.S. airstrikes steadied the Kurds when their capital, Erbil, was attacked in August 2014. But it is improbable that the Islamic State could have seized or held majority-Kurdish areas in the Kurdistan Region, and the ethnic frontline was indeed successfully defended for the most part.[l]

Sunni insurgents such as the Islamic State can only damage the "home bases" of perceived enemies such as the Shi`a and the Kurds through strategic terrorist attacks. In the past, the Islamic State and its forerunners have invested significant assets into launching such attacks on Baghdad, the Shi`a shrine cities of Najaf and Karbala, the southern Shi`a cities, and the Kurdistan Region using suicide-vest bombers, suicide-vehicle bombers, other large or well-placed explosive devices, or teams of attackers to storm key

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f   "Sunni disenfranchisement" is not a literal phrase because under Saddam the Sunnis had no appreciable democratic rights and now they are fully entitled to vote. Instead, the phrase tends to be a catch-all for Sunni complaints about civil equality at a national level, relating to issues such as an easing of de-Baathification statutes, judicial reforms that would disproportionately aid Sunnis, and constitutional and legal amendments intended to reassure the Sunnis that Iraq will remain an administratively centralized Arab republic. For a summary of the main issues, see "Make or Break: Iraq's Sunnis and the State," International Crisis Group, 2013, and Kirk Sowell, "Iraq's Second Sunni Insurgency," *Current Trends in Islamist Ideology* 17 (2014).

g   Here the author refers to very concrete local grievances, for example, systematic harassment, extortion, and detention of local Sunnis at checkpoints by ISF units recruited from outside the area. To give a Mosul-specific example, Shi`a-led security forces prevented Moslawis from holding wedding motorcades during Shi`a mourning periods, despite Mosul having almost no Shi`a citizens. Author interview, Rasha Al Aqeedi, Moslawi analyst, August 2016.

h   Sunni provincial-level leaders in Iraq played a major role in driving their populations toward armed militancy against the state in 2012-2014, especially in Mosul and Hawija. See Adel Kamal, "The Government and Military Fall out of Love in Mosul," Niqash, March 2, 2011, and also Inside Iraqi Politics, no. 52, January 3, 2013, p. 3, and Inside Iraqi Politics, no. 65, July 20, 2013, p. 8. Across a range of editions in 2012–2013, the Inside Iraqi Politics team documented and tracked the tight relationship between the Jaysh Rijal al-Tariq al-Naqshabandi (JRTN) movement and the Free Iraq Intifada protest group, which was eventually publicized by both parties.

i   In Anbar, the Sunni tribal leadership executed a very sudden pivot from anti-government protests in late December 2013 to close cooperation with the ISF in January 2014 as soon as the Islamic State's predecessor group tried to take over Ramadi. See Michael Knights, "ISIL's Stand in the Ramadi-Falluja Corridor," *CTC Sentinel* 7:5 (2014): p. 9.

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j   This phrase reflects that perception that many Sunnis may hold of the relative strength of Shi`a and Kurdish forces versus Sunni residents.

k   This denotes attacks that demonstrate "reach" of the Islamic State and other Sunni insurgents deep into the Shi`a south.

l   The Peshmerga did surrender ground in Sinjar, the Ninawa Plains, and in Jalula.

buildings.[m] Such "spectaculars," executed with grinding intensi-ty,[16] assisted the Islamic State in rebuilding its status in 2011-2014. Regular bombings within the Shi`a or Kurdish heartlands tend to sharpen sectarian and ethnic tensions, which can be exploited by groups like the Islamic State. In the aftermath of battlefield defeats, it is a good bet that the Islamic State and splinter groups or reactivating or rebranded Sunni insurgent groups may use strategic terrorism to build or rebuild their brands.

According to the author's Iraq incident dataset,[n] the Islamic State is already sending four to five mass-casualty attacks into Baghdad

city each month, a level that roughly matches the incidence rate in 2011, when the Islamic State, in its previous form, was at its lowest ebb.[o] This is likely to change in the next year as the Islamic State is less distracted with the defense of territory. Initially, suicide vests will likely be preferred due to their ease of transit.[17] Car bombs have become less frequently used because vehicle bomb manufacturing and storage facilities in Fallujah were lost, and so then were replacement facilities north of Baghdad.[18] In Tarmiyah, linked to Diyala and the internal ungoverned space, Islamic State bomb-making sites were also disrupted by active ISF operations.[19] Long-distance vehicle bombs were then sent from the Syrian border district of al-Qaim in the last three months of 2016,[20] but this practice seems to have been abandoned and may become even more difficult later in 2017 or in early 2018 when the ISF is expected to move to liberate al-Qaim. For the Kurds, the opposite situation is unfolding; the risk of inbound mass-casualty attacks is again increasing as the frontline

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m   Baghdad, Hillah, Karbala, Najaf, Amarah, Nasiriyah, and Basra are the main strategic targets in southern Iraq. For a recent example, see "Two suicide car bombs explode on highway near oilfields in southern Iraq," Associated Press, May 19, 2017. Erbil and Sulaymaniyah are the key targets in Kurdistan. For the most recent successful attack, see Isabel Coles, "Car bomb kills three outside U.S. consulate in Iraq's Kurdish capital," Reuters, April 18, 2015.

n   All incident data is drawn from the author's geolocated Significant Action (SIGACT) dataset. The dataset brings together declassified coalition SIGACT data plus private security company and open-source SIGACT data used to supplement and extend the dataset as coalition incident collection degraded in 2009-2011 and was absent in 2012-2014. New data since 2014 has been added to the dataset to bring it up to date (as of the end of June 2017).

o   In April-June 2011, the Islamic State undertook 12 mass-casualty attacks in Baghdad city versus 13 in April-June 2017. At the height of the Baghdad bombing campaign, the Islamic State mounted 62 attacks in April-June 2013. All figures drawn from author's SIGACT dataset.

Colonization Zone in Iraq (Rowan Technology)

with Mosul is demilitarized and reopened to commercial traffic.[21][p]

The key warning sign when it comes to the security of Baghdad is whether there is any effort to regenerate Islamic State bomb-making factories inside Baghdad city and its adjacent rural districts. An intriguing case presented itself on June 26, 2017, when a major explosives cache was intercepted inbound to southeastern Baghdad.[22] The cache included 44 explosive filler sets for suicide vests.[23] As in 2012-2013 when the Islamic State began its escalating pattern of Baghdad attacks, insurgents may boost their operational tempo by mounting non-suicide (i.e., remote- or timer-detonated) vehicle bombings and backpack or bag bombings in public spaces.[q] Islamic State cells in Kurdistan appear to have prepared for this option also as a means of maximizing the number of attacks each cell can make.[r]

Weak Insurgency in the Partnership Zone

A second set of Iraq districts comprise what might be called "the partnership zone." In these areas, the Sunnis make up a clear demographic majority and the Sunni communities appear less sensitive to ethno-sectarian threats. This may be because they are physically distant from Baghdad (and/or the Kurdish zone) and thus Sunnis are somewhat left alone by Baghdad (and Erbil) to run local affairs.[s] In the partnership zone, it is more likely that local Sunnis attain command of local police and paramilitary forces, and it may be easier for the U.S.-led coalition to sustain its training, logistical, intelligence, and aerial support to Iraqi forces because of the limited presence of Shi`a militia forces operating under the PMF umbrella. All of these factors improve the likelihood that insurgency can be held at or reduced to a low level.

At present the partnership zone is limited to Anbar province, where Baghdad has traditionally adopted a relatively hands-off approach to local governance and policing. A Sunni-only province,[t] Anbar has a unique track record in fighting the Islamic state and its forerunners, providing successful templates of partnership between U.S. and Sunni tribal fighters from 2005 onward.[24] U.S. forces currently based at Al-Asad airbase, 110 miles from Baghdad, have been

able to provide strong support to Sunni tribal resistance forces.[u] The oil refining center of Haditha was successfully defended from the Islamic State by tribes and ISF throughout the post-2014 war,[25] contrasting with the fall of cities much closer to Baghdad such as Ramadi and Fallujah. Since the Islamic State's seizure of Fallujah in January 2014, Sunni tribes from Anbar have generally cooperated well with the security forces, for example, resisting the Islamic State takeover of Ramadi for 15 months before finally succumbing to an intense assault involving as many as 30 car bombs in March 2015.[26]

Despite some encouraging indicators, there are many reasons to be concerned about a potential resurgent Islamic State campaign in Anbar. The proximity of Syria and the difficulty of securing the border mean that military-grade high-explosives, anti-tank weapons, large armored vehicle bombs, and other heavy weapons may continue to be available to Anbar insurgents as long as the Syrian civil war continues. Furthermore, though the Islamic State still geographically controls some parts of Anbar (mainly al-Qaim district), the Islamic State transitioned a year ago to insurgent operations in the liberated parts of the province. Thus, observers can already view some of the strengths and weaknesses of an Islamic State-led insurgency in Anbar.

The Islamic State is currently only able to mount a hit-and-run rural insurgency in Anbar. The high plateau of the western desert (an ungoverned space between liberated Rutba and al-Qaim) is used as a launchpad location for an average of seven explosive incidents[v] per month against nearby Rutba,[27] where non-local and predominately Shi`a PMF have deployed to control the road to Syria—a vital link in a potential Iran-Iraq-Syria logistical corridor.[28] The tactics are straight out of 2012: effective roadside bombs capable of defeating Hummer armor; attempts to overrun PMF and military checkpoints; mortar and drone attacks on static sites; and fake vehicle checkpoints to ambush and massacre ISF and PMF convoys.[29] In April-June 2017, 27 Iraqi troops were reported killed and 40 wounded in such attacks,[30] a demoralizing tally for the units in this one small corner of the war.

