Evolution, not Revolution? Some Thoughts on Desert Storm and the RMA Debate

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Abstract: Even now, more than 25 years after the outbreak of Gulf War One, the debate as to the degree to which that war embodied a revolution in air power persists. This paper examines whether Operation DESERT STORM was truly a revolution in Air Power and, having concluded that when viewed alone it was not, further considers the notion that DESERT STORM may have been a nascent development in a far broader, still on-going revolution.

Introduction

Commencing at 0240hrs on 17 January 1991, 2,775 aircraft sorties were launched during the first 24 hours of Operation DESERT STORM;[1] Iraq was both subject to the opening blows of a wide-ranging air attack and witness to a lucid demonstration of air power's ability to strike with new-found precision. In the eyes of a watching public, only recently furnished with round-the-clock news coverage, the air offensive would have appeared so vastly different to anything previously observed that drawing a conclusion of revolution would have been almost irresistible. In the 25 years since DESERT STORM, a number of commentators have supported that initial perception that this was indeed a revolution in military affairs; however, perhaps yet more have renounced that notion, suggesting instead that this was simply the culmination of ongoing evolution.[2]

Albeit limited in its ambition, this short article will attempt to analyse the facets of DESERT STORM which most convincingly lay claim to the accolade of being revolution in military affairs (RMA). To this end, it will assess where this Operation fits within the genesis of revolutions and will finally examine the notion of an ongoing societal revolution in order to offer some thoughts as to whether DESERT STORM represented an evolution or a revolution in air power, if not military affairs as a whole. It concludes by proposing that Operation DESERT STORM cannot presently be categorised as a revolution, but that it may eventually be considered a contributing element of an as yet-to-be-fulfilled revolution in air power, as well as being a small symptom of a current, far broader revolution in western society.

It is important to consider what is meant by an RMA before embarking upon an examination of DESERT STORM as a possible exemplar. This is a complex task; as Crane Briton suggests, 'revolution' has become a synonym for almost any change and has perhaps retained only a hint of abruptness or significance.[3] Moreover, analysts have already identified (conservatively) 3 different types of revolution in the military sphere including: the grandiose Military Revolution, the narrower Military-Technical Revolution and the more contemporary, often DESERT STORM associated, Revolution in Military Affairs.[4] Whilst it may appear that having at least 3 types of revolution from which to pick is a blessing, it is in fact a curse as, where agreed amongst academics, each comes with its own numerous and specific criterion which if utilised would unnecessarily bind the scope of our considerations here. Consequently, those 3 benchmarks are aside here, and revolution will seen through the simpler definition of "A dramatic and wide-reaching change in conditions, attitudes, or operation."[5] Logically, any change which falls short of revolution is inherently evolutionary, a rather less contentious concept.

First then, we must establish which air power aspects of DESERT STORM demonstrated the most dramatic and wide-reaching changes. Richard P. Hallion lists only training, technology and doctrine under the subtitle "What Worked" whilst Keaney and Cohen, when considering the degree to which DESERT STORM was a revolution, list 5 technological advances ahead of any other area of consideration, only later including doctrine and even then weaving yet more forms of technology into their text.[6] Accordingly, whilst air power's relaunch on the world's

stage contained strong turns from a number of performers, doctrine and technology were ostensibly the stars of the show. Do they pass the revolution test?

Now familiar to air power students worldwide, in 1988 Colonel John A Warden theorised that each nation-state draws its power from 5 concentrically-depicted centres of gravity, with strikes against the outer rings lower impact but relatively easy to achieve, conversely strikes against the centre high impact but significantly harder to achieve and the potential that substantial effect anywhere may reverberate through the entire system.[7] By combining this notion with excellent target information and awareness of the previous 20 years' technological advancements (which had apparently eluded US Tactical Air Command planners), Warden presented various Commanders with a plan which would "cripple Iraq's military" or in a different parlance, achieve strategic paralysis.[8] Whilst the tactical specifics did not play out as Warden and his colleagues in the 'Checkmate' planning cell had envisaged (indeed, the detail of their Instant Thunder plan was not taken forward),[9] his thinking and in particular his Five Strategic Rings did underpin the subsequent air plan. His work, which effectively provided the intellectual component to the air campaign's fighting power, was considered by some to be genuinely ground-breaking and even recent observers have apportioned an appearance of revolution with one describing the rings concept as "a fundamental change in aerial operations" however, there is certainly evidence which more clearly supports the notion of an evolution in doctrine.[10]

