Pilot Training Next students train on virtual reality flight simulator at Armed Forces Reserve Center in Austin, Texas, June 21, 2018 (U.S. Air Force/Sean M. Worrell)

Beyond the Third Offset

Matching Plans for Innovation to a Theory of Victory

By James Hasik

In November 2014, Secretary of Defense Chuck Hagel announced the launch of the Third Offset Strategy. Despite official insistence to the contrary, the offset remains substantially a technology strategy, and one largely focused on the interrelated technologies of autonomy and artificial intelligence (AI). While progress in these fields has been brisk, their offsetting qualities are not obvious, and they may not be realms of enduring comparative advantage to the United States. If they do prove efficacious, military planners must contemplate profound organizational and doctrinal changes to compensate for rapid change in the ways of war. Whatever the likelihood of future military-technological trajectories, American strategists might consider less expensive and more certain ways of dealing with some adversaries' local superiorities.

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Three Offset Strategies

To understand how the department stumbled into this set of choices, we should review what Americans mean by the term *strategy*. In Arthur Lykke's formulation, now widely cited within the Armed Forces, a strategy is a plan, tying means to ways, to achieve overall ends.[1] However, the effect should not be seen as additive: applying more resources (means) through more methods (ways) does not generally produce better strategy. Applying *all* elements of national power may just produce denser briefing slides and more frustrated officials.[2] Any

good strategy must embed an economical theory of victory, and that requires deeper thinking.[3] One alluring concept can be an *offset* strategy, which is consciously designed to diminish or balance adversaries' known advantages with asymmetric alternatives. Done well, an offset strategy may impose such costs on adversaries that they will decline to become actual enemies.[4] In 2014, after years of enduring insurgents' asymmetric attacks, Pentagon leadership decided to borrow the approach, taking a page from one of its old playbooks.[5] Thus, in a speech that November, Secretary Hagel announced the launch of the Defense Innovation Initiative, which would include the now widely discussed Third Offset Strategy.[6]

Hagel made the announcement, but the progenitor of the concept was clearly former Deputy Defense Secretary Robert Work, who kept his position through Hagel's handover to Secretary Ashton Carter, and even into the first several months of the Trump administration under Secretary James Mattis. Work made this "big idea" initiative a central occupation of his tenure. In his view, the "job of the deputy secretary, the primary job, is to fashion a program that is constant with the secretary's strategic vision."[7] He traced his thinking about the need for an offset strategy to 2012, when he was Under Secretary of the Navy, and Carter himself was Deputy Secretary of Defense. Carter established a Strategic Capabilities Office (SCO) that year, designed to cost-effectively draw new capabilities out of existing systems with limited injections of advanced technology.[8] As Work was one of the few Obama administration officials asked to remain into 2017, one could surmise that the new administration, or at least the new Defense Secretary, was reasonably taken with the concept.

In Work's figuring, the first great American offset strategy was the New Look of the Eisenhower administration. In 1953, the National Security Council took stock of several serious strategic problems: the cost of the recent Korean War, consolidation of communist control across much of Eurasia, growing Soviet conventional superiority in central Europe, transoceanic distances over which American reinforcements would need to travel, and reluctance of its North Atlantic Treaty Organization (NATO) Allies to fully rearm during postwar reconstruction.[9] In war, in Nathan Bedford Forrest's famous formulation, it is generally best to "get there first with the most men," but no one on the friendly side had a direct solution. The indirect solution was to threaten massive retaliation, in which the United States would "consider nuclear weapons as available for use as other munitions."[10] While far more economical than matching the Soviets tank-for-tank *ex ante*, it would also have been wantonly destructive *ex post*.

The strategy embedded two important organizational factors. At the highest level, solidarity across NATO was required for deploying and threatening the use of enough nuclear weapons around the periphery of communist Europe to crush any advance. But planning for the New Look recognized from the start that the Soviets would eventually have many nuclear weapons themselves. In 1956, this led the U.S. Army to an intriguing organizational innovation, and a Service-level response to the broader New Look: the Pentomic infantry division. Each formation of three brigades was reorganized into five regimental-sized "battle groups," each containing five infantry companies. Between the discontinued brigades and battalions, an entire level of hierarchy was removed. The smaller, flatter, wider division was intended to have increased survivability through dispersion across the atomic battlefield.