The Islamic State is a lot less confident in the cities of Anbar, probably because they were broadly rejected by the people and were militarily defeated in these places just a year ago. The Islamic State

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p   Mosul's reconstruction and reopened markets have resulted in hundreds of trucks crossing the Kurdistan-Mosul frontline each day since November 2016. These vehicles receive only a rudimentary visual check.

q   This option allows the same cell to undertake repeated attacks and even to "seed" multiple delayed-action targets in a single day. In 2012-2013, the Islamic State rebuilt its bombing series in Baghdad and southern cities with numerous vehicle-carried IEDs and bag bombings. Author's SIGACT dataset.

r   Cells of Salafi Kurdish "homegrown" attackers in Erbil (in 2015) and Sulaymaniyah (in 2017) have focused on developing pipe-bomb, radio-control IEDs in order to strike multiple soft targets (such as markets). Author's SIGACT dataset.

s   The Shi`a leadership in Baghdad has historically been quite parochial in its focus on security operations in Baghdad and southern Iraq, neglecting Anbar and Ninawa security for extended periods.

t   Though there has not been an ethnic census in Anbar since Saddam Hussein's time, it is fair to surmise from general reporting, author visits, and election results that there are no sizeable non-Sunni population groups in Anbar.

u   U.S. Congress ring-fenced funding for Tribal Security Forces in the 2015-2017 Iraq Train and Equip Fund (ITEF). See Cheryl Pellerin, "Centcom Spokesman: Counter-ISIL Momentum Attracts New Tribal Forces," U.S. Department of Defense, February 5, 2016.

v   The author uses the phrase "explosive events" to describe IED detonations, including vehicle bombs, suicide vests, grenades, rocket-propelled grenades, recoilless rifles, improvised rocket launchers, guided missiles, newly laid mines, and indirect fire from rockets and mortars. Events on major battlefield locations (such as airstrikes, artillery strikes, car bombings, and so on) are excluded by geographic filtering to ensure only incidents in "liberated areas" are counted. The author has deliberately excluded "unknown explosions," "finds" and "found/cleared" data on car bomb, suicide-vests IED finds, and caches in order to maintain the highest-fidelity incident data possible. Explosions are the category of incidents most likely to be detected whether intelligence and media reporting is strong or weak and the least likely category to be faked or exaggerated (as is often the case with cache finds reported by the ISF). Explosive events in the Sunni majority areas have been manually reviewed and screened by the author to exclude criminal uses of explosives. (Of note, this article does not consider explosive events inside Baghdad city, where it is almost impossible to differentiate criminal or vendetta uses of explosive devices versus smaller insurgent attacks).

does not yet carry out many urban attacks. In April-June 2017, the Islamic State carried out an average of 11 explosive incidents per month in Ramadi, nine per month in Hit, and seven per month in Fallujah.[31] The predominance of explosive events over shootings[w]— for example, 146 explosions versus 36 shootings in April-June 2017[32]—indicates that the insurgency in liberated parts of Anbar is not yet confident enough to really reach into the cities, perform target prioritization and "pattern of life" profiling on key tribal and security leaders,[x] and mount regular 'quality'[y] attacks against them. The Islamic State's current campaign in Anbar is characterized by distant harassment,[z] collective punishment,[aa] and haphazard targeting, with 57% of small bombings apparently striking average civilians (families in cars, bystanders passing an IED in a trash can) rather than military targets.[33] In April-June 2017, there were more non-battlefield explosive events than in the equivalent period of 2013, but there were a third as many shootings this year compared to April-June 2013.[34] This is significant because the most frightening aspects of the Islamic State's remorseless intimidation of Sunni communities in Iraq in 2013 was the increase of precisely targeted attacks[35]—the close-quarter assassination or lethal under-vehicle bomb that killed exactly the right tribal figure to intimidate far larger populations into submission. This has not returned yet as a significant tactic, but Iraq observers should keep a close watch for the resurgence of systematic 'quality' attacks against Sunni local leaders in Anbar and elsewhere.

The Colonization Zone

A final set of areas, spanning 24 of Iraq's 102 districts, can be termed the "colonization zone"[ab] because Sunni-majority communities in this swath experience the greatest fear of displacement and ethno-sectarian discrimination by either Shi`a or Kurdish forces. At present, there is a mild honeymoon effect,[ac] whereby Sunnis have welcomed liberation by predominately Shi`a forces because they are in deep shock at the Islamic State's violent excesses and are frustrated by Sunni leadership failures, and by intra-communal Sunni betrayals. This honeymoon may pass in the coming year or two if the Shi`a and Kurds fail to develop partnerships with Sunni communities. In this context, allegations of human rights violations (e.g., summary executions) during the Mosul battle[36] and by Federal Police during the broader campaign[37] could prove particularly injurious to community relations.

From a local Sunni perspective, the Shi`a colonization zone historically includes the cross-sectarian areas of Baghdad's rural outskirts (the Baghdad belts), southern Salah al-Din province, much of Diyala province, the Shi`a Turkmen pocket of Tal Afar, and rural parts of Tuz Khutmatu district in northern Salah al-Din.[ad] In these areas, local Sunnis make up the demographic majority or a large plurality, but the ISF have historically been Shi`a-dominated.[ae] The replacement of Iraqi military forces with outsider[af] PMF forces since 2014 has sharpened this dynamic. The Sunni perception of a Shi`a colonization zone has also broadened geographically because Shi`a PMF now control areas that Shi`a militias were much less interested in before 2014, such as the deserts west of Mosul, the Ninawa Plains, Sharqat, Beyji and adjacent oilfields, the Beyji to Haditha pipeline, Tikrit, Dour, Taza Khurmatu, Sadiyah and Jalula, Jurf as-Sakr, Rutba, and the Walid border crossing with Syria.[38] In many of these areas, Sunni displaced persons are only allowed to return to liberated sites if they agree to PMF preconditions, including compensation and provision of military manpower to serve under PMF leadership.[ag]

From a local Sunni perspective, the Kurdish colonization zone established since 2003 includes multi-ethnic but Kurdish-dominated areas such as Zummar, Kirkuk city, and northern Diyala areas (for example, Jabbarah, Qara Tapa, Sadiyah, and Jalula).[ah] Though Mosul is not physically controlled by the Kurds, the outsized Kurdish influence within the Ninawa provincial council (due to a lack of a cohesive Arab bloc) continues to stoke Sunni Arab and Sunni Turkmen fears of Kurdish domination.[39] To this historic list are now added three new Sunni areas under expanded Kurdish control since 2014—Dibis district (including many of Kirkuk's largest oilfields[ai]),

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w   The author uses the phrase "shootings" to describe events in his SIGACT dataset such as small arms fire, precision small arms fire, close quarter assassination, and "complex" attack types that do not include explosive devices. "Murder" events have been excluded and the shootings have been manually reviewed and screened by the author to rule out events that appear to be criminal rather than insurgent. The result is still somewhat subjective, but a valid attempt has been made to create statistics that reflect (as accurately as possible) insurgent use of gunfire.

x   The Islamic State does occasionally kill off-duty ISF senior officers and get suicide bombers inside security force and tribal headquarters, but such incidents are not happening more than once every month at the current time.

y   By "quality attacks," the author means attacks that are effective in overcoming defensive measures to strike protected targets. This is a means of differentiating a high-quality, close-quarter assassination from an inaccurate spray of drive-by gunfire, for example.

z   Such as rocket and mortar attacks, and unattended IEDs.

aa The Islamic State has begun monthly attacks on electricity pylons in the Haditha to Ramadi corridor, seemingly as a punitive measure against the population. (Similar efforts are mounted in Diyala and Salah al-Din). Author's SIGACT dataset.

ab Again, this phrase reflects the perspective of Sunni populations toward outside forces.

ac National Democratic Institute polling suggests that the PMF had a 60% favorability rating in Anbar in March-April 2017, versus 38% in January 2016. See Greenberg Quinlan Rossner Research, "Improved Security Provides Opening for Cooperation," March – April 2017 Survey Findings," p. 20.

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ad It is no coincidence that these were the most violent parts of Arab Iraq prior to 2014.

ae In particular, unit command appointments became concentrated in the hands of Shi`a political appointees and fighters seconded from the Islamist militias to the security forces. See Knights, "The Future of Iraq's Armed Forces," p. 41.

af The PMF includes many units drawn from local communities who are employed within their own communities (e.g., Sunni tribesmen from Anbar or Salah al-Din used to liberate their own districts). These PMF tend to answer to the local ISF chain of command and enjoy local legitimacy. Problems typically arise when the PMF are brought from outside the area, including use of southern Shi`a led by Iranian-backed commanders to garrison northern Sunni areas.

ag This has been evident in places like Yethrib, Muqdadiyah, and Tikrit. See "Diyala Governor Splits Sunnis to Defeat Impeachment Bid," *Inside Iraqi Politics* 134 (2016).

ah It is again no coincidence that these were the most violent parts of the federal Iraq/Kurdistan disputed boundary prior to 2014.

ai These are Bai Hassan and Avana oilfields.