Whilst Warden's 5 rings (leadership, system essentials, infrastructure, population and fielded forces) have been heralded as new, it is worth noting – as Warden himself would be first to recognise – that in 1921, Guilio Douhet had already suggested 5 very similar basic target sets in Command of the Air: industry, transport, infrastructure, communications and the will of the people.[11] Douhet even identified the need for precision in order to target those elements by suggesting that they should be destroyed "in one pass."[12] Additionally, numerous warfare theorists had previously suggested that preventing an enemy from functioning would be a highly-desirable objective during conflict. In 1928, J F C Fuller proposed the notion of "Strategic Paralysis as the Objective of the Decisive Attack" and yet further, in 1954 Capt Sir Basil Liddell Hart opined "A strategist should think in terms of paralysis, not killing…so that the sword drops from a paralysed hand."[13] It must therefore be considered that although timely and well packaged for an embryonic PowerPoint generation, as almost every aspect of Warden's 'new' idea had already been prophesised, this was not truly a revolution. It might even be said that it was not really an evolution but more a case of repetition designed to bring about reinvigoration in conceptual thought.[14]

If the doctrine which underpinned the air campaign was not revolutionary, the technology which finally enabled the prosecution of strategic paralysis certainly lays greater claim to being so. Stealth/Low Observable (LO) aircraft dropping Precision Guided Munitions (PGMs) and Cruise Missiles destroying buildings (with fascinated media coverage establishing the popular idea that these weapons entered through specific windows of a target building) are

perhaps the defining images of that war and therefore immediately feature when considering revolutionary technology which featured in DESERT STORM. Yet more technologies did not debut here however, remembering that the chosen definition of revolution caters for a wide-ranging change in operations and given the vast increase in their utilisation, they might also be considered: the High-speed Anti-Radiation Missile (HARM), Air to Air Refuelling, the secret communications-providing Secure Telephone Unit mark 3 (STU-III) and air and space-based Information Surveillance and Reconnaissance (ISR) systems had all been used before.[15] Notwithstanding their sizable respective contributions, for the purposes of the contention here, we will focus upon the one technology with perhaps the strongest revolutionary credentials: Stealth/LO design.

The art of creating a LO platform, achieved by reducing its Radar Cross-Section (RCS) such that it can operate closer to a detection system than a conventional platform, helped enable the prosecution of targets which might have otherwise remained unstruck.[16] That the F-117A Nighthawk attacked 40% of strategic targets (including key air defence, leadership and communications objectives) in spite of accounting for just 2% of the total sorties flown clearly illustrates the degree to which, in spite of initial uncertainty and a lack of confidence at the highest levels, LO technology became a vital part of the air campaign.[17] These systems were not able to deliver novel or massive ordnance, nor were they sufficient in number to strike in stunning waves however, their effective invisibility allowed surprise to be re-introduced within the air domain, would have conveyed considerable influence through psychological effect and, through their ability to attrite the Iraqi air defence network with almost absolute impunity, they reduced the extent to which other coalition aircraft could be observed and therefore vastly enhanced the coalition's degree of control of the air.[18]

The introduction of this technology proved so successful that post conflict some suggested that the USAF would never again be able to justify the purchase of aircraft which "do not incorporate low observables";[19] given that the 3 major additions to the USAF's manned fighter/bomber inventory made during the intervening period (the B-2 Spirit, F-22 Raptor and F-35 Lightning II) have embodied this innovation, it would appear the USAF hierarchy may have shared the belief that "stealth…best exemplified the new revolution in aerospace power made possible by advanced technology."[20] Notwithstanding the above however, when LO technology's dramatic effect is isolated from other abetting factors applicable in DESERT STORM (including good threat and target information, enabling basing options, unrestricted operating terrain, vastly improved US-Russia relations and poor Iraqi use of their own not inconsequential air power) and evidence of a dramatic change in conditions, attitudes or operations sought, even this most highly-acclaimed progression falls short of revolution.[21]

