A Revolution of Warfare: How IEDs Transformed the Iraq War of 2003-2011

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The Iraq War began on March 20, 2003, and lasted until December 15, 2011. Throughout the conflict, Improvised Explosive Devices (IEDs) were the single greatest threat to U.S. ground forces. According to the Congressional Research Service, IEDs caused over 60 percent of all American combat casualties in Iraq (Wilson, 2007). The effectiveness of IEDs against U.S ground forces made them a significant point of research for the U.S and its adversaries, and changed the strategies used in modern warfare.

Widespread use of IEDs in Iraq demonstrated that local combatants with no formal military training can be of decisive significance in conflict. Local noncombatants' lower entry cost to become effective combatants has changed warfare by increasing weaker states' means of fighting. This change is currently being displayed by the war in Ukraine.

To prevail against a power that holds the home territory advantage, a power that holds the advantage in terms of resources must prevent noncombatants from becoming combatants.

For nonviolent resistance movements, the reader is directed to Popovic (2015) and the CANVAS Handbook for Working with Activists (2017). Both consider how technology has changed the frequency and outcomes of nonviolent resistance movements.. On the psychological factors affecting the resolve of combatants to become noncombatants, the reader is referred to Wang (2022) and Gat (2009).

Review of Research

Mack argues that in asymmetric warfare whichever actor has more resolve to endure hardship wins (Mack, 1975). Arreguín-Toft disputes this and argues that strategic interaction is the most important component in the outcome of asymmetric warfare (Arreguín-Toft, 2001). Arreguin-Toft and Mack support their arguments by examining hundreds of wars from the last century and the factors that lead to their outcome. These arguments are compelling and important, but were written too early to consider the effect that new technologies have on the battlefield.

A vast amount of research has been published exploring why the Iraq war of 2003-2011 did not end when Saddam Hussein was overthrown. Schwartz explores the misconceptions the invading U.S forces had about Iraqi society and the failures in military strategy that contributed to the prolongment of the conflict (Schwartz, 2008). Schwartz describes how the end goals of the U.S. in Iraq were not clearly communicated to the Iraqi people, the American public, and to the U.S. military, and how the stated goals shifted throughout the conflict. Schwartz's analysis focuses on the strategic element of the conflict, but does not address the effect that the accessibility of IEDs had on the conflict.

Rizer argues that the vast employment of landmines has allowed small guerilla forces to bring superpowers to their knees and supports his argument with analysis from the Iraq war of 2003-2011. Much of Rizer's research and analysis is in line with the arguments made in this paper, but Rizer's focus shifts from the effectiveness of landmines to their legality. Rizer does not make the connection between the effectiveness of IEDs, the availability of IEDs, and the effect that this had on the outcome of the war.

Defining the Conflict

The participants involved in the conflict can be split into foreign powers supporting Iraqi insurgents, Iraqi insurgents, and the U.S. and its allies.

Lt. Gen. Raymond T.Odierno, who served as Commanding General of U.S. military forces in Iraq said, "it's clear to us that there are networks that are smuggling weapons, both explosive-formed projectiles, IEDs, as well as mortar and other capabilities from Iran into Iraq" (Washington Times, 2007). While Iran denies involvement, numerous sources document Iranian forces training militant groups in Iraq how to employ IED's, Iranian designed and produced IEDs and EFPs (explosively formed penetrator) being transported into Iraq, and Iranian efforts to destabilize the country (Wilson, 2007). According to U.S. Navy Cmdr Sean Robertson, the DoD assessed that at least 603 U.S. personnel deaths in Iraq were the result of Iran-backed militants (Schogol, 2019). This backing came in the form of supplying proxy groups with equipment ranging from IEDs and EFPs to small arms and improvised rocket assisted munitions (IRAM) (Schogol, 2019). Collectively, this amounted to approximately seventeen percent of all U.S. casualties in Iraq between 2003 and 2011 (Schogol, 2019).