Whether that would have worked was a separate question. During World War I, the Imperial German Army progressively flattened its command structure. In 1916, the brigades between regiments and divisions were effectively eliminated; two brigades of two regiments each became a single brigade of three regiments, but in name only. By early 1918, regiments were serving mostly administrative functions, with battalions reporting directly to division headquarters during battle.[11] The U.S. Air Force takes a similar tack today with its skip-echelon command hierarchy, which accords mostly administrative functions to groups and numbered air forces. Air divisions were completely eliminated in the 1990s. This approach, however, may be more feasible in relatively static trench warfare, or when managing a 3-day air tasking order. For the U.S. Army in the 1950s, the organizational change went unloved, substantially because of the inherent command and control problems with the communications technologies of the time.[12] In early 1961, President John F. Kennedy's introduction of the Flexible Response strategy convinced the Army that battlefields would likely not be nuclear. By 1965, the Reorganization of Army Divisions plan had returned all Army formations to structures akin to those of the armored divisions of World War II.[13]

Whatever the organizational initiatives, the problem of Soviet numerical superiority had not gone away. In parallel, American observers noted how precision aiming and guided missiles led to high loss rates in the 1973 Yom Kippur War. The first commander of U.S. Army Training and Doctrine Command remarked shortly thereafter that with modern weapons, "what can be seen can be hit, and what can be hit can be killed."[14] Conveniently, during the Vietnam War, the United States had begun investing in a variety of new technologies for precision bombardment and electronic warfare, and Pentagon leadership had reasonable faith in an enduring American advantage in these realms over the Chinese and Soviets.[15] In 1977, Defense Secretary Harold Brown developed a Second Offset Strategy, which he actually termed the "Offset Strategy."[16] He was clearly taken with the idea; his annual report to the Congress for fiscal year 1982 used the word *offset* 15 times.[17]

Effectively employing these technologies further required new operational and doctrinal innovations, notably Follow-On Forces Attack and AirLand Battle. Organizational innovation was another matter. The structures of brigades, wings, and flotillas did not change radically, for the weapons were just swapped in to replace less accurate analogs, and

the precision-guided violence would largely head outbound. However, the sophistication of those formations' higher headquarters would greatly increase, just to manage the flow of information needed for rapid precision targeting. As early as 1984, Marshal Nikolai Ogarkov, chief of the Soviet General Staff, had concluded that NATO's precision conventional weapons could produce battlefield effects approaching those of nuclear weapons, just without the vast collateral damage.[18] In 1991, the first coalition campaign against Iraq produced some astounding results. Large formations of Iraqi armored vehicles made brilliant targets against the cold desert at night, and as U.S. Air Force Chief of Staff General Ron Fogelman later stated, the "Russians got to watch it on television."[19]

Today, the near-peer, pacing competitors remain the Chinese and Russians. While North Koreans, Iranians, and sundry insurgents are vexing, it is the first-division adversaries whose advantages most need offsetting. As before, they challenge American military planning through numbers, distance, and the free-riding of allies. The Russians can notably bring local quantitative advantages in armored forces and air defenses, a budding drone program, and even qualitative superiority in artillery and overland electronic warfare. Their ability to integrate the various arms has been on recent display in the smoldering Russo-Ukrainian war.[20] The Chinese notably bring quantitative superiority in guided missiles, and nearly a continent in which to hide them from approaching ships and aircraft. Both the Russians and Chinese have hugely improved their reconnaissance and surveillance capabilities in just the past 10 years. As such, each seriously poses what was until recently officially termed an antiaccess/area-denial threat.[21]

Work repeatedly stated that the innovations of the Third Offset would be found in technologies, operating concepts, *and* organizational structures. In a seminal speech in London in September 2015, he called for "another doctrinal revival like that of the early 1980s," with "an AirLand Battle 2.0" and "modern concepts as game-changing as Follow-On Forces Attack."[22] However, during his similar speech in Brussels the following April, he talked almost exclusively about technology, and just two interrelated fields of technology: autonomous systems and artificial intelligence. At that time, he gave particularly short shrift to organization, mostly just reminding us how Alliance solidarity was important to the First Offset.[23] But during a speech to the Air Force Association that September, he again insisted that "offset strategies are not about technology per se, so it drives me crazy when people say, 'Oh, the Third Offset is AI and autonomy.'"[24] Work repeated this view the following month in another speech, but it is just possible that the former Deputy Secretary didst protest too much.[25]