That 8 distinct targets could be struck by 4 independently operating, LO-enabled F-117A aircraft when a package of up to 37 conventional aircraft would have been required to do so is impressive.[22] However, this reduction in numbers does not inherently represent a revolution when applied against the given definition. First, the advent of stealth technology did not

extensively change the conditions in which air power was delivered and indeed, by requiring to fly exclusively at night so as to maintain their 'cloak', the F-117A perhaps imposed more conditions on the utilisation of air power than those by which previous Commanders had been bound. Second, this technology did not initiate wholesale changes in the operation of aircraft; the Nighthawk was utilised in Attack and Control of the Air roles just as conventional aircraft had previously been, were during this conflict and would continue to be so.[23] Third, this capability did not significantly alter attitudes to the utilisation of air power, save for reinforcing the ever-developing perception that cutting-edge air power can be utilised in more greatly contested environments or in familiar threat environments at lower risk.[24] Given the above, though incredibly successful, LO technology cannot be considered revolutionary and, as this was identified as the best technological candidate for confirmation as revolutionary, it follows that no element of technological improvement will be considered as such.

Overall, neither the doctrinal nor technical contributions to DESERT STORM are found to have the hallmarks of a revolution and if none of the constituent parts are revolutionary, it should follow that the Operation was not so. Nonetheless, it is clear that there is much literature and online material which suggests that many still believe this to have been a revolution of some sort. In spite of the above findings, it is quite possible to empathise with that viewpoint. One explanation for this 'feel' may be that, as suggested by former head of the House Armed Services Committee Les Aspin, this war represented the first occasion upon which the major equipment worked as planned and the utilisation of that equipment was so exceedingly well orchestrated that the total was greater than the combination of its parts.[25] Whilst this viewpoint offers some justification, it still does not fully explain the sense of revolution which proliferates; perhaps a wider perspective is required to achieve clearer focus.

Alvin Toffler proposed that the history of civilisation can be divided into 3 phases: the first followed the agricultural revolution, the second stemmed from the industrial revolution and the third, into which we are now transitioning, is derived from an information revolution.[26] Each new wave shatters the political, social and economic patterns which defined the previous and whilst the first 2 revolutions are generally familiar, the third-listed information revolution, though it surrounds us every day, is somehow less so. In a more recent publication, the Tofflers tied forms and indeed examples of warfare to the earlier suggested waves, citing the American Civil war as the last of the agricultural-wave wars, the World Wars as specimens of industrial-wave wars and the first Gulf War as one of the first information-wave wars.[27]

When examining the suggested information wave and the war which they tied to that paradigm, there appears to be a strong degree of coherence. Toffler detailed that civilisations in this new age would be born of 2 major driving factors, the rise of new industries based on scientific innovations and the power of computing, and that 4 specific fields of commerce would witness the greatest advances: electronics and computing, space, undersea and genetics.[28] Whilst the maritime industry has perhaps not developed as suggested and the genetics industry has to date had no significant impact on the conduct of warfare, Toffler's

suggestion of great advances in computing and space have certainly been realised and those advances contributed significantly to the successes of DESERT STORM.[29] Accordingly, whilst it has been established that air power in the first Gulf War was not itself a revolution, it may be that this was a nascent development in the still ongoing, far broader, third-age revolution however, the degree of confidence in and future utility of this quasi-conclusion must be explored further.