EFPs of Iranian design killed at least 196 U.S. troops and wounded nearly 900 between 2005 and 2011 (Horton, 2020).

Brian Castner, a former U.S. Air Force explosive ordnance disposal (EOD) officer spoke in length to the Washington Times and in his memoir *The Long Walk* about the effectiveness and design of EFPs. Castner describes them as a coffee can shaped charge, packed with plastic explosives, that would melt a contained copper plate into shards that could penetrate armor (fig. 1). These copper shards were capable of reaching Mach 6 speeds and killing or mutilating soldiers inside of an armored vehicle (Horton, 2020). These devices were often hidden in foam

blocks to disguise them as rocks and were feared by U.S. forces due to their effectiveness (fig. 2).

Figure 1: EFPs seized by U.S. Army soldiers near Baghdad in 2008 (Horton, From U.S. Army, 2020)

Figure 2: Brian Castner, a former Air Force explosive ordnance disposal officer, holds an EFP weapon in Kirkuk, Iraq, in June 2006. (Horton, From Brian Castner, 2020)

The Quds force, a branch of Iran's Islamic Revolutionary Guard Corps, provided the logistics support and training to Iraqi bomb makers necessary to introduce EFPs to Iraq (Horton, 2020).

Terrorist groups such as Al Qaeda and Ansarr al Sunna hired highly skilled Iraqi cells in the country to conduct strikes for them.

Iraqi insurgents, including both Sunni and Shia Iraqi militant groups, employed IEDs against U.S ground forces. Remnants of Saddam's fedayeen forces also employed IEDs against U.S forces.

Many Iraqi civilians became involved in the conflict both actively and passively. Iraqi civilians transported, emplaced, and detonated IEDs for insurgents due to coercion, threats, and financial remuneration. (McFate, 2005).

The last participant groups are related to the American military and direct supporters of the American military. Soldiers and marines on the ground reported IEDs, captured bomb makers, and requested equipment to protect them from IEDs (Congressional Record 153, 2007). Military leadership presented these needs to congress, which approved of significant funding for research to combat IEDs and to produce vehicles and equipment that could better protect soldiers (Congressional Record 153, 2007).

The Effect of IEDs

After the overthrow of Saddam Hussein's regime, widespread looting occurred. During this looting, 80 tons of powerful conventional explosives (mainly HMX and RDX) went missing

from the Iraqi Army base at Al Qaqaa (McFate, 2005). This provided the insurgency with all of the explosive material that they would need (McFate, 2005).

IEDs are composed of a power source, a trigger, a detonator, and a main charge (Zorpette, 2008). Conventional explosives were commonly used as the main charge, but Sunni insurgents also developed a process to produce homemade IEDs using common household goods. Sunni insurgents produced homemade urea nitrate bombs by performing chemical processes on nitrogen based fertilizers that were abundant in the country (Zorpette, 2008). Sunni insurgents used 5 gallon buckets and other common containers to house the explosive material and a thick plastic bag to house the detonator (Zorpette, 2008). The plastic bags used to transport MREs (Meal Ready to Eat) to coalition soldiers were abundant in the country and commonly used (Zorpette, 2008).

M-21, a unit within the Iraqi Intelligence Service, published manuals teaching the reader how to create and hide IEDs, and how to conduct ambushes using IEDs (McFate, 2005).

The combination of the explosive materials and the manuals required to develop and utilize IEDs gave the insurgency everything that it needed.

The U.S. spent millions of dollars developing technology to mitigate the effectiveness of IEDs. These programs were largely unsuccessful due to the influence of foreign powers, the innovation of Iraqi insurgents, and the nature of the conflict in the region.

Gen. John P. Abizaid, CENTCOM Commander for U.S. forces in the early years of the Iraq war, adopted a "51 percent solution" strategy for detecting and mitigating the danger from IEDs (Atkinson, 2007). This strategy involved devoting funding and research to any technology that had a higher chance of success than failure in defeating the IED problem. This came out of desperation to find a solution and many of these programs proved ineffective.