At roughly the same time, Secretary Carter was establishing the Defense Innovation Unit Experimental (DIUx), with locations in the information technology hubs of San Jose, Austin, and Cambridge. The now-permanent DIU has a "chief science officer," but no other such chiefs. Carter's new SCO has focused on technologies, and notably again, autonomous ones. Later, Work established an Algorithmic Warfare Cross-Functional Team to create artificially intelligent software "to sort through vast amounts of video collected by surveillance drones, a flood of data that is overwhelming human analysts."[26] For all this effort, one could be excused for presuming that innovation, at least for some of the recent leadership, has been equated with technology, and particularly information technology. Little work seems to have been done on the required organizational and doctrinal changes. As Benjamin Jensen of the Marine Corps University has written, "too much time is being spent identifying exquisite technological capabilities absent a unifying concept on how to employ military forces."[27]

There are several issues with this technology-laden approach. The first is the appropriateness of the chosen technologies as offsets. Do autonomous, artificially intelligent systems necessarily offset adversaries' advantages in numbers and distance? Perhaps swarms of intelligent drones, deployed from long-range aircraft, can compensate for local enemy superiorities in missiles or tank troops. That seems the point of the SCO's Perdix drone demonstration, in which a hundred networked tiny aircraft cooperate in performing reconnaissance missions—or perhaps more lethal missions eventually.[28] Even nonlethal autonomous vehicles can track enemies, and in return create more targets for them, alleviating the burden for units that place humans in harm's way, or just far from home.[29] The *Sea Hunter*, the prototype boat in the Anti-Submarine Warfare Continuous Trail Unmanned Vessel program, a joint effort by the Navy and Defense Advanced Research Projects Agency, is promising in this regard.[30] Some of this work has now also been passed to the SCO, just under greater secrecy, as the Ghost Fleet project.[31] Global presence, whatever its real political value, is a very expensive business for the Navy and Air Force every year. The notion that intelligent payloads can be developed and retired faster than tanks, ships, and aircraft is economically relieving.[32] On the other hand, unless armies and fleets of killer robots are to stand watch continuously in Eastern Europe and the Western Pacific, there are practical limits to this approach.

Just Who Is Offsetting Whom?

Alternatively, the Pentagon has other developmental priorities that seem at once operationally simpler, less morally upsetting, and more practically offsetting. Lasers and rail-guns hold the promise of nearly limitless magazines for opposing incoming missile barrages. As the Air Force secretary and chief of staff wrote in July 2014 in their 30-year strategy, "if it costs markedly less for us to defeat a missile than it does for the adversary to build and launch it, the strategic calculus changes significantly."[33] Lasers and rail-guns each demand huge power inputs, and each has been promised as verging on breakthrough for perhaps 50 years. All the same, the Navy's renewed enthusiasm for rail-guns and the pending test on USNS *Trenton* are notable, even if the

USS *Ponce* conducts demonstration of Office of Naval Research–sponsored Laser Weapon System while deployed to Arabian Gulf, November 16, 2014 (U.S. Navy/John F. Williams)

recent track record is mixed.[34] Moreover, recent advances in the practicality of solid-state lasers, and the Navy's actual deployment of a small one on USS *Ponce*, suggest greater promise.[35]

Those physical deployments should remind us that plenty of compelling and possibly offsetting technologies are already on the shelf, or even in service. One could criticize Work's focus as just the latest new, new thing, for "basing a strategy on technological innovation that is not in hand is nothing more than wishful thinking."[36] Then again, the Second Offset bet on nascent technologies very successfully, and many of those advances remain not only available, but also sources of unique American advantage. One was stealth, and the United States remains the leader in the field. With the F-35 and B-21 programs, the military Services are building an aerial armada of stealthy jets to penetrate dense defenses. No matter how many missiles the enemy has, they are nearly useless without target tracks. Turning Raytheon's SM-6 missile into a ship-killer was an early accomplishment of the SCO, which indeed "reflects a Pentagon push to make old weapons do new tricks for a minimum added cost."[37]