Rabiya sub-district in northern Sinjar,[aj] and the Zarga farmlands southwest of Tuz Khurmatu city.

Special attention should be focused on the Dibis district, where there is a growing local insurgency that is partly supported by the adjacent Islamic State pocket at Hawija but that appears to be at least partly organic to the area and its Sunni farming communities. Dibis includes large numbers of Sunni villages that were built on top of demolished Kurdish farms by the Baath regime. When such villages were liberated from the Islamic State, Kurdish forces took the opportunity of leveling them in order to prevent the return of displaced Sunni inhabitants. The result has been an escalating local Sunni insurgency. In April-June 2017, there were an average of 15 explosive events per month (mainly oil and electricity infrastructure attacks) in the 25-by-10-mile Dibis district versus an average of two per month in the same period in 2013. The Islamic State has been undertaking 'quality' attacks in the area; for example, one Islamic State cell penetrated more than 10 miles into the Kurdish domination zone in Dibis to specifically execute a village headmen (*mukhtar*) as well as religious and police leaders within a Sunni hamlet.[40]

It is also worth looking at three parts of the Shi`a colonization zone for indicators of the intensity and shape of future Sunni insurgencies in Iraq. The first is Diyala province, where Alex Mello and this author explored the evolution of Islamic State insurgency in 2015-2016 in a recent article for this publication.[41] (Diyala is a thoroughly mixed Sunni-Shi`a province where a slender Sunni majority is under the firm control of the Badr organization,[42] an Iranian-backed political party and the main bloc within the Shi`a PMF.) Without reiterating all the background points in that study, it is important to underline that Diyala is presently suffering a more intense insurgency than at any time since al-Qa`ida in Iraq's heyday in the province in 2007-2008.[43] In April-June 2017, there were more explosive events (169) than there were in the equivalent period of 2013 (118).[44] Small-arms fire attacks and other direct engagements are now occurring at nearly double the frequency of 2013 (70 attacks in April-June 2017 versus 43 in April-June 2013).[45] What observers are seeing in Diyala is a full-fledged Islamic State-led insurgency that draws on support from the adjacent ungoverned space of the Islamic State pocket north of the Diyala River (in the Hamrin Mountains, Jallam desert, and Hawija). The insurgency has attained a steady, consistent operational tempo of roadside IED attacks, mortar strikes and raids on PMF outposts, and attacks on electrical and pipeline infrastructure.[ak] In Diyala, the Islamic State is already engaged in the kind of intimate violence that was seen across northern Iraq in 2013: granular, high-quality targeting of Sunni leaders and tribes working alongside the PMF.[al]

Adjacent Salah al-Din province seems to be one step behind Diyala, perhaps because the Islamic State has been conducting an insurgency in Salah al-Din for 18 months rather than nearly 30

"Diyala is presently suffering a more intense insurgency than at any time since al-Qa`ida in Iraq's heyday in the province in 2007-2008."

months in Diyala.[am] It is worth looking back at the transformation that the Sunni insurgents made in 2009-2013 in Salah al-Din to get a sense of the potential for violence within the province. In 2009, Salah al-Din was still in the grip of a machine-like insurgency; roadside bombing crews pumped out IED attacks on the coalition main supply route up the Tigris River Valley, and indirect fire cells kept up a rote pattern of rocket and mortar attacks on U.S. bases.[46] Just over 90 explosive events were carried out each month with cold-blooded, assembly-line regularity. But by 2013, the ingrained pattern had shifted. Roughly 90 explosive events were still delivered each month but against Sunni opponents, Shi`a, and local police forces, not against the long-departed coalition transport columns and logistics. From 2011 to 2013, the amount of small-arms fire in Salah al-Din increased from an average of six attacks per month to 36 attacks per month.[47] The Islamic State very effectively reshaped the ingrained nature of the local insurgency within just two years after the U.S. departure.

Today's insurgency in Salah al-Din does not have to make the same radical reorientation as it did in 2009-13 to sustain itself, and it is gradually recovering. The number of explosive events each month averaged 48 in April-June 2017 versus 77 in April-June 2013.[48] As in Anbar, most attacks harass rather than kill; Salah al-Din witnesses very large numbers of mortar attacks, regular roadside IED attacks, and efforts to target and overrun static checkpoints and bases.[49] The ungoverned space of the Hamrin Mountains, Jallam desert, and Hawija provides a base from which to resource, plan, and launch attacks. The passivity of ISF and PMF units has allowed the Islamic State to mount a surprising number of well-conceived raids of sufficient scale to overrun large villages and penetrate security force headquarters.[an] As in Anbar, however, the Islamic State is not yet engaging in intimate targeting within Salah al-Din's Sunni communities to change the local balance of power. At present, insurgents overwhelmingly target fielded ISF and PMF units using explosive devices, with very little targeting of civilians and almost no surgical assassinations of Sunni leaders.[ao]

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aj   Rabiya, an Arab majority tribal district, was controlled by Iraqi army forces until 2013, lost to the Islamic State in 2014, and liberated and occupied by the Kurdish Peshmerga since November 2014.

ak   Local insurgents have repeatedly bombed power pylons, transformer yards, and the Iranian gas pipeline supplying Mansouriyah power station with fuel. Author's SIGACT dataset.

al   The Islamic State has operated inside Sunni villages, striking at the homes of local sheikhs and hitting the protective security details of key Sunni political and security leaders. Author's SIGACT dataset.

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am   The Islamic State transitioned to insurgency in Salah al-Din by the start of 2016. In Diyala, the Islamic State has been fighting a major insurgency since the start of 2015.

an   The Islamic state is regenerating a capacity to penetrate well-garrisoned areas like Samara city (which was attacked by five suicide-vest attackers on June 16, 2017) and defended locales like the Karkush military base and the Diyala provincial council (both struck by suicide bombers in May 2017). Author's SIGACT dataset.

ao   There was an average of just 12 shooting attacks per month in April-June 2017 versus 36 per month in the same period of 2013. Author's SIGACT dataset.

A clear increase in violence is occurring in the Baghdad belts,[ap] and this is disconcerting because the cross-sectarian rural districts around the capital had been relatively secure for most of the period since the U.S. surge and Iraqi Awakening in 2007-2008.[50] The Baghdad belts were the launchpad for Sunni militancy in the capital in the worst months of the insurgency, but these areas never seemed to be integrated fully into the Islamic State's resurgence after 2012, possibly due to the disproportionate concentration of ISF and later Shi`a militia forces around the Iraqi capital.[51] Now there seems to be a determined effort by the Islamic State to return to the Baghdad belts.[52] Explosive events are now higher than 2013, with 151 explosive events in April-July 2017 versus 123 in the same period in 2013.[53] Shooting incidents are on par—51 in April-July 2017 versus 57 in the same period in 2013.[54] The Baghdad belts are suffering a coordinated campaign of anti-civilian bombings that appears intended to stoke sectarian tensions. In April-July 2017, the Islamic State and other Sunni insurgents appear to have launched at least 88 local bombings against shops and fish markets.[55] These occurred in all the quadrants of the belts: Taji and Tarmiyah to the north; Nahrawan and Jisr Diyala to the east; Mada'in and Yusifiya to the south; and Abu Ghraib to the west. Forty-four civilians were killed and 290 wounded in the attacks.[56] The stoking of sectarian tensions with large numbers of micro-bombings and shootings could be an effective tactic, particularly if PMF and ISF units retaliate against Sunni civilians and so should be monitored closely.

Implications for Counterinsurgents

The analysis above indicates that the Islamic State in Iraq is not a movement in disarray at the loss of its territorial holdings; rather, it has moved on. The Islamic State's current insurgent operations in Iraq have reset at the 2013 level, as opposed to the movement's nadir in 2011. Thus, the liberation of the cities has only turned back the clock to one of the most dangerous moments in post-Saddam Hussein Iraq's history. The battles fought since 2014 have given Iraq and its allies a second chance to try again to kill off the Islamic State insurgency, but success in this venture is not assured. Iraq's government and its international partners need to achieve results in three areas to reduce the chance of a new wave of strong Sunni insurgencies in Iraq.

First, the ISF need to be both stronger and smarter at counterinsurgency. Combined Joint Task Force Operation Inherent Resolve (CJTF-OIR) needs to continue and evolve its training, equipping, advising, and assisting of the ISF.[57] Having supported Iraqi forces in fighting conventional battles, the focus of training ought to now switch back to counterinsurgency and counterterrorism. The ISF, PMF, and Kurdish Peshmerga today are woefully deficient in most of the practical requirements of counterinsurgency. Avoidable casualties from mortars, rockets, roadside bombs, and shootings are suffered by the security forces because of a simple lack of force protection. Troops are moving in unarmored vehicles; convoy security and route clearance procedures are absent; medical services

> "The Baghdad belts are suffering a coordinated campaign of anti-civilian bombings that appears intended to stoke sectarian tensions."

are almost nonexistent; and outposts are not sufficiently fortified.[aq] International advice, training, and engineering support can help rectify these shortfalls. There are strong arguments for the coalition to also play a role in blunting Islamic State strategic terrorist attacks against Baghdad, other Shi`a cities, and the Kurdistan Region.[58] Such attacks always hold the potential to create game-changing anti-Sunni and anti-Arab backlash that could collectively punish Sunni civilians and ultimately benefit Sunni militants.