First, and with regard to confidence, it is feasible to suggest that the technological advancements discussed during this piece were not as a result of a third-wave revolution but more simply derived from the enabling societal mechanisms found in the nations which contributed to DESERT STORM's success. Illustratively but not exhaustively, the USA's highly-educated population, significant spending on defence (in particular on R&D) and tight controls designed to protect intellectual property and transfer of technology certainly helped facilitate success in this air war[30] however, such enabling factors only deliver a marginal advantage outside of a Toffler-esque, broader revolution. Accordingly, the significant technological advantage attained by Western nations in the years preceding DESERT STORM supports the notion that the third-wave revolution was, and indeed is, underway.

Second, with regard to utility and as suggested in War and Anti-War, one nation may experience a transition in civilisation and warfare whilst other nations and organisations may not. As all waves of warfare may therefore exist in parallel, a third-wave nation might paradoxically struggle to defeat an enemy who remains firmly entrenched in the first.[31] To illustrate, consider the recent intervention in Afghanistan where, should the coalition militaries have been less advanced, Close Air Support (CAS) may have been provided cheaply and effectively by a light turbo-prop aircraft[32] such as the A-29 SuperTucano currently being delivered to the Afghan Air Force. Instead, short endurance, costly to operate and logistically hungry advanced multi-role aircraft such as the F/A-18 and F-16 were often used, clearly demonstrating the way in which a nation significantly more advanced than its enemies may be able utilise only a small proportion of its high-technology, high-cost but low-numbered systems' vast capabilities and yet further hinting that high-end technology is not easily warfare-wave backwards compatible. Perceived advantages may be disadvantageous. Moreover, whether fighting a conventional peer or an asymmetric insurgency (as may continue to be the trend),[33] Maj Gen Vladimir Slipchenko's claim that "High technology becomes pivotal only when it exists in enough numbers to make its influence felt" rings true.[34] If the increase in quality associated with an advance in warfare is accompanied by an equivocal or greater decrease in quantity, no genuine advance has been made and indeed a retrograde may have occurred.

Finally, returning to confidence, as they might strive to ensure the evidence supports their view and as they are not blessed with a wide or distant perspective, those living through a potential revolution (including the author of this piece) are perhaps poorly placed to objectively assess if that is indeed the case. Only when those judging with the benefit of hindsight assess this

period to have seen sufficient development so as to have been a societal revolution can it truly be known if DESERT STORM was indeed an early part of that wider revolution. Should Toffler's third wave stall and future generations assess no dramatic or wide-reaching change in society at large (and air power by association) to have occurred, this article's explanation for DESERT STORM's revolutionary 'feel' will be proven invalid and that Operation, with each constituent part failing the revolution test, will forevermore be consigned to the supposed ingloriousness of mere evolution.

In conclusion, this short piece has explored the concept of revolution, assessed the facets of air power which demonstrated the greatest degree of change during Operation DESERT STORM and has found no individual element to have undergone sufficiently significant or wide-ranging change for the Operation to be declared a revolution when measured against a broadly-accepted definition of the term. Furthermore, in spite of no individual element being revolutionary, it may be that DESERT STORM carries an air of revolution both because it was so well co-ordinated so as to be greater than the sum of its parts and, more broadly - and carrying greater weight - as it perhaps serves as an early expression of wider advancements derived from Western society's transition into an information age. Finally, aligned with the essence of Zhou Enlai's (albeit misrepresented) view that even 2 centuries later it was still too early to assess the impact of the French Revolution, so only in the fullness of time will this article's assertions be proven or disproven.[35]

In the interim, and irrespective of the degree to which DESERT STORM's advances were revolutionary, politicians and Commanders, perhaps seduced by the promise of low-risk, quick-win wars, will continue to pursue, purchase and field high technology aircraft which, with almost exponentially rising price tags, may only buy out the capability gap left gaping by reducing asset numbers (which itself stems from that rising unit cost). The risks this ouroboros cycle poses (ever fewer eggs in yet fewer baskets) may be intolerable to some but, as the platforms' rise in demand for mission management attention continues to outstrip the supply afforded by a human's limited capacity, so that human will increasingly require augmentation. Fourth generation aircraft did much to reduce the capacity drain of actually having to fly the aircraft placed upon a pilot,[36] fifth generation aircraft will utilise intelligent sensor fusion to aid decision making[37] and perhaps sixth or seventh generation aircraft will see the human-in-the-loop finally cede to a fully Artificial Intelligence (AI) controlled platform, releasing autonomous weapons[38] according to a strategy devised and microworld-tested with the assistance of modular AI.[39] Should this level of automation in the delivery of air power be achieved then the information-wave warfare revolution will be complete, the risks taken in the continual drive towards high technology will have been justified and this (by then far-distant) campaign will have been vindicated as the first overtures of a revolution which may have altered not just the character of air war but, by potentially breaking the societal link between the people and their air force, perhaps its very nature.