Similarly, "distributing lethality" onto more ships with more missiles would seem to require some engineering work but no great technological leaps forward. The bigger change may be found in a new operating concept and perhaps new procurement priorities.[38] What it does require in technology is robust long-range communications—and at a time of growing adversarial capabilities in cyber-electronic warfare. Success in this realm may not be inevitable. From 2003 through 2009, the Army and its prime contractors, Boeing and SAIC, worked to develop the Future Combat Systems (FCS), a collection of "fourteen manned and unmanned systems tied together by an extensive communications and information network."[39] The latter would enable commanders to "see first, decide first, [and] act first" on large and fast-moving battlefields.[40] In June 2008, an independent review termed the stability and scalability of that network "an unresolved technical challenge."[41] The next year, Secretary Robert Gates canceled the entire FCS program. In 2017, the Army's objectives for battlefield radios remained yet unmet.[42]

Technological challenges and opportunities thus await on multiple fronts. Indeed, "in the initial stages of the Third Offset Strategy, administration officials and defense commentators advanced a laundry list of possibilities" for which technologies would be areas of focus.[43] To make the Third Offset Strategy a real offset strategy, the United States would need to double down in those areas in which it excelled, but the Chinese did not, and could not. Early in the discussions in the Pentagon, an intellectual battle emerged between advocates of bigger investments in the well-understood assets of long-range precision strike,

Defense Advanced Research Projects Agency successfully completes its Anti-Submarine Warfare Continuous Trail Unmanned Vessel program and officially transfers its technology demonstration vessel, christened *Sea Hunter*, to Office of Naval Research (DARPA)

and something wholly new in AI. One can make the case that either is a source of American advantage, but the latter uniquely fits the zeitgeist. AI also promised faster decisionmaking in the face of massive missile barrages, though with one proviso: Without rail-guns or lasers, Army and Navy missile defenses would still only bring so many rounds, and those rounds would often be more expensive than the inbound ones.

The second issue is comparative advantage. Are autonomy and AI really areas of enduring American acumen, and specifically relative to Chinese? True, for decades, software has remained one of the most competitive U.S. industries globally.[44] But Work himself admitted that sustaining a long-term technological advantage will be much harder in this century than the last, for the premier-league adversaries are not the closed societies of the Cold War. Integrated into the global economy, they have access to the same commercial technologies as American industrialists, and much of the best work in autonomy and AI is now commercially driven. It is quite possible that Alphabet or Uber or Ford will create a reliable self-driving truck well before any defense contractor does. Their rewards for innovation are far greater.[45] For this reason, we can at least hope that the Defense Department will confine its research priorities to those applications with largely military utility. In the dual-use realms, industry will require much less financial enticement.

This also gets to the question of who is offsetting whom: great commitments to new technologies may not produce the intended winners. Consider some historical antecedents. The British Admiralty's opposition to steam propulsion in the 1820s may have been overblown in the retelling, but the leveling effect of the new technology was still threatening.[46] After they provided the example, could their enemies the French just steam across the channel in a surprise attack? In the 1930s, petroleum-poor Germany and Japan each developed military strategies that depended inexorably on petroleum. Perhaps more than oil fuels modern warfare, but offensive plans that depend on it do require it.[47] Today, as Josh Marcuse of the Defense Innovation Board has remarked, "software is eating the war"—demand for new electronic capabilities has been increasingly damaging affordability for decades.[48] Will investments in millions more lines of code lead to real breakthroughs or just more exquisitely complicated systems?

Choosing the wrong area of technological investment can then lead to pointless expenditure down dead-end pathways, or even costly new arms races. Lord Fisher's *Dreadnought* was a great accomplishment in 1906, but by rendering all other battleships obsolescent, it almost lent *Tirpitz* hope of catching up. Only Wilhelmine Germany's geopolitical position rendered that forlorn. Thus, the Kaiser's peculiar naval obsessions would never do anything for his war effort. Instead, while underinvesting in the actually offsetting technology of submarines, his navalists built a High Seas Fleet (*Hochseeflotte*) that largely saw the side of a pier. Because Germany would never outbuild Britain in battleships, building any more than a few was self-defeating. Consider this in the context of another uncertainty: if autonomous systems offer the potential for faster decisionmaking in battle, they may raise the potential for successful preemption of enemies. Jensen thus worries that the Third Offset could produce another conceptual *Dreadnought*, ushering in an era of strategic instability.[49]