The philosophy and tactics of counterinsurgency also need to be adopted by the ISF, PMF, and Kurdish forces. Too often, such forces fail to protect the Sunni population and allow themselves to become alienated from local people. The above analysis suggests that a basic problem in Iraq today is that too many districts lie within the colonization zone, and too few are within the partnership zone. At present, liberated Sunni communities are too numbed to develop resentment toward outsider ISF and PMF units, but in a short period of months or years, the insurgents will begin to exploit any divisions between the people and the security forces. The next generation of Sunni insurgents might not appear to be led by the Islamic State, either because they are genuinely new homegrown groups or because they are rebranded Islamic State cells. In addition to slow-burn national reconciliation initiatives, the Iraqi and Kurdish governments would be well advised to intensify local security partnerships (with locally recruited and commanded Sunni Arab forces) to prevent an incremental comeback by insurgents.[59] Open-ended garrisoning by predominately Shi`a non-local PMF creates ideal conditions for militant resurgence. If the PMF are to remain a part of the security environment in Sunni Iraq, for the sake of Iraq's future they need to be predominately Sunni PMF operating on a separate chain of command[60] from Iranian-backed PMF leaders such as U.S.-designated terrorist and PMF deputy commander Abu Mahdi al-Muhandis.[61]

Lastly, insurgent sanctuaries in ungoverned spaces must be minimized. Staunching the connection between Iraq and the civil war in Syria is an obvious but difficult task that will require specialized train-and-equip programs for the ISF.[62] Coordination with security forces on the Syrian side of the border would ideally be tight, whether they are friendly toward the Iraqi government, the coalition, or both or neither. At least as importantly, Iraq needs to focus on its domestic insurgent sanctuaries. Embedded advisor and intelligence cells will be needed for multiple years to keep up the tempo of counterinsurgency operations in Anbar, Salah al-Din, and the Baghdad belts. Though the dominance of Iranian-backed Shi`a militias has precluded CJTF-OIR presence in Diyala so far, this is the province where the ISF needs the most support. In both Diyala and

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ap The rural districts bordering Baghdad but not within the city limits (*amanat*) include places like Taji, Mushahada, Tarimiyah, Husseiniyah, Rashidiyah, Nahrawan, Salman Pak, Suwayrah, Arab Jabour, Yusufiyah, Latifiyah, Iskandariyah, and Abu Ghraib.

aq These impressions were formed from a synthesis of the author's dataset and review of many hundreds of images of ISF, PMF, and Kurdish troops moving and operating.

Salah al-Din, the prevalence of non-local Shi`a militia garrisons coincided with the strong and near-immediate bounce-back of the insurgency to 2013 levels. Iraq and the coalition have been clearing outward toward the north and the west, but in the coming year Iraq must turn inward to remove the internal ungoverned spaces in Hawija, Hamrin, Jallam, Anbar, and eastern Diyala. This will mean learning how to rewire command and control of operations to allow the ISF, PMF, Kurds, and CJTF-OIR to work together in a shared battlespace.

Analytical Challenges

Analysts trying to track and predict the insurgent landscape in Iraq can draw many lessons from the period during which the Islamic State recovered its potency in 2010-2014. The first and most important lesson is the need to go to extraordinary lengths to maintain reasonably good security incident datasets. Such metrics help analysts spot trends, but as importantly, they make it possible to convince leaders that changes are occurring. The difficulty is that good-quality attack metrics are even harder to acquire now than they were in the 2009-2011 period, when coalition forces were last leaving Iraq. Today's Iraq is even less open to media reporting on security incidents than the Iraq of 2011-2014, with today's reporters constrained in their movement and reporting across swathes of Salah al-Din and Anbar, plus all of Diyala province.[63] Local commanders may downplay or overplay security challenges in their areas of operation depending on their situation. This places maximum stress on inventive modes of data collection. All diplomatic, coalition, private security, and open-source analysts need to cooperate and exchange information as freely as possible. Mining of social media data and geolocation of imagery is particularly important,

but efforts should also be made to support the work of Iraqi journalists and civil society activists who can directly access the rich on-the-ground data that allows analysts to understand, for example, whether a shooting is a criminal drive-by versus a carefully planned intimidation attack on a key sheikh.

A second analytical lesson relates to the issue of the qualitative detail of security incidents. As noted earlier, the Islamic State was often at its most dangerous when its attacks were the quietest. In 2012, the author commented on this theme, which is worth reproducing here:

> *"The fastest-growing class of violence comprises the 'intimidation and murder' categories, including close-quarters shootings, under-vehicle bombs, fatal stabbings, punitive demolition of property, and the kidnap of children. These are the categories of violence that are least noticed and least often counted by the Iraqi press or by foreign government agencies, yet they may be the most vital indicators of where Iraq is headed. Fewer people may be dying each month, but they are increasingly the right people—in other words, illustrative violence against community leaders that has broad impact within communities and helps insurgents regain freedom of movement. This high-impact, low-visibility violence typifies the insurgency of today and tomorrow in Iraq. If we don't count such incidents, then of course Iraq will appear more stable."[64]*

To avoid being set up for a further surprise, analysts of insurgency in Iraq should not only recognize that incident metrics are only ever an incomplete sample, but should also look beyond quantitative trends to spot qualitative shifts that may be of far greater consequence.   CTC

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The Mujahidat Dilemma: Female Combatants and the Islamic State

By Charlie Winter and Devorah Margolin

There has been an apparent shift in the Islamic State's position on whether or not women can participate in combat. While female suicide bombers were used extensively by the Islamic State's predecessor group, al Qa`ida in Iraq, the Islamic State strictly mandated that women should be wives and mothers rather than fighters. With the group under pressure and facing recruitment challenges, two recent announcements suggest it has lifted its moratorium on women combatants, a shift that could have significant implications for regional and international security.

On July 8, 2017, an image emerged from Mosul in which a young woman was shown cradling a baby as she walked through the ruined streets of the old city, flanked by members of the Iraqi security forces.[1] Moments after the image was captured, the woman—who remains, as of yet, unidentified—allegedly detonated an explosive device that had been concealed in the bag at her side. The explosion was reported to have killed the woman and her child, and injured a number of civilians in the vicinity, as well as two Iraqi soldiers. As the battle for Mosul drew to a close after more than nine months of intense urban warfare, reports such as this one have emerged with increasing regularity. Indeed, by mid-July, more than 30 women were alleged to have engaged in suicide operations.[2] The Islamic State has not yet claimed any of these attacks, and it could be that it never will. Regardless, the surge of reports regarding alleged female suicide bombers in the Islamic State's territories raises important questions regarding the organization's position on women's participation in war.

While, in recent years, most allegations regarding women bombers in Iraq and Syria have been dubious, there is reason to believe that at least some of these latest reports from Mosul are credible.[a] The Islamic State has not acknowledged responsibility for these reported female suicide bombings, but it *has* modified its ideological position on the permissibility of female combatants recently, adopting a stance distinctly reminiscent of its predecessor, al-Qa`ida in Iraq (AQI). Until now, this shift has gone largely unnoticed.

In the following pages, the authors examine the documents that marked this turnaround, as well as the policies that were antecedent to it. By analyzing the Islamic State's Arabic- and English-language literature on the matter, the authors demonstrate that, notwithstanding a handful of unconfirmed reports about female suicide bombers, the group's embargo on female fighters had been remarkably consistent until recently.[b] They show that, whether or not women are already being posted to the battlefield—and there are increasing numbers of reports that suggest they are—these announcements lay the theological foundations for a development that could have significant implications on the war against the Islamic State not just in Iraq or Syria, but the rest of the world, too.

The article proceeds in five parts. First, it sets out the shift in Islamic State rhetoric on the issue, before tracing the roots of the most commonly held jihadi stance on women in war. Next, it sets out the position that was adopted by AQI, the Islamic State's predecessor, in the 2000s. After that, it explores a range of official and semi-official discussions on female combatants released by the Islamic State between 2014 and 2017. The authors conclude by discussing what this shift actually means to those fighting against the organization or shaping policy to counter its terrorist endeavors abroad.

A New Era?

In July 2017, the Islamic State published the 11th edition of Rumiyah, its official magazine.[3] Released each month in a number of languages—the issue in question was published in English, French, Bosnian, German, Indonesian, Kurdish, Pashtu, Russian, Turkish, Uyghur, and Urdu—Rumiyah is a repository for Islamic State news, speech transcripts, and infographics. However, it is perhaps most

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a   It should be noted that a significant number of women have been reported to have carried out suicide operations on behalf of Wilayat West Africa (Boko Haram), the Islamic State's affiliate in West Africa. It appears that the group has not been guided by—or has not cooperated with—official Islamic State policy. Jason Warner and Hilary Matfess, *Exploding Stereotypes: The Unexpected Operational and Demographic Characteristics of Boko Haram's Suicide Bombers*, (West Point, NY: Combating Terrorism Center, 2017).

b   For example, in October 2016, Aymenn Jawad al-Tamimi published a document being circulated among Islamic State supporters in which the author referred, in passing, to a female suicide bomber who had killed herself in an operation in northern Syria. Beyond the fact that the perpetrator was a woman, no other information was offered about the attack, so it was not possible to verify it. See Aymenn Jawad al-Tamimi, "The Archivist: Stories of the Mujahideen: Women of the Islamic State," Jihadology, October 17, 2016.

important for its role—alongside the Islamic State's Arabic-language newspaper, *al-Naba'*—as an arbiter of organizational policy.