Notes

[1] Tom Clancy and Chuck Horner, *Every Man a Tiger* (New York: Putnam Publishing Group, 1999), 343.
[2] Defence Dept, *Conduct of the Persian Gulf Conflict: An Interim Report to Congress, July 1991* (United States: United States Government Printing, 1991), 164Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf* (United States: Naval Institute Press, 1995), 199 – 201.
[3] Crane Brinton, *Anatomy of a Revolution* (New York: Random House, 1965), 3.
[4] For further exploration of these notions see: Colin S. Gray and Williamson Murray, *Strategy for Chaos: Revolutions in Military Affairs and the Evidence of History* (London: Frank Cass Publishers, 2002).
[5] *Oxford Dictionary* (Oxford University Press, 2016), s.v 'Revolution' by Oxford, accessed March 17, 2016, http://www.oxforddictionaries.com/definition/english/revolution.
[6] Keaney and Cohen, *Revolution in Warfare?*, 188-212.
[7] Richard P. Hallion, *Storm over Iraq: Air Power and the Gulf War* (Washington, DC: Smithsonian Institution Press, 1992), 242 – 243.
[7] Keaney and Cohen, *Revolution in Warfare*?, 188-212. John A Warden et al., T*he Air Campaign: Planning for Combat* (San Jose: iUniverse, 1998).
[8] Clancy and Horner, *Every Man a Tiger*, 258.; Williamson Murray and Robert H. Scales, and Harvard University Press, *The Iraq War: An Elusive Victory* (Cambridge, MA: Harvard University Press, 2005), 158Norman H Schwarzkopf and Peter P Written, *It Doesn't Take a Hero: The Autobiography of General H. Norman Schwarzkopf* (New York: Bantam Dell Pub Group, 1992), 318.
[9] Clancy and Horner, *Every Man a Tiger*, 359-265.
[10] Clayton KS Chun, *The U.S. Army War College Guide to National Security Issues*, 4th ed. (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2010), 296.
[11] Giulio Douhet, *The Command of the Air* (New York: Arno Press Inc., 1942), 50.
[12] Ibid., 20.
[13] J F C Fuller, *On Future Warfare* (London: Sifton Praeed, 1928); Basil Liddell Hart, *Strategy*, 2nd ed. (New York, N.Y., U.S.A.: Penguin Group (USA), 1991).
[14] On the subject of Warden's contribution to regenerating conceptual thought, see John A Olsen, *John Warden and the Renaissance of American Air Power* (Washington DC: Potomac Books, 2007)
[15] Keaney and Cohen, *Revolution in Warfare?*, 189-199 and Clancy and Horner, *Every Man a Tiger*, 335.
[16] Keaney and Cohen, *Revolution in Warfare?*, 190.
[17] The F-117A was not the only LO-enabled attack capability, a combined 323 Tomahawk Land Attack Missile (TLAM) and Conventional Air-Launched Cruise Missile (CALCM) also struck strategic targets; Thomas A Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Appendix T 'Performance of Selected Weapons Systems'* (Washington, D.C.: U.S. G.P.O., Supt. of Docs., 1993); Benjamin S. Lambeth, *The Winning of Air Supremacy in Operation DESERT STORM,* (Santa Monica, CA: Rand, 1993), https://www.rand.org/content/dam/rand/pubs/papers/2009/P7837.pdf, 10.