Rethinking the Theory of Victory

Finally, as in the 1950s, there may be a reorganizational imperative, particularly if the technologies of autonomy do not perfectly offset enemies' advantages. If advances in AI make autonomous precision weapons more capable against concentrated military forces, and those advances become generally available, then it could be the Chinese who wind up offsetting the Americans. Major American military expeditions still depend on iron mountains of supplies, the concentrated logistics of rail lines and cargo ships, the chokepoints of port facilities, and the high-value targets of large aircraft carriers and airbases. The ground troops still fight in formations similar to those that raced across France in 1944. Back then, the *Panzertruppen* arrayed against them failed to function well under sustained attack by the Ninth (U.S. Army Air Force) and Second (Royal Air Force) tactical air forces. Had those pilots been employing weapons like Joint Direct Attack Munitions and Brimstones, the results would have been ugly.[50]

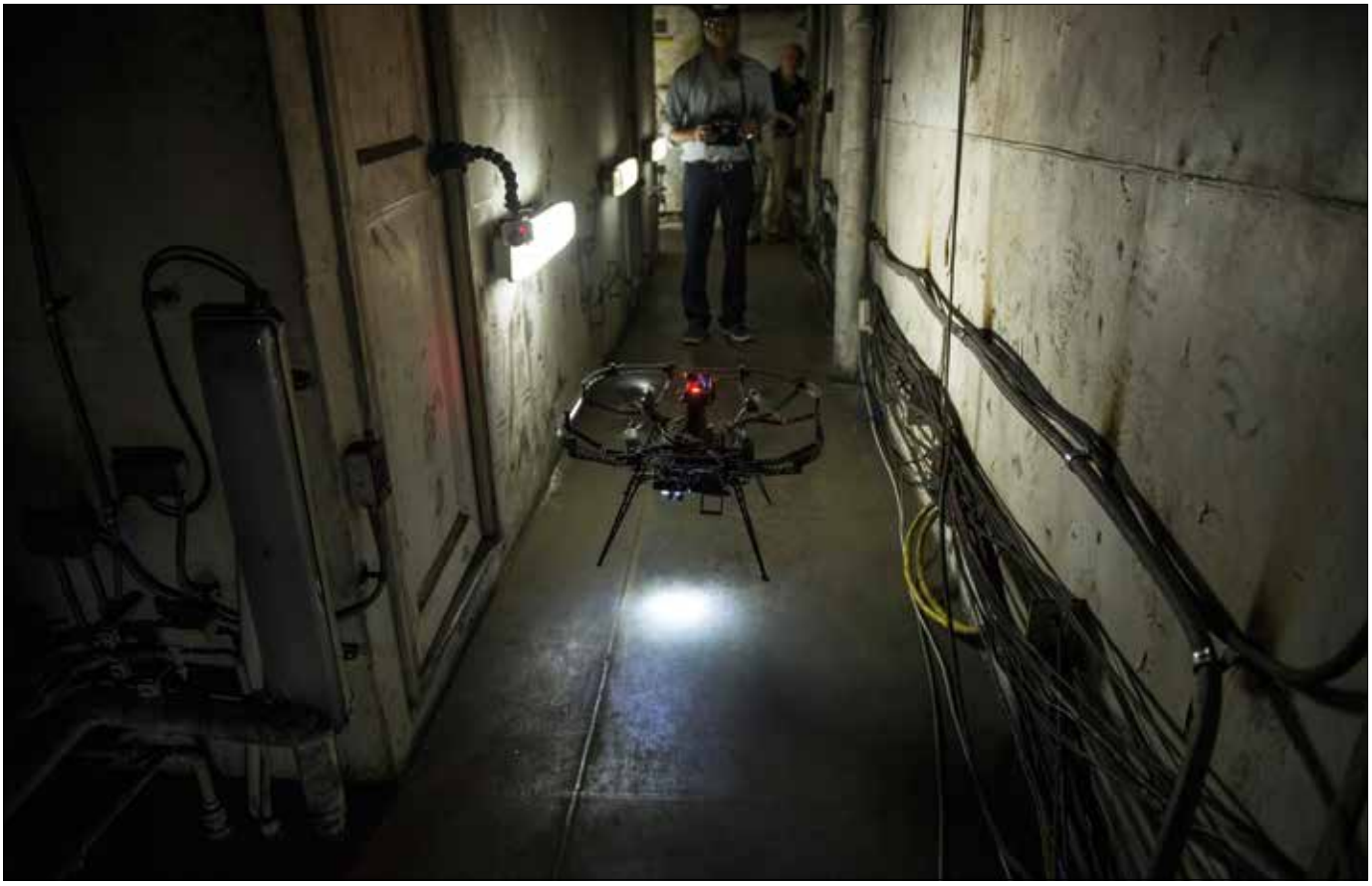
Yet uglier could be the results of future attacks carried out by artificially intelligent hunter-killer robots. Work has assured us, of course, that humans will stay in the loop.[51] Perhaps the promise