One of Rumiyah's recurring features is ideological content tailored specifically to the interests of female supporters. In this regard, its essay, "Our Journey to Allah," did not fail to deliver.[4] The article was a four-page polemic encouraging women in the Islamic State to remain "steadfast and unshakable" in the face of adversity and support their husbands as they fought off the so-called caliphate's encroaching enemies.[5] Parroting the usual organizational line, it held that women are first and foremost "wives" and "mothers" who "must fulfill" their duties "attentively," and refrain from complaining when their husbands "practice the sunnah [Prophetic tradition] of polygamy."[6]

The article would have been wholly unremarkable were it not for four sentences toward the end in which the author declared, by analogy, that women could now take up arms in combative jihad. It was stated that the time had come for them to "rise with courage and sacrifice in this war" and follow in the footsteps of Umm 'Amarah, a female companion of the Prophet Muhammad who is said to have defended him at the Battle of Uhud along with four other women, one of whom is said to have been pregnant at the time.[7] Female supporters of the Islamic State, the article held, were now encouraged to emulate Umm 'Amarah's example and take to the battlefield "not because of the small number of men but rather, due to their love for jihad, their desire to sacrifice for the sake of Allah, and their desire for Jannah."[8]

This call-to-arms compounded an assertion made in *al-Naba'* in December 2016 that "jihad is not, as a rule, an obligation for women, but let the female Muslim know as well that if the enemy enters her abode, jihad is just as necessary for her as it is for the man, and she should repel him by whatever means possible."[9] Taken together, these declarations—both of which reframed the Islamic State jihad as a defense—seemed to suggest that the caliphate had at least rhetorically lifted its moratorium on female combatants.

Before examining how and why this matters, it first serves to contextualize the issue within the wider ideology of jihadism.

Jihadis and Women at War

In recent decades, jihadis have tended to coalesce around the view that women—whom they revere as wives, mothers, and educators of the next generation—should not engage in combative jihad—unless, that is, extenuating circumstances demand otherwise.[10] This position is based on a doctrine of military jihad that dates back to the early years of Islam and that has been revisited multiple times by Islamic scholars. The doctrine was developed in order to distinguish between times of war and peace as well as the relations not only between Muslim nations, but also between Muslims and their non-Muslim neighbors. While interpretations of it have fluctuated significantly over the last 1,400 years, the position on women in war has remained relatively consistent. Female Muslims were generally discouraged from ever participating in battle.

This changed when 'Abdullah 'Azzam, building off the writings on defensive jihad by the Egyptian Islamist 'Abd al-Salam al-Faraj, cleared the theological way for female combatants.[11] In his most famous *fatwa*, which was popularized in the 1980s, 'Azzam determined that defensive jihad was a *fard 'ayn* (a personal duty) for all Muslims, men and women.[12] While relatively revolutionary, this was not a blank check for women to participate in combat. 'Azzam's position was more nuanced than that. He ruled that female fighters,

while in theory permissible, had to be confined to certain contexts and could only engage when the jihad was defensive.[13] This contention was supported by senior jihadis like the al-Qa`ida ideologue 'Abd al-Qadir bin 'Abd al-'Aziz (Sayyid Imam al-Sharif), who argued that women should be given military training, but only insofar as it would equip them for self-defense against the enemies of Islam.[14]

In sum, the stance on women's participation in combat most often adopted by jihadis is distinctly ambivalent. Females are not *meant* to fight, but there are conditions whereby it theoretically becomes permissible. However, as scholar Nelly Lahoud found, even when conditions for permissibility arise, it is rare indeed for them to actually be conscripted.[15]

While it may not have been the first jihadi outfit to militarize women, AQI was a trailblazer in taking this idea from theory to practice.

Al-Zarqawi's Mujahidat

In the context of AQI, women combatants were destined to become commonplace. Indeed, during the second half of the 2000s, dozens were reported to have been dispatched on suicide missions for the group.[16]

The female bomber phenomenon first emerged in Iraq in 2005, a few months after AQI's leader, Abu Mus'ab al-Zarqawi, released a 97-minute statement entitled "Will the Religion Wane While I Live."[17] In it, he specifically discussed the role of women in jihad, noting that the pressure Sunni Muslims were facing from the occupation in Iraq at the time required that they take a more proactive role. Referring to the precedent set by Umm 'Amarah—the same female companion of the Prophet Muhammad discussed by the Islamic State of late—al-Zarqawi declared that "the *mujahidah* woman is she who raises her child not to live, but to fight and then die so that he may live and be free. What a great endeavor and what a supreme intention."[18] Minutes later, al-Zarqawi can be heard speaking of "the many *mujahidah* sisters in the Land of the Two Rivers [Iraq] who are requesting to perpetrate martyrdom-seeking operations." While al-Zarqawi refrained from confirming whether or not these requests were granted, his words seemed to foreshadow the beginning of what would become AQI's systematic militarization of women.[19] Indeed, in the months and years that followed this speech, female bombers came to play an instrumental role in the Iraqi insurgency, in many ways proving to be more useful than male operatives as they were generally less conspicuous and thus able to slip into areas that were harder to target.

What is widely regarded to have been the first operation by AQI involving a woman came on September 28, 2005, when a female bomber "dressed like a man" detonated an explosive device outside a U.S. military base near Tal Afar.[20] In a statement commemorating the attack, AQI's spokesman at the time, Abu Maysarah al-'Iraqi, declared the bomber to be "a noble sister" who was acting "heroically in the name of her religion."[21]

A few days later, al-Maysara commemorated another attack, this time in Mosul, in which a pair of bombers descended upon a U.S. convoy. His statement read:

> *"The brother assaulted a convoy of the Cross worshippers in the Baladiyyat district of East Mosul, destroying, by the will of Allah, an armoured vehicle and killing all those within it, thanks be to Allah and His Grace. Then, [the brother's] wife—and what a wife she was—plunged into another Crusader convoy in the Hadba' district, crying 'By the Lord, I*

succeeded.' By the will of Allah, she destroyed an armoured vehicle, killing everyone within it, thanks be to Allah and His Grace."[22]

To be sure, these operations and others like them—including one that involved the Belgian convert Muriel Degauque—were controversial.[23] However, according to al-Zarqawi's reading of jihadi doctrine, they were justified both tactically, as a way to strike the adversary, and strategically, as a way to shame men into taking up arms.[c] As such, they continued unabated even after al-Zarqawi died and AQI began operating under the guise of the Islamic State of Iraq.[24] Indeed, with the onset of the 2007 surge, the rate of female suicide bombings actually *increased*, peaking in 2008 as an apparent result of the unprecedented pressure on the organization at the time.[25]

An Uneasy Moratorium

For reasons that remain unclear, at around the turn of the decade, the Islamic State of Iraq determined that female participation in combat was no longer permissible. While the organization never specified why, this was perhaps due to the gradual withdrawal of U.S. troops, who had served to justify its 'extreme' measures. However, even though reports about women bombers unequivocally dried up, the group never fully shut the door on its former position.

As such, even though its stance regarding the impermissibility of female combatants was, until recently at least, unambiguous, the Islamic State never refrained from revering the female fighters that had taken up arms as part of its forebears. Take, for example, Sajida al-Rishawi, who was arrested in Amman, Jordan, in 2005 after she failed to detonate an explosive device at a wedding in the Radisson Hotel. In February 2015, years after she had faded from the public eye, al-Rishawi's name returned to the headlines when the Islamic State demanded that she be released from death row in exchange for the lives of Kenji Goto, the Japanese photojournalist it had taken hostage the year before, and Mu'adh al-Kasasbeh, the Jordanian pilot that had crash-landed near Raqqa at the end of 2014. After weeks of negotiations and the deaths of both Goto, who was beheaded by Mohammed Emwazi (aka 'Jihadi John'), and al-Kasasbeh, who was burned alive in a cage, al-Rishawi was hanged by the Jordanian government.

Among other things, this episode drew attention to an implicit contradiction within the Islamic State's ideology. When it came to honoring the life of al-Rishawi, the group's support for her as a would-be AQI bomber was unambiguous. However, at the same time, the Islamic State was, and for a number of years has been, an ardent opponent of female combatants, let alone bombers. Indeed, over the course of the Islamic State's short tenure as caliphate, its propaganda had been replete with theological, emotional, and political arguments against the appearance of women on the battle-

Muriel Degauque, the Belgian woman who committed a suicide bombing attack against a U.S. Army convoy in Iraq in November 2005. (Virginie Lefour/ AFP/Getty Images)

field, a stance that contradicted that of the organization to which it owed its existence.

Until recently, this had continued to be the case. Indeed, the Islamic State had not had to meaningfully engage with the dilemma of female combatants until it started hemorrhaging territory. After all, after it declared itself a caliphate in 2014, the group not only enjoyed the presence of tens of thousands of fighters from abroad—and hence was not suffering from any manpower shortages—it had unambiguously framed its jihad as offensive, not defensive. However, now that its caliphate has been pushed to the brink of territorial collapse, the nature of its jihad has seemingly changed back to a defensive stance. As such, so too has it had to revisit its position on the issue of female combatants.

The Ideal Muhajirah: Between Myth and Reality

In the summer of 2014—when the Islamic State seized Mosul, expanded across Syria, and declared a caliphate—the organization became a daily fixture in the global news media. One facet of it that received the steadiest stream of attention was its female supporters, the so-called 'jihadi brides' that had traveled from across the world to join it as *muhajirat* (female migrants). The Western tabloid press in particular fetishized this phenomenon, providing regular reports on women in the Islamic State that were often reductive and misleading.