IED Blitz occurred August-November of 2004. The purpose was to use all assets at the U.S.'s disposal to develop a reconnaissance method to determine where bombs had been placed before they were detonated. The operation included satellites, U-2 spy planes, 14 MAKO unmanned aerial vehicles, and other aerial surveillance systems including systems with ground penetrating radar (Atkinson, 2007). These systems were capable of telling the difference between an apple and an orange from thousands of feet in the air, but were not capable of determining when an IED had been placed early enough to provide actionable intelligence (Atkinson, 2007). Of the 44 IEDs that detonated or were discovered by ground troops in the surveillance area, the multimillion dollar surveillance operation did not detect any of these devices (Campbell, 2008).

As U.S. surveillance capabilities improved, insurgents adopted hasty emplacement methods to decrease the amount of time between placement and detonation. This rendered the advanced surveillance technology useless.

After the failure of IED Blitz, the U.S. shifted its focus to jammers. Jammers were used to interfere with the electrical signal sent from the triggerman to the explosive. 14,000 jammers were fielded including the Warlock Green Jammer, Mobile Multi Band Jammer, and IED Counter Electronic Device (ICE) (Wilson, 2007).

Insurgents adopted daisy chaining, vehicle borne IEDs, house bombs, and began using lower tech detonators to get around the jammers (Atkinson, 2007).Years and millions of dollars of U.S. efforts were devoted to combat existing IED employment methods, but the insurgents would change strategies within days and render these efforts useless. In 2005 it was estimated that there were at least 90 existing methods to detonate an IED (Atkinson, 2007). Daniel B. Widdis, an instructor at the Naval Postgraduate School, commented on the U.S. 's technology based solutions saying that ,"These are billion-dollar solutions with ten-cent countermeasures,"

(Zorpette, 2008). As the conflict continued, the U.S. began diverting resources from looking for a technology based solution to winning over the Iraqi population and attacking the bomb producing network (Zorpette, 2008). U.S. forces did not see steep declines in IED attacks in Iraq until they gained the cooperation of the local people (Zorpette, 2008).

American soldiers advocated for more advanced protection from IEDs. Countless accounts describe the constant state of stress American soldiers experienced during the conflict due to the prevalence of IEDs and the nature of the war. Frederick captures a number of these accounts in his novel *Black Hearts* where he describes the extreme stress soldiers from the 101st Airborne Division experienced when deployed to Iraq between 2005-2006. Frederick asserts that there is a connection between the soldiers' fear of IEDs, the loss of a number of friends to IEDs, and the rape and murder of a fourteen year old Iraqi girl and her family (Frederick, 2010).

In the chapter titled "It Is F*cking Pointless" Frederick describes the state of the platoon and the effect that the deployment had had on them. " 'F*ck it', said Private First Class Chris Barnes, raising his hand. 'Let's do it. This sounds like a great f*cking idea. Who wants to get blown up?' They started laughing. Watt, Barker, Cortez, and Private First Class Shane Hoeck all raised their hands. They did not give a damn anymore…The only thing they could do was laugh. 'Hooray! We're going out to get blown up!' they sang." (Frederick, 2010).

One road, designated Caveman, was infamous among the soldiers due to the number of IED attacks that occurred. Frederick describes how the unit once found twenty-six IEDs in one three-mile stretch. Frederick describes how in the medic area of the Forward Operating Base each medic would write where they were going for the day. The day that Specialist Collin Sharpness was assigned to route Caveman he wrote "getting blown up" (Frederick, 2010).

Frederick describes how these seemingly random attacks contributed to a widespread feeling among the soldiers that death was certain and that they were not coming home. Insurgent use of IEDs contributed to the constant state of stress experienced by the soldiers of the 101st Airborne Division, one of the most elite units in the U.S. Army, and broke their will to live.