Russian Sukhoi Su-24 attack aircraft makes low-altitude pass by USS *Donald Cook* as it conducts routine patrol in U.S. 6th Fleet area of operations, Baltic Sea, April 12, 2016 (U.S. Navy)

of all this man-machine teaming will fundamentally change the ways of war. Work has even gone further, stating that he is now "starting to believe very, very deeply that it is also going to change the *nature* of war."[52] Or perhaps Work's "war without fear" will eventually prove as elusive and amusing as Admiral Bill Owens's *Lifting the Fog of War*.[53] Either way, fighting through dense and intelligent threats to access may require more than grafting new technologies onto old platforms and sprinkling machine learning into existing formations. Surviving advancing lethality may require greater dispersion—a new Pentomic formation, but with modern command and control. Effect has long required concentration, but perhaps distributing lethality can compensate for this.

In the end, however, machine learning will be no substitute for organizational learning. Doing it right may require rethinking and expanding an ethos of command by negation. The Army has been telling a good story about *Auftragstaktik* since the 1980s, but often honors it more in the breach than the observance.[54] Among the military Services, only the Navy uses the acronym *UNODIR* (unless otherwise directed), but the rest could learn it.[55] In turn, the resulting demands for individual initiative and skill placed on relatively junior officers may require a new approach to human capital development, as well as the hard institutional work of cultural change in the Armed Forces. This Third Offset may need some strategic lieutenants to master employment of its strategic capabilities. Secretary Carter's Force of the Future initiative sought to overturn the military's rather uniform and longstanding model for building human capital, but most of the elements concentrated on matters such as extending maternity leave and creating public-private work partnerships.[56] These may be laudable ideas, but they do not directly produce new forms of combat units leveraging autonomous intelligent anything.

The fundamental question thus remains one of geographical disadvantage, in which asymmetric strategies from the far side of the Pacific can turn American technological strengths into weaknesses.[57] Simply put, "the United States is attempting to project power half a world away against a continental-sized power."[58] As a final alternative, we might then consider a completely different but very conventional approach. A competitive *military* strategy could take advantage of geography, rather than trying to cope with it. American forces' exposure to inbound precision weapons is exacerbated the further forward they stand. Against modern mobile missiles hiding in the hinterland, Lord Nelson's admonishment that any captain "place his ship alongside that of the enemy" is rather outweighed by British Admiral John Fisher's dictum



Student-researcher from Carnegie Mellon University remotely maneuvers quadrotor micro-air vehicle through narrow hallways of Naval Research Laboratory's ex–USS *Shadwell* to smoke-filled, GPS-denied area to identify fire's location and transmit data back to research team, Mobile, Alabama, November 5, 2014 (U.S. Navy/John F. Williams)

that "a ship's a fool to fight a fort."[59] China's maritime trade, however, may be quite susceptible to a rather distant blockade. If necessary, the United States could wage a "war of economic attrition to bring about a stalemate and cessation of conflict with a return to a modified version of the status quo."[60] Here, the SCO's recent thrust toward reviving the Army's coastal artillery could also be useful—and not technologically taxing.[61] All this at least constitutes a coherent, modest, and reasonably achievable theory of victory. Such a strategy would require no technological leaps forward, or any "fevered imaginations" of what the future might hold.[62] By imposing costs on the Chinese, it could be called an offset strategy, just not a technological one. It would simply require an honest appraisal of what aims existing methods and projected resources could produce. **JFQ**

Notes

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