The myth of the female foreign fighter largely owes its existence to claims made on social media by Western *muhajirat*, who frequently alleged that they were training for combat and participating in skirmishes.[26] The reality of life for women in the Islamic State was significantly different from what these notorious accounts sug-

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c   This latter sentiment was apparent as early as January 2004, when al-Zarqawi released a speech shaming men for not rushing to join his group. He declared, "The war has broken out, the caller to jihad has called for it, and the doors of heaven have been opened! So if you don't want to be of the knights, then make room for the women to wage war, and you can take the eyeliner." Al-Ansar Media Battalion translation, Abu Mus'ab al-Zarqawi, "Join the Caravan," January 4, 2004. The authors wish to thank Brian Fishman, Craig Whiteside, Christopher Anzalone, Jean-Charles Brisard, and Catherine Philip for their help in tracking down the exact release date of this statement.

gested—more a manifestation of jihadi conceptions on the idealized role of women than anything else. Female supporters were expected to marry strangers, stay indoors, and support the jihad from far behind the frontlines. Given that promises of empowerment and participation were instrumental to the group's appeal, it is unsurprising that the social media myth—in which women were given roles as gun-toting soldiers and enforcers—did not live up to reality.

Examination of the Islamic State's Arabic- and English-language propaganda offers a more accurate picture of what life was like for female members of the group, one that has repeatedly been echoed in the accounts of women who married into it and were subsequently captured as they fled from places like Raqqa and Mosul in 2017.[27] There are three principal sources that discuss the role of women in the caliphate: first, the Khansa' manifesto on women; second, the Zawra' treatise on female combatants; and, finally, the women-orientated articles in its magazines, Dabiq and Rumiyah, and, to a slightly lesser extent, its newspaper *al-Naba'*. Together, these three sets of material illustrate the realities and evolution of women's roles in the Islamic State far more reliably than the personal propaganda disseminated by *muhajirat*.

The Khansa' Manifesto

The Khansa' manifesto, which was first circulated online by Islamic State supporters in early 2015, offered explicit advice regarding the role of women in the Islamic State.[28] The manifesto's author—who claimed to be affiliated with the Khansa' Brigade, an all-female policing unit operating in Raqqa at the time—stated that their "fundamental function" was "in the house, with [their] husband and children."[29] There were some exceptional circumstances in which female supporters would be permitted to leave their homes—for example, to study their religion and to engage in medical work.[30]

On the question of whether or not women could participate in combative jihad, the document was unequivocal. Women were expressly forbidden from fighting unless circumstances demanded otherwise. Indeed, the text held that women may engage in combat "if the enemy is attacking [their] country, and the men are not enough to protect it, and the imams give a *fatwa* for it, as the blessed women of Iraq and Chechnya did with great sadness."[31] According to the Khansa' manifesto, then, women could theoretically participate in combative jihad, but only in highly specific circumstances, which female jihadis in Iraq and Syria were not facing at the time that it was published.

The Zawra' Foundation

The Zawra' Foundation—another female-orientated propaganda outlet aligned with the Islamic State—upheld the above position when it released a treatise on women and combat in August 2015.[32]

Entitled "Valuable Advice and Important Analysis on the Rules for Women's Participation in Jihad," the Zawra' treatise noted that there are four conditions in which women may engage in combative jihad—first, "if a woman is raided in her house, she may defend herself;"[33] second, if she is "in a hospital or a public place attacked by the *kuffar* … and she has a [suicide] belt with her, she can detonate it;"[34] third, "if she is in a solitary place and has been ordered by the *amir*," she may use a sniper rifle; and, finally, "martyrdom operations are permissible for women but only if the *amir* has permitted it, and it is for the public good."[35]

The brief treatise concluded by advising that women should not preoccupy themselves with the idea of engaging in combative jihad, but should instead focus on "nursing, cooking, [and] sewing," though it was permissible for them to train with "weapons" for purposes of self-defense.[36] In this sense, the text reiterated the Islamic State's position that women could only engage in combative jihad if the circumstances demanded it and they were specifically instructed to by their emir, or if they were attempting to protect themselves.

Dabiq, Rumiyah, and al-Naba'

Between 2014 and 2017, the Islamic State intensively discussed the role of women in publications like Dabiq and Rumiyah, both of which are al-Hayat Media Center products, and *al-Naba'*, which is published by the organization's Central Media Diwan.

While, when it was last in circulation, Dabiq offered a slightly more ambiguous stance than that of Rumiyah and *al-Naba'*, it was still clear about what women should prioritize as supporters of the Islamic State jihad. For example, in its first "To Our Sisters" feature, Dabiq interviewed the erstwhile wife of Amedy Coulibaly, who killed four civilians at a Jewish grocery store in Paris in January 2015.[37] Hayat Boumeddiene—or as she came to be known, Umm Basir al-Muhajirah—called upon her female readership to:

> *"Be a base of support and safety for your husbands, brothers, fathers, and sons. Be advisors to them. They should find comfort and peace with you. Do not make things difficult for them. Facilitate all matters for them. Be strong and brave."*[38]

In spite of the fact that, prior to her husband's attack, she had been photographed training with a crossbow in France,[39] Boumeddiene did not encourage women to take up arms. Likewise, in a later issue of Dabiq, Umm Sumayyah al-Muhajirah, another female member of the Islamic State, echoed this position, writing that women have no place on the battlefield.[40] She noted that:

> *"The absence of an obligation of jihad and war upon the Muslim woman—except in defense against someone attacking her—does not overturn her role in building the Ummah, producing men, and sending them out to the fierceness of battle."*[41]

When it came to Rumiyah, the magazine that replaced Dabiq in September 2016, the Islamic State continued in this vein. For the rest of the 2016 and much of 2017, it doubled down on the fact that women should not engage in combat. Indeed, even when the coalition-backed campaign for Mosul was at its fiercest, the Rumiyah editors were preoccupied with urging their female readership to limit their engagement in jihad to childbearing and providing for their husbands, fathers, brothers, and sons. Articles like "Abide in Your Homes,"[42] "Marrying Widows Is an Established Sunnah,"[43] and "I Will Outnumber the Other Nations through You"[44] invariably focused on the need for women to continue living a sedentary, supportive existence. Of course, this was only up until July 2017, when Rumiyah's combat moratorium was lifted.

For its part, *al-Naba'* discussed the role of women in the caliphate much less than Dabiq or Rumiyah, offering up only a handful of essays between late 2015 and 2017 that discussed issues like the need for female modesty[45] and guidelines for what was considered to be the appropriate dress for women.[46] As was the case with Rumiyah, though, this editorial stance was set to change. In December 2016, it published "I Will Die While Islam Is Glorious," the aforementioned article in which it was asserted that combative "jihad is just as necessary for [the woman] as it is for the man" provided it was occurring in the right context.[47]

Conclusion

Up until recently, the message conveyed to women in the Islamic State's Arabic- and English-language propaganda was threefold: first, female supporters were told to stay at home and maintain a sedentary and reclusive lifestyle; second, they were advised to support the Islamic State through money and words, rather than deeds; and, third, they were instructed to have as many children as their bodies would permit and be open to remarriage if their husband was killed on the battlefield. For years, this tripartite message—which largely conforms to the traditional jihadi reasoning regarding women and war—was consistently and clearly disseminated by the Islamic State from multiple official channels in multiple languages. Women in the caliphate were cherished as necessary parts of the jihadi project but never encouraged to engage in violence, and on the rare occasion that they did, the organization's ambivalence was clear.[d]

However, as the Islamic State's territorial losses and manpower shortages mounted,[e] this position appeared to change. While the extent to which women are formally being operationalized currently remains unclear, the Islamic State undeniably began to sow doubt as to the impermissibility of female combatants from the end of 2016 onward, as the abovementioned articles in *al-Naba'* and Rumiyah indicate. In so doing, it drew on the very same theological precedents referred to by al-Zarqawi in 2005, when he first substantively discussed the role of women in jihad.

Taking this into account, the Islamic State's rhetorical turnaround could turn out to be significant indeed, and with unconfirmed reports of female suicide bombers[48] and snipers[49] streaming out of places like Mosul at an increasing rate, it seems that this shift could already be under way.   **CTC**

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d   For example, the Islamic State refrained from referring to Tafsheen Malik, one of the San Bernardino attackers, as one of its "soldiers," and when three young women attacked a police station in Kenya with knives and firebombs in 2016, its celebration was only tentative. The group commended them, but only inasmuch as they had "shoulder[ed] a duty that Allah had placed on the shoulders of the men of the Ummah." See "A Message from East Africa," in Rumiyah Issue II, October 4, 2016.

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Banning Encryption to Stop Terrorists: A Worse than Futile Exercise

By Aaron F. Brantly

Terrorist groups are increasingly using encryption to plan and coordinate terrorist acts, leading to calls for the banning or backdooring of encrypted messaging apps. This would be misguided. It would not remove the ability of terrorist groups to access this technology and may push them to communicate in ways that are more difficult for Western intelligence agencies to monitor. By creating vulnerabilities in online tools used by a very large number of Americans and other users around the world, it would also expose the broader society to increased security risks.