David Bellavia describes the extreme stress of soldiers fighting in Fallujah, Iraq in 2005 in *House to House: A Soldier's Memoir*. Bellavia describes the extreme stress of urban combat and the constant fear of being killed by an IED at any moment. Bellavia describes preparing to clear a house, and noticing crisp and clean wires in the doorway. The wires were connected to a number of bricks of C4 plastic explosive, a cart of propane tanks, and to an aerial drop tank. The drop tank was from a MiG fighter jet and garbage bags had been placed over the tail fins and the nose had been removed. This building-contained IED (BCIED) was similar in design to the bombs that caused the fireballs at the World Trade Center on September 11, 2001 (Bellavia, 2008). The insurgent had daisy chained together enough explosives to destroy the entire neighborhood and Bellavia's entire platoon (Bellavia, 2008). Bellavia's platoon was saved because they were able to kill the triggerman before detonation.

Bellavia describes a similar incident that occurred in the Spring of 2005 where an elite Special Forces team breached a warehouse in Baghdad and were killed by a BCIED (Bellavia, 2008). An elite team with years of training and experience and the best equipment available was killed by an undetectable trap.The same style trap that would have killed Bellavia and a number of the forty soldiers in his platoon if they had not been able to kill the triggerman.

The testimonies of U.S. soldiers in Bellavia and Frederick's novels express a helplessness when it comes to IEDs. In many cases, U.S. soldiers had superior numbers, equipment, and

training, but were killed by an enemy that they could not see. IEDs allowed insurgents to fight an

enemy that they otherwise would not have been able to.

As IEDs were the greatest threat to American troops, the U.S. armed services invested

heavily in means of protecting American soldiers from them; in summer 2007, IED attack

efficacy began a steep and prolonged decline (figs. 3-7).

