

What Does Persistent Observation Mean?

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Abstract

Persistent observation capabilities have been pursued for decades. Military planners, policy-makers, and intelligence professionals have envisioned how it can be exploited, and recent investments within the defense, and intelligence communities are rapidly reducing the technical barriers to making it a reality. However, observational capabilities alone will not transform the role of intelligence in strategy and military operations. This paper presents three conceptual frames of reference: (1) Sherman Kent's three types of intelligence, (2) Sun Tzu's and Clausewitz' views on the value of intelligence in military and strategic affairs, and (3) Robert Art's four uses of military force – in order to create an analytically rich context, from which persistent observation capabilities must be developed and operationalized. While the conceptual frames presented here are not exhaustive, they challenge the notion that more and better sensors can provide decision-makers with the tools they need, and argue that absent new analytic tools, methods, and concepts, the anticipated gains of persistent observation will never materialize.

1. Background and Framework

Persistent observation has been an important concept in military and strategic communities for decades. The airplane and satellites provided early glimpses into the potential of overhead observation. By the 1970s, the Soviet Union developed concerns over technological and conceptual trends within the U.S., particularly the apparent infancy of a Reconnaissance Strike Complex that seamlessly coupled sensors and weapons in near-real time. Soviet analysts believed that the militarization of emerging advances in computing and sensor technologies could provide the U.S. with a conventional ability to engage and defeat massive armor formations from standoff distances. By the 1980s, Soviet thoughts on the future of warfare were incorporated into U.S. thinking and were most forcefully advanced under the term Revolution in Military Affairs (RMA), and now military transformation.¹ An enduring and implicit assumption is that at least one side in the strategic competition would be capable of observing the actions of the other continuously.

2. Military Transformation and Information

The context of transformation is an important one for thinking about persistent observation. The transformation

agenda characterizes the growing expectations of information, and the increasing reliance on information collection capabilities within the military. Likewise, transformation's successes, failures, and challenges provide a sobering appreciation for the difficulty of conducting technologically sophisticated, strategic activities globally and consistently. Before considering the specifics of persistent observation, understanding the broader context of transformation is needed.

At the core of the RMA and military transformation are beliefs about information technology as a source of military and strategic advantage. These advantages go beyond communications and sensors, extending into information collection, processing, storage, retrieval, and network and cybernetic-based metaphors for organizational and strategic behavior. While the near-term benefits of the information revolution have provided the U.S. with overwhelming conventional military capabilities, many of these developments, such as precision-weapons, have merely fulfilled the expectations of technologists five decades ago. Disagreement persists as to what is truly revolutionary, mature, or conclusive regarding technology and strategic advantage.² Moreover, the advantages provided by changes in information technology have been uneven in both depth and breadth.

From a strategic perspective, the impact of information technologies on government capabilities and strategic activities has been heavily concentrated within military and economic sectors, and nearly absent in other aspects of national security, such as diplomacy. Within organizations, information technology has been used to greatly intensify the degree and direction of connectivity, enabling information to empower an ever increasing set of actors. But information technology itself has been surprisingly absent in helping decision-makers generate and choose between alternative courses of action. Ergo, increasingly the availability of information has had almost no discernable effect on the quality of decision-making.³ In addition, the information technology build-out has encountered significant difficulties in solving the problem of the "last mile" or delivering services to mobile and remote operators that lie on the fringes of dense information infrastructures.⁴

Key concepts at the heart of military transformation are Dominant Battlespace Awareness (DBA), and Dominant Battlespace Knowledge (DBK). The most forceful advocate of developing these concepts into

tangible, operational capabilities was Admiral William Owens, who articulated a “system-of-systems” Command, Control, Communications, Intelligence, Surveillance and Reconnaissance (C4ISR) architecture, in which forces would have near total awareness of everything happening within a geographic space (arbitrarily envisioned as a 200km by 200km area, in which all surface, sub-surface, air and space assets could be observed).⁵ This notion of the system-of-systems was later expanded into the concept of Network Centric Warfare (NCW) through the inclusion of behavioral strategies that sought to capitalize on increasing returns in competitive environments.⁶ Therefore, notions of persistent observation have been deeply embedded in the current military transformation agenda; the expected benefits of having information (one must have information in order to share information) are implicit in all transformational programs and plans.

3. Defining Persistent Observation

At its core, persistent observation involves the movement, placement, and density of sensors, as well as the fusion and processing of information acquired from them. In theory, three archetypes of sensor systems exist, from which persistent observation can be achieved:

- High-endurance, geostationary observation platforms composed of single or multiple sensors;
- Constellations of sensors that cannot remain stationary, but seamlessly maintain coverage of a target area through a constellation of identical sensors;
- Multiple, heterogeneous sensors that observe a target in several different points of view that are later fused into a single, common situational picture.

From an operational perspective, each of these three different sensor-architectures approaches yields different kinds of knowledge about the target’s behavior. While ideal versions of these archetypes do not exist, real world operations contain portions of these approaches, and are complex combinations of these three basic forms.

Persistent observation implies something different from continuous coverage, although precisely what these differences are have yet to be formally defined. The term “persistent” suggests that collection systems have a lengthy duration of coverage, and an impressive breadth of coverage, i.e. collection activities are capable of pursuing target data across multiple domains and over an extended period of time. The term “observation” also has significant implications. The ability to observe suggests more than the ability to watch a target – they can measure macroscopic and/or microscopic properties of the target

and discern qualitative differences and quantitative proportions.