Calls for backdoors to be placed within popular peer-to-peer messaging applications that use end-to-end encryption, or for these apps to be banned, have become almost a ritual in the wake of terrorist attacks in the West.[1] Although there is substantial evidence terrorists are increasingly using encryption in their communications in planning, providing instruction for, and coordinating attacks, these calls are misplaced and would likely make communications intercepts more difficult except in the very short term.

The debate over encryption and terrorism is complex and multifaceted. Yet at its core, the argument revolves around a decentralized and evolving marketplace that has grown substantially over the last 10 years. Prior to 1992, cryptographic technology was subject to the U.S. Department of State's Munitions List within the International Traffic in Arms Regulations (ITAR). In 1992 and through the remainder of the 1990s, controls on encryption were increasingly reduced and moved from ITAR to the Commerce Department's Export Control List.[2] This shift was pivotal to the expansion of the internet because it made possible secure online commerce and the protection of communications and data. To understand the relationship between encryption and terrorism and the flawed logic of backdoors and banned services requires understanding the need for encryption in everyday life as well as the challenges that would be faced through the restriction of its implementation.

Throughout most of U.S. signals intelligence history, from World War II to the present, the study, development, and code-breaking of encrypted communications was conducted under the highest levels of security.[3] The sale or transfer of information related to the development of cryptography was heavily restricted under ITAR, and its move to the Department of Commerce was largely spurred by a confluence of events. Most notably, in 1992 Congress signed the Scientific and Advanced-Technology Act,[4] which allowed for public and commercial networks to connect with one another. This act and the increasing rise of commercial internet traffic necessitated the implementation of basic encryption to secure communications and commerce.[5] Initial cryptographic implementations were differentiated within the Netscape browser between foreign software distributions and domestic distributions. The intent was to separate and limit the spread of strong cryptography to foreign actors. These two tiers of cryptographic strength established a double standard that hindered international commerce and communications and soon fell by the wayside. Yet, these initial expansions of cryptography into the broader internet led to immediate backlash within law enforcement and intelligence communities.

In testimony before the Senate Judiciary Committee on July 9, 1997, FBI Director Louis J. Freeh lamented:

"The looming spectre of the widespread use of robust, virtually uncrackable encryption is one of the most difficult problems confronting law enforcement as the next century approaches. At stake are some of our most valuable and reliable investigative techniques, and the public safety of our citizens. We believe that unless a balanced approach to encryption is adopted that includes a viable key management infrastructure, the ability of law enforcement to investigate and sometimes prevent the most serious crimes and terrorism will be severely impaired. Our national security will also be jeopardized."[6]

So real was the fear associated with encryption that in 1993 the National Security Agency developed the Clipper Chip, a small computer chip that could backdoor into telecommunications on user devices to provide readily accessible decryption with a warrant.[7] The prototype was never put into operation because a Bell Labs researcher, Matt Blaze, published a paper demonstrating fundamental flaws in the tool that would have resulted in significant security vulnerabilities allowing for the interception of all traffic and data on the devices by third parties.[8] This period, known as the first crypto wars, served as a precursor for today's often truculent debates on the merits and pitfalls of encryption in modern society.

The terrorist attack by Khalid Masood in London in March 2017 and revelations that he used the popular messaging application WhatsApp prior to the attack saw calls within the United Kingdom and the United States for "no hiding places for terrorists."[9] These were renewed after the bombing attack by Salman Abedi in Man-

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chester in May 2017 and the attack on London Bridge and Borough market in June 2017 after which British Prime Minister Theresa May stated, "We need to work with allied democratic governments to reach international agreements that regulate cyberspace to prevent the spread of extremist and terrorism planning."[10] In August 2017, British Home Secretary Amber Rudd called on companies to provide what, in effect, would be backdoors in messaging apps. "We want [technology companies] to work more closely with us on end-to-end encryption, so that where there is particular need, where there is targeted need, under warrant, they share more information with us so that we can access it," she said.[11 a]

There is no doubt that the wide commercial availability of end-to-end encryption has provided terrorist groups with a powerful tool to plan and coordinate attacks in real time. It allowed the Paris and Brussels cell, for example, to enter into extensive contact with Islamic State operatives in Syria during the planning phases of their attacks. That being said, there has been a tendency to scapegoat encryption after attacks in which encrypted messaging apps were not used as far as is known in attack planning (for example, the San Bernardino plot) or not used uniformly by plotters in the lead-up to an attack (the Paris attacks).[b] In fact, there is no significant evidence that any of the attacks that have been perpetrated against the U.S. homeland would have been prevented had encryption been weakened while there were opportunities to identify the cells behind some European attack without encryption messaging backdoors.

Even though end-to-end encryption is proving to be a powerful new tool for terrorist groups, calls to either weaken or provide backdoors into encryption rely on assumptions that both the market for encrypted messaging applications is closed and that weakened encryption is in the best national security interest of the nation. Both arguments are erroneous. To understand why providing backdoors into encrypted messaging applications would fail to stop terrorists requires breaking apart these two assumptions.

WhatsApp iPhone mobile app icon (Hoch Zwei/Corbis via Getty

The Communications Applications Market

The marketplace for messaging applications is diverse.[c] A basic Google search of messaging applications reveals more than 180 different applications spread across dozens of platforms. Thirty-one of these applications have general public licenses (GPL), meaning they are free, often non-copyrighted, and enabled with permissions to copy and/or modify the code.

Put another way, the code behind end-to-end encryption is (and will likely always be) available to terrorist groups. Robert Graham previously discussed the difficulties of preventing innovation and adaptation of source code by terrorist organizations in this publication; his insights remain pertinent and problematic for those who seek to regulate encryption.[12] In a 2014 report on the state of al-Qa`ida encryption, one group of tech analysts noted at minimum six iterations of encrypted communications platforms developed by al-Qa`ida and its affiliates.[13] The development of ad hoc communications platforms or the co-optation of code from other platforms remains an ever-present problem and one that is likely to challenge efforts to implement backdoors or weaken encryption in any given platform.

It should also be noted that many of the messaging applications, which feature end-to-end encryption, are not developed in the United States and would therefore not be subject to U.S. laws. Although the United States could legally force Google Play and the App Store[d] to prevent the downloading of applications that do not conform to U.S. law, this is easily circumvented on phones using Google's Android system. This is because programs (such as, for example, the Berlin-headquartered Telegram) can be downloaded onto Android phones directly from the website of the app developers through APKs[e] due to the fact that Android's entire concept is based on publicly sharing code to create compatibility. This can be

a   The attacks in San Bernardino, Orlando, Paris, and Brussels also spurred discussions on encryption. Russell Brandom, "How San Bernardino changes the FBI's war on encryption," Verge, March 29 2016; Pamela Engel, "The Orlando attack exposes the biggest blind spot in the US strategy against ISIS," Business Insider, June 19, 2016; David Kravets, "FBI Is Asking Courts to Legalize Crypto Backdoors Because Congress Won't," Ars Technica, March 1, 2016; Michael Birnbaum, Souad Mekhennet, and Ellen Nakashima, "Paris attack planners used encrypted apps, investigators believe," Washington Post, December 17, 2015.

b   No evidence has come to light that encryption apps were used by the Orlando attacker, Omar Mateen, in planning his attack. Encrypted messaging applications were used by the cell behind the Paris and Brussels attacks while preparing for the attacks. However, during the 24 hours leading up to the Paris attack and during the attacks, several of the attackers communicated by cell phone calls and text messages. In total, 21 phone calls and two text messages were exchanged in the 24 hours before the Paris attack between the Samsung phone used by the Bataclan attackers and a cell phone geolocated in Belgium. Glyn Moody, "Paris terrorists used burner phones, not encryption, to evade detection," Ars Technica, March 21, 2016; Paul Cruickshank, "Discarded laptop yields revelations on network behind Brussels, Paris attacks," CNN, January 25, 2017; Paul Cruickshank, "The Inside Story of the Paris and Brussels Attack," CNN, March 30, 2016; Scott Bronstein, Nicole Gaouette, Laura Koran, and Clarissa Ward, "ISIS planned for more operatives, targets during Paris attacks," CNN, September 5, 2016.

c   Although there are certain platforms (WhatsApp in particular) within the general population that maintain market dominance, this dominance is a fluctuating phenomenon. "Messaging apps are now bigger than social networks," BI Intelligence, September 20, 2016.

d   Google Play is the name of the applications store run by Google. App Store is the name of the applications store run by Apple.

e   Android Package Kit (APK) is the package file format used by the Android operating system for distribution and installation of mobile apps and middleware.

done via VPN[f] or proxy networks,[g] making it difficult to prevent.

The open nature of the operating systems on which those platforms function complicates regulating the development of backdoors into encrypted messaging programs. Open platforms such as Android are largely non-excludable, meaning they allow users to download material from all websites using compatible code, and any law or policy that restricts or weakens encryption in installed applications could be circumvented through the creation of new programs outside of U.S. jurisdictions. U.S. regulators could, in theory, try to shut down rogue websites offering backdoor-less, end-to-end encryption, but this would likely result in a fruitless game of whack-a-mole across the dark web. Even a shift to force Google to provide backdoors within Android (the base operating system) or to restrict the open nature of its Android platform would not solve the problem as the code for Android is already available publicly and modifiable.[14] In other words, users could just download a non-approved version of Android operating system to run on their phones.

Generating a backdoor into today's leading chat application should not therefore be seen as a long-term solution. Rather, all evidence to the contrary suggests that terrorists will quickly shift to new platforms or innovate and create their own.