US troop levels in Iraq - March 2003 to December 2011

US troops, thousands

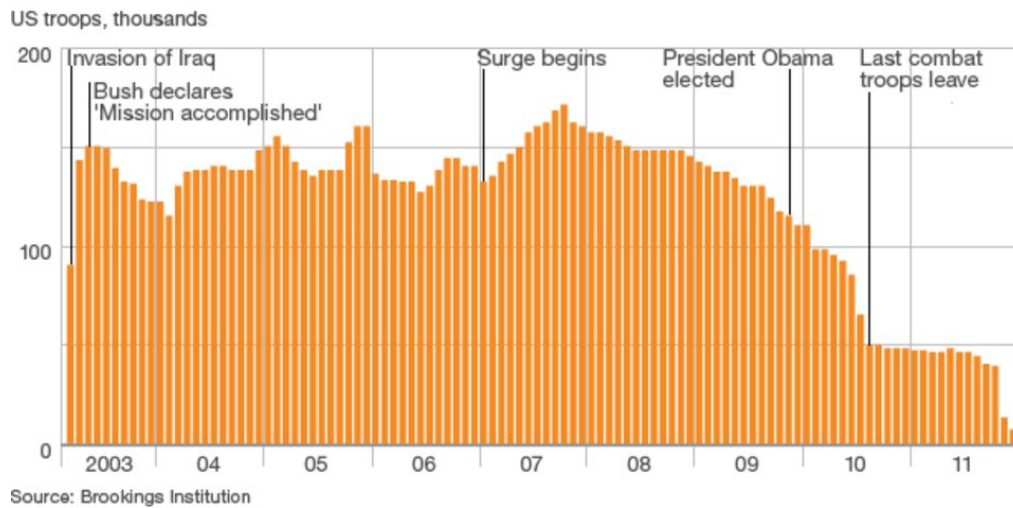

Source: Brookings Institution

Figure 3: US troop levels in Iraq- March 2003 to December 2011. The data is from the
Brookings Institute Iraq Index (O'Hanlon and Livginston, 2011), and was converted into
graphical form by the British Broadcasting Corporation (BBC, 2011)