[18] Keaney and Cohen, *Revolution in Warfare?*, 190.
[19] Lambeth, *Air Supremacy in Operation DESERT STORM*, 10.
[20] Hallion, *Storm over Iraq*, caption for final picture prior to page 243.
[21] Lambeth, *Air Supremacy in Operation DESERT STORM*, 8.
[22] Benjamin S. Lambeth, *Speech to Zhukovskii Engineering Academy, Moscow*, (n.p., 1992).
[23] Colin S. Gray and Williamson Murray, *Strategy for Chaos: Revolutions in Military Affairs and the Evidence of History* (London: Frank Cass Publishers, 2002), 31; *DCDC, JDP 0-30*, 3-1.; Or indeed in the "Air Bombardment" and "Neutralisation of Enemy Air Forces" roles, which were defined in AP1300 as early as 1928.
[24] It is reduced risk which perhaps best explains why 'stealth' technology has so captivated governments, Commanders and air power proponents worldwide. LO technology was the latest military-industrial complex instalment of the countermeasure (or counter-countermeasure, continue ad infinitum) but came at a time when tolerance to the loss of military lives on foreign soil had significantly reduced. Accordingly, 'stealth' was an answer which helped re-defined a different question.
[25] Benjamin S. Lambeth, 'The Desert - A New Assessment', *JFQ* Winter 2000-2001 (2000), accessed April 6, 2016, **http://www.dtic.mil/dtic/tr/fulltext/u2/a426732.pdf**, 34.
[26] Alvin Toffler, *The Third Wave: The Classic Study of Tomorrow* (New York: Bantam Press, 1984).
[27] Alvin Toffler and Heidi Toffler, *War and Anti-War: Making Sense of Today's Global Chaos* (New York: Warner Books, 1995), 3.
[28] Toffler, *The Third Wave*, 129.
[29] Defense Dept, *Conduct of the Persian Gulf War: Report to Congress*, (United States: United States Government Printing, 1992), XII.
[30] Clearly, the notion of societal support to military technological advancements is not limited to the USA. For examples of how other nations developed their technology before and during Operation DESERT STORM see Hallion, *Storm over Iraq*, 243.
[31] Toffler and Toffler, *War and Anti-War*. For a clear illustration depicting the parallel waves of warfare see Robert J. Bunker, 'Tofflerian Paradox', *Military Review*, May-Jun 1995 (1995), accessed April 9, 2016, **http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1132&context=cgu_fac_pub**, 100.
[32] Stephen Trimble, *Irregular Warfare Offers New Role for Propeller Driven Aircraft*, October 26, 2010, accessed April 14, 2016, **https://www.flightglobal.com/news/articles/irregular-warfare-offers-new-role-for-propeller-driven-348848/**.
[33] DCDC, *Global Strategic Trends out to 2045*, (Shrivenham, Wilts: DCDC, 2014), **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/348164/20140821_DCDC_GST_5_Web_Secured.pdf**, xiii.
[34] Lambeth, *Air Supremacy in Operation DESERT STORM*, 15.
[35] Zhou believed the question he had been asked related to the French Students' riots which occurred only 3 years earlier but, as the misunderstanding was "too delicious to invite correction" and as the sentiment stands, it was never corrected and has now entered wide speared use as a prosaism. For further information see Richard McGregor, 'Zhou's Cryptic Caution Lost in Translation', *The Financial Times* June 10, 2011, accessed April 10, 2016,

https://next.ft.com/content/74916db6-938d-11e0-922e-00144feab49a?ftcamp=rss.

[36] 'Eurofighter Typhoon - the Aircraft', March 2016, accessed April 10, 2016, https://www.eurofighter.com/the-aircraft.

[37] 'F-35 Lightning - Capabilities', 2016, accessed April 10, 2016, https://www.f35.com/about/capabilities.

[38] Manuel de Landa, *War in the Age of Intelligent Machines* (New York: Zone Books, 1992), 46.

[39] Kareem Ayoub and Kenneth Payne, 'Strategy in the Age of Artificial Intelligence', *Journal of Strategic Studies* November 23, 2015, doi:10.1080/01402390.2015.1088838, 11.