While backdoors would provide only a very short-term gain in combating terrorism, there would be significant long-term costs for U.S. companies. Google prides itself on providing a readily modifiable software platform that allows for users and companies to customize their experience. If this customizable experience were curtailed, it would close off portions of Google's market. Mandating laws or policies on encryption would likely cause a shift in application and operating system markets by individuals who value their privacy as well as a shift by terrorists and others away from those products believed to be penetrated by intelligence and law enforcement agencies. This adaptation to market conditions is not hypothetical but is borne out in discussions within Islamic State and al-Qa`ida chatrooms and forums.[15]

A market shift away from U.S. companies would result in billions in lost revenues and undermine many of the core technical communities at the heart of the modern digital economy. Central to the digital economy is trust, and revelations about U.S. espionage severely degrade trust in American companies online.[16] Financial damage done to U.S. firms is also not hypothetical as demonstrated by the losses suffered by American firms following the Edward Snowden leaks.[17] These losses are doubly damaging as they open the door to foreign competitors to step in where U.S. firms are unable to compete due to regulation or revelations of close coordination with the U.S. government. They also potentially expose users to foreign products that might lack the same privacy and security mechanisms commonly included in U.S. products.[18]

A more effective approach than creating backdoors would be to intensify current efforts to intercept terrorist communications. Some encryption tools offering end-to-end encryption can be cracked through a variety of means, including supercomputers.

More practically, the targeted interception of communications of specific subjects of interest has been demonstrated in numerous instances against multiple types of actors who use robust encryption and digital operational security. Western intelligence agencies have the most sophisticated techniques available, but other actors have also proved able to extract information from the devices of individuals using encryption—including recently in Syria by the pro-Assad regime Group5, which used Android malware, PowerPoint files, and other file types to target opposition groups.[19] While the use of end-to-end encryption denies access to intelligence and law enforcement agencies who seek to passively collect large scale communications in transit, the use of targeted intelligence through the introduction of malware and the exploitation of software vulnerabilities and other weaknesses in both the hardware and software of devices likely leaves ample room for the collection of data on the endpoints of communications, which can be helpful in preventing terrorist attacks.[20] In other words, there are powerful tools available to intelligence services to remotely extract messages from smart phones after a particular messaging app (for example, WhatsApp) has decrypted them.

Another argument for not moving toward backdoors is that by fostering close relationships with developer communities and monitoring within the context of acceptable legal parameters, intelligence agencies and law enforcement can keep terrorist adversaries within a more readily monitorable ecosystem.

Innovative techniques to access the content of encrypted messaging apps have been demonstrated by the German Federal Criminal Office (BKA) in instances of countering neo-Nazi groups and jihadi terrorists through the use of custom software tools and the creative manipulation of device registration and login security credentials.[21]

Even in cases where it is not possible or practical to access the content of conversations, the relevant data associated with those conversations is likely to be accessible. This relevant data includes initial registration information, such as phone numbers, email addresses, or usernames, and metadata associated with the transit of data from source to destination through a subpoenable party within U.S. jurisdictions.[22] While these clues might not provide the time and place or plan of attack, they can help a vigilant intelligence and law-enforcement community develop patterns of behavior and network analysis that ultimately may achieve many of the same goals of backdooring encryption without the side effects of platform flight and market disruptions to U.S. firms.[23]

Lastly, there is a false assumption embedded within calls for backdoors and weakened encryption that intelligence agencies and law enforcement will suddenly have instant access to that data. If there were only a few targets of interest, this would likely be true. Following a reasonable legal process of seeking out a warrant, law enforcement could keep surveillance on potential terrorists. Yet, the reality is that the volume of potential information collected far exceeds the ability of intelligence agencies and law enforcement to meaningfully track each individual case to the level of detail required to listen to every communication or message transmitted. Additionally, U.S. law limits what the intelligence community, including the NSA, can collect overseas with the constraints centering

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f   A virtual private network (VPN) extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network.

g   A proxy server is a server (a computer system or an application) that acts as an intermediary for requests from clients seeking resources from other servers.

on "valid targets" relevant to national security.[h]

It should also be noted that even with encryption backdoors, terrorist attacks will still get through because not all terrorists use encryption to communicate their plans. There is no evidence the Boston bombers, the San Bernardino attackers, or the Orlando shooter had any communications with any third-party actors or terrorist groups overseas that would have alerted law enforcement to specific plans to attack.

Breaking Encryption and National Security

Jihadi terrorism is a significant threat, yet it is a threat that must be contextualized within the entire scope of the security needs of the nation. Code, or the logical constructs within which encryption is implemented, is deliberate, and it functions to achieve software goals and objectives. Even without backdoors being mandated by governments, the robust implementation of encryption into messaging applications or other programs is difficult and often fails.[24] And even the best encryption poorly implemented is insufficient to secure communications in digital networks.

From a technical perspective, the addition and manipulation of code that would be necessary to create backdoors undermines security.[25] Programs often contain superfluous code that seemingly has no purpose, yet it is in these areas of inexactitude that malicious parties target their attention. The better a program is written and the more it conforms to secure development lifecycles, the less likely it will be to contain weak spots.[26]

Encryption facilitates a range of social goods that are critical to the functioning of modern society.[27] Encryption underpins the modern financial system and makes it possible to engage in secure commerce. It protects medical records,[28] personal records,[29] corporate secrets, and intellectual property.[30] Encryption is critical to securing the communications of private citizens and businesses. Whether we recognize it or not, encryption is quite literally embedded in our daily lives.

Encryption provides several valuable functions that its deliberate manipulation would endanger.[31] First, and perhaps least importantly, encryption provides confidentiality. The clear majority of ire directed against encryption implementations in applications centers on the ability of encryption to ensure the confidentiality of communications. Second, encryption ensures the integrity of data transmitted. Integrity is of limited concern with regard to popular messaging applications as a dropped line can still contain the context of conversations (the voice might come through slightly scrambled or a bit of text might be missing), but it is of immense value in financial and medical records or other data types that rely on accuracy. Third, encryption ensures authenticity. This is vital both in communications and in data transmission. The ability to authenticate data ensures its trustworthiness. Finally, encryption

allows for non-repudiability. This essentially means that it establishes that the user of a given product is who they say they are and that the data they are transmitting is being transmitted by them and not a non-trusted party.

The backdooring of encryption undermines each of these core competency areas of encryption and potentially opens areas for legal challenges should a case ever be prosecuted. Beyond providing a space for potential legal challenges of intercepted communications, the deliberate weakening of encryption knowingly introduces vulnerabilities into systems that already struggle to establish security. First, a conversation that fails to maintain confidentiality might result in the loss of valuable intellectual property, medical information, or other forms of communications vital to personal, corporate, or other forms of security. Second, the invalidation of the integrity of communications might inadvertently lead to the manipulation of communications, causing individuals to make, for example, financial transactions or medical decisions based on information that is invalid and resulting in damaging outcomes. Third, authenticity ensures that individuals are less susceptible to the manipulation of identity within a communication chain. This prevents such common problems as identity theft. Lastly, and particularly important to financial transactions, is non-repudiability. It is immensely important know that the person requesting some action—for example, a stock trade—is the person asking for it and that they cannot say as some point in the future that their communications were manipulated.

The Core of the Terrorism and Encryption Debate

The debate over encryption has been presented as a tradeoff between a narrow national security imperative and the United States' broader national security interests: Is the possible prevention of terrorist attacks against the homeland sufficient to deliberately undermine the code that underpins the national strength of the United States?

The framing of the debate in this way depends on the premise that backdoors would provide a security dividend when it comes to counterterrorism. This article has argued that in all but the very short term, the reverse may be true because terrorists may move onto parts of the internet that are more difficult to monitor.

But even if the premise of a tradeoff were accepted and even if the deliberate weakening of encryption were guaranteed to prevent all future terrorist incidents in the United States, the debate would still be worth having as it involves a tradeoff that includes balancing the needs of U.S. firms, individuals, and national security.

Those who argue there is a broader national security imperative for encryption include former NSA and CIA Director General (Ret.) Michael Hayden, who has stated "American security is better served with unbreakable end-to-end encryption than it would be served with one or another front door, backdoor, side door, however you want to describe it."[32]

Americans expect their intelligence and law enforcement professionals to be perfect. To achieve perfection, the intelligence and law enforcement communities rightly request every capability available. As General (Ret) Hayden has noted, "the American people expect the CIA to use every inch we're given to protect her fellow citizens."[33] In a public forum conversation between Hayden and Chris Soghoian on ethics at West Point in the spring of 2015, Hayden said "we will only go far as the American people allow us, but we will go all the way to that line."[34] Yet, the line on encryption is not black and

white. To speak the lanuage of software engineers, providing the ability to access all encryption for one *use case*—preventing terrorist attacks—has consequences in virtually all others *use cases*. Nor does the ability to access communications imply that all terrorists will be stopped.

Although encryption is an easy punching bag in the wake of terrorist attacks, weakened encryption is not the panacea it is made out to be. There will continue to be challenges faced by intelligence and law enforcement professionals in stopping terrorists if encryption is weakened, and those challenges could become even greater if terrorists retreat from online ecosystems which are easier to monitor.

Terrorism remains a problem and a challenge to liberal democracy, but undermining the digital security of society without improving the capability of security services in a sustained way to detect terrorist activity is a worse than futile exercise.   CTC

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