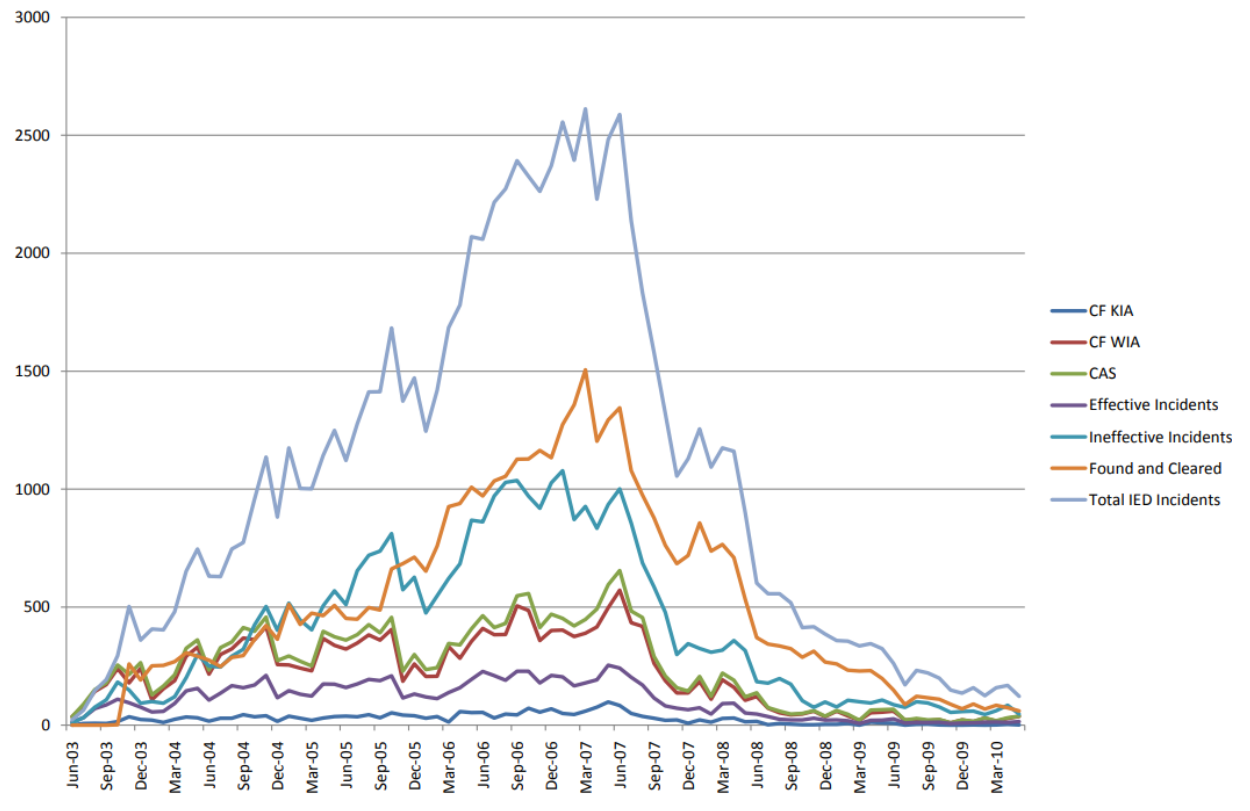
Figure 4: IED incidents between June 2003 and March 2010 organized by severity. KIA: Killed in action, WIA: wounded in action, CAS: casualty (Cordesman et al., 2010)
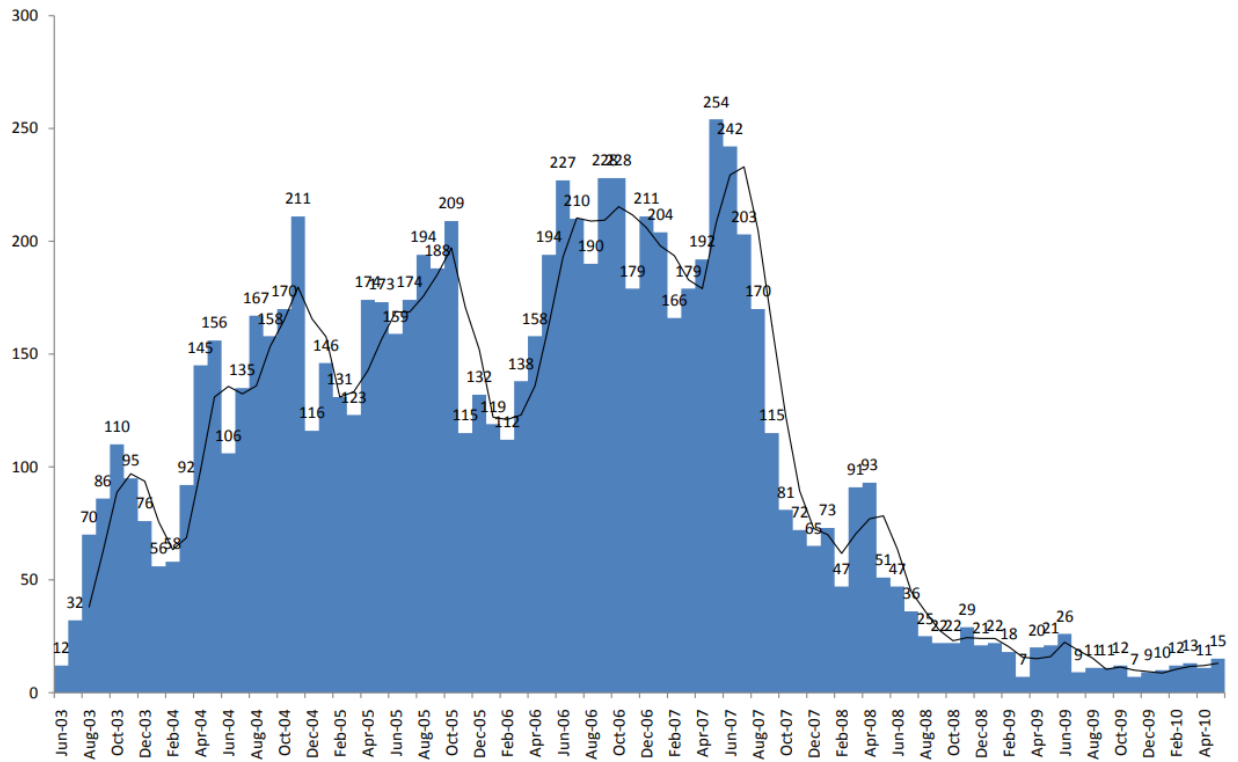
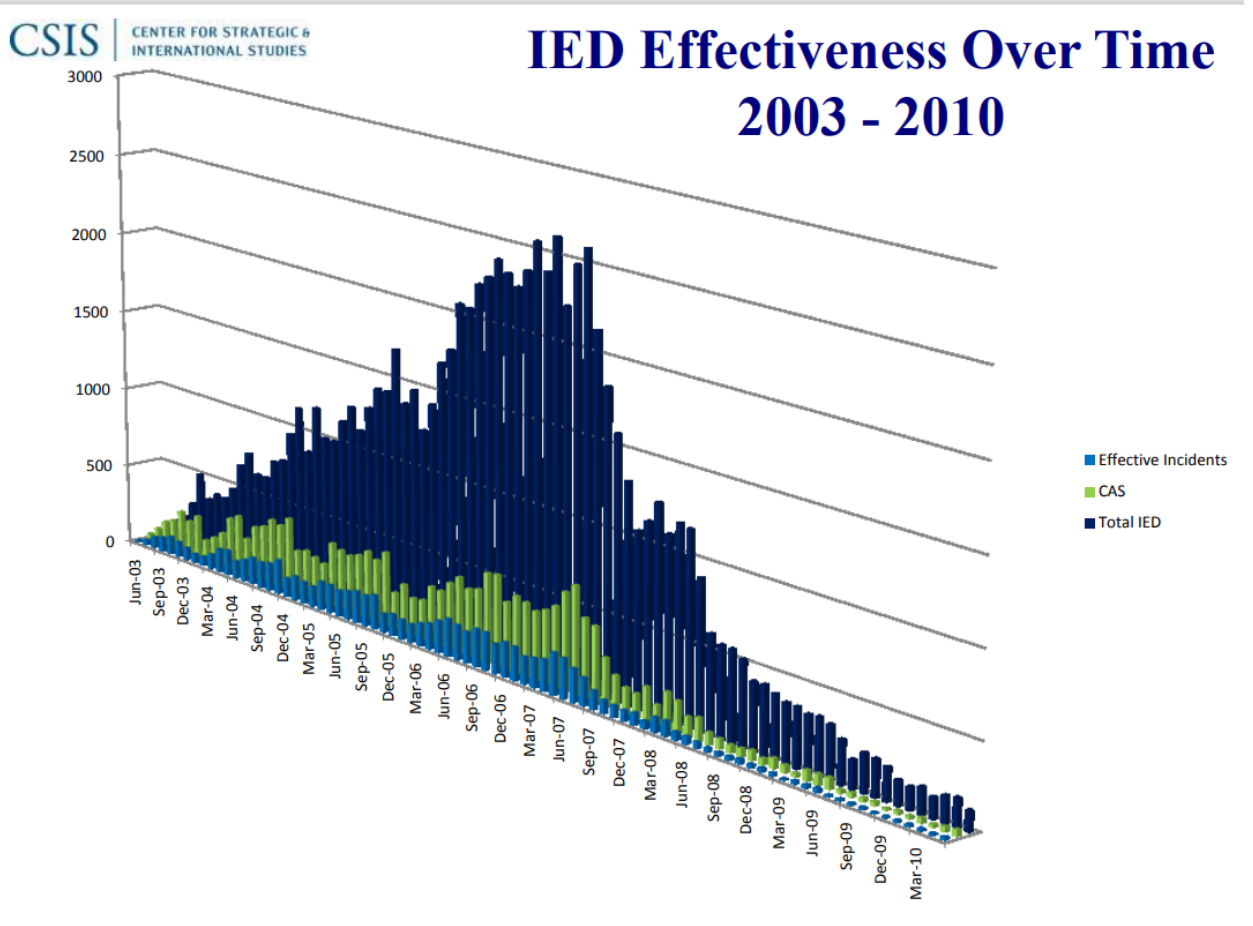Figure 5:Effective IED attacks between 2003 and 2010 (Cordesman et al., 2010)

Figure 6:Effectiveness of IEDs throughout the conflict (Cordesman et al., 2010)

US funding of operation in Iraq

$bn

Total funding 2003-2011, including pending requests

$801.9bn

*includes pending requests
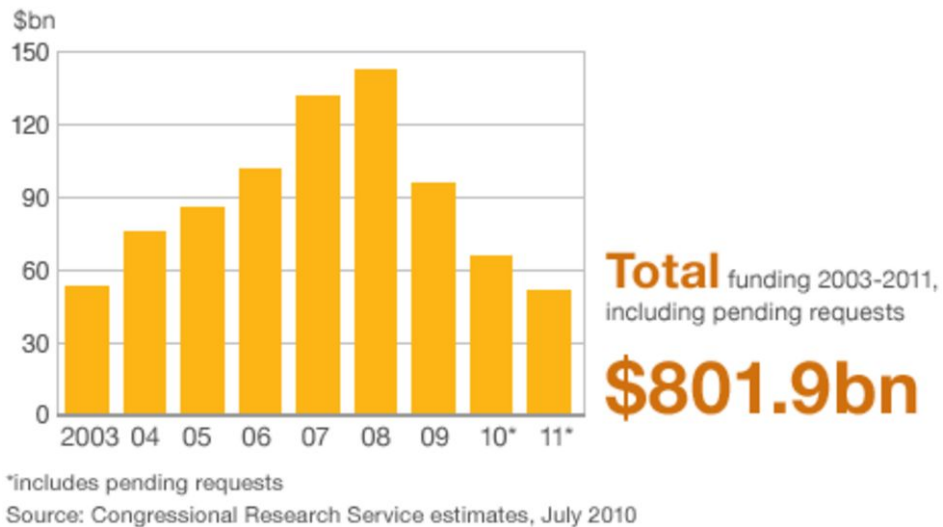Source: Congressional Research Service estimates, July 2010

Figure 7: U.S. funding of operations in Iraq between 2003 and 2011. The data was published by the Congressional Research Service and put into graphical form by the BBC (Belasco 2014, BBC 2011). *The CRS has updated the article since 2010

IEDs became the preferred weapon of the insurgency due to their effectiveness and anonymity. IEDs gave insurgents the means to effectively fight a better trained and better equipped enemy. This transformed the nature of the conflict because it gave Iraqi noncombatants the means to fight a force that they otherwise may have been unwilling or unable to fight. Colonel Dick A. Larry, head of the IED division of the U.S. Army Asymmetric Warfare Office predicts that "The IED threat will be long-term, because nobody will want to fight the United States force-on-force," (Zorpette, 2008). The Iraq war of 2003-2011 demonstrated that with modern technology people with little to no military training can have a significant effect on the outcome of a conflict.

How Technology Continues to Enable Weak Actors: The Case of Ukraine

Initial estimates believed that Ukraine would fall 2-4 days after Russia began its special military operation on February 24, 2022 (Sciutto, 2022). A year later, there is no clear end to the conflict in sight. Significant amounts of western aid are now being sent into the country and the European Union has imposed significant sanctions against Russia in an attempt to cripple its ability to finance the war.

How has lowered entry cost allowed the Ukrainian military to utilize more of its population to fight Russia?

A significant amount of the Ukrainian success can be attributed to weapons sent to Ukraine from Western powers. Most notable among these is the Javelin missile system. A number of sources estimate that as of February 15, 2023 Russia has lost approximately half of its main battle tanks, and much of this success is attributed to the fire and forget Javelin missile system (Fidler & Bo Williams, 2023). This system was sent to Ukraine from the United States and requires very little training to operate. The estimated training time can be as little as thirty minutes and is deadly against armored targets (Schogol, 2022). A story published by the Military Times and Task & Purpose reports of a Ukrainian soldier calling a U.S. national guardsman and troubleshooting the weapon system from across the Atlantic Ocean over the phone (Clark, 2022).

A significant amount of support for the Ukrainian cause has come as a result of their effective use of social media. The #ukrainewar has 4 billion global views on Tik Tok and is among a number of other hashtags Ukrainians have used to draw attention to their cause. The Saint Javelin organization, which began as a meme describing the effectiveness of the Javelin missile system, has raised $2 million to support Ukraine (Borys, 2022). While $2 million is not a significant amount in the conflict as a whole, it serves as evidence of a trend. Ukraine has won

the social media battle for the hearts and minds of foreign actors. Ordinary people, with no military experience, have contributed to the billions of dollars of aid flowing into the country.

Modern technology has allowed Ukrainaians with no military experience to become combatants both in the literal sense of using advanced weapon systems to combat the Russians, and in the less obvious sense of using social media to win support for their cause. Russia's inability to prevent material aid from entering Ukraine and its inability to win the hearts and minds of the Ukrainian population has crippled their war effort.

Conclusion

New technologies have improved the position of weak actors by increasing their means to fight and better allowing the weak state to utilize its strategic strengths. The use of the internet and social media has allowed ordinary civilians, with no military experience, to significantly contribute to the war effort. In the future, we will see if continued advances in technology contribute to this trend or if improvements in facial recognition, surveillance technology, and artificial intelligence will increase the entry cost for a non-combatant to become a combatant. It is unclear if advances in technology has ended the age of superpowers, or if the development of new technologies will turn the tide.

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