The notion of measurement, particularly the ability to consistently monitor qualitative and quantitative properties, distinguishes persistent observation from continuous observation. The longitudinal, i.e. temporal, endurance of persistent observation ensures that qualitative changes, baselines, and cycles of behavior can be observed. Furthermore, persistent observation is distinct due to its large field of regard. The geographic breadth under observation ensures that a target’s behavior and properties can be observed and identified at all times. Finally, persistent observation demands the ability to pursue macroscopic and microscopic collections and measurement, meaning that collection and analytic resolution must be able to shift between broad and narrow focuses, dynamically.

Consideration of the definition of persistent observation reveals that many issues regarding the use of intelligence remain unresolved. While persistent observation emphasizes collection requirements, it is the analysis of the information gathered from sensors that will ultimately determine the value of persistent observation as a theory and capability. In order to further explore the potential contributions of persistent observation, three alternative frameworks for thinking about intelligence information are considered below:

1. Sherman Kent’s three types of intelligence;
2. Intelligence and strategic decision-making from the perspectives of Sun Tzu and Clausewitz; and,
3. Four uses of military force that persistent observation must be able to support.

The following frameworks are not exhaustive. They are meant to outline many opportunities and challenges that the pursuit of persistent observation entails. Each of frameworks is established and constitutes classical frames, within which emerging capabilities can be viewed, but merely represent skeletal frames that may stimulate the thinking of readers.

4. Sherman Kent’s Three Types of Intelligence

Intelligence information can be categorized as one of three types: basic, reportorial, and speculative.⁷ Basic intelligence consists of general background knowledge about a domain. Basic intelligence tends to be factual and empirically measurable, but may also include qualitative information such as ethnographic descriptions – including demographic, environmental, geographic, constitutional, legal, organizational, technological, and other features of a target, whether the target is an entire country or

particular organization. Reportorial intelligence constitutes descriptive accounts of what is currently happening. This intelligence includes the monitoring of indicator data for the purposes of warning, descriptions of current organizational or individual behaviors and activities, etc. Typically, reporting data is gathered via SIGINT, HUMINT, or other collection methods that can focus on the activities of a specific target, or isolate specific signals amongst a sea of noise. Speculative, the third type of intelligence, constitutes projections of future conditions and assessments of unknown or unobserved features of a target's behavior. Speculative intelligence includes anything where judgments extend beyond what is explicitly known based on basic and reportorial intelligence.

Distinctions between these types of intelligence are important because they are equally sensitive to content and method. In some cases, such as products specifically oriented towards the analysis of future conditions, their categorization is clear. In other cases, such as descriptions of adversarial organizational structures and processes, the processes, by which they were produced, may be the determining factor as to the type of intelligence they represent. A depiction of the Soviet Army's organization, acquired through the collection of manuals, communications intercepts, political and legal observation, etc., may produce a factual, empirically grounded understanding on the organization's structure and processes. Acquiring information about al Qaeda's structure and decision-making process through a complex array SIGINT, heuristics, and speculation may be far more difficult to ascertain. The quantity and quality of information used to generate analogous analyses of target organizations may determine whether the products are regarded as basic or speculative intelligence. This framework reveals the importance of philosophical concerns over the roles of theory, ontologies, and epistemology within the practice of intelligence, despite the community's general ambivalence towards abstract issues.⁸

The framework of basic, reportorial, and speculative intelligence provides an opportunity to consider persistent observation from a temporal perspective. The ability to observe a broad area for an extended period of time can create opportunities to gather specific information as to the basic landscape of the micro- and macro-level targets. Micro-level targets include specific facilities, locations, people, or the search for predefined signatures. Macro-level targets include population distributions and properties, broad mappings and geo-location of the infrastructure, input and output measures of economic production and resource flows, and other information that provide a basis for understanding the target's management of tangible, observable assets and resources.

Changes in micro- and macro-temporal and spatial scales impact military operations. Micro-level analysis, the near-real time emphasis on particular intelligence targets, e.g. facilities, leaders, or individual military units, directly supports the engagement of military targets. Alternatively, macro-level analysis can consist of temporal histories, pattern recognition, change detection, and krieging. This information may have little direct contribution to military operations, but can be immensely important in determining if policies and operations are having intended political, economic, military, or social effects.

Persistent observation's greatest contributions will likely lie in the macro-level domain by providing a larger, more complete foundation of basic intelligence, and allowing for the observation of broad, structural, geospatial features that are normally confined to speculative analytic products, because they defy measurement and observation. In many areas, such as infrastructure and population dynamics, analysts may be able to inference from a complete universe of observations rather than extrapolate based on a small number of cases.

An important feature regarding persistent observation is that while it enables a broad range of measurements to be conducted, these measurements are unlikely to provide causal knowledge or explanations that can be exploited by military planners and policy-makers. Intelligence collection may be capable of providing an awareness regarding changes in macro-level patterns, distributions, and structures, but it may not be able to explain why changes do or do not occur. Absent theories specifically tailored to explain macro-level structures from large volumes of empirical data, the contextual potential of persistent observation will remain untapped, and inferring the success or failure of actions on the target will remain a risky endeavor at best. The demand for theory and models ensures that speculative intelligence will remain an important feature of the analytic portfolio, despite the increased ability to perform measurements previously deemed unimaginable.

The central role of speculative intelligence as a means for deriving contextual insight from persistent observation reveals an important paradox that has always beset the intelligence community. Intelligence professionals note a strange irony that policy-makers derive the greatest value from intelligence when it contextualizes the target's behavior. However, it has also been noted that decision-makers consider analytic judgments and speculation the least credible or worthwhile intelligence products.⁹

Persistent observation provides continuous observation of targets in real-time or near real-time. Therefore, a persistent observation capability is fundamentally within the category of reportorial intelligence, where current

activities or conditions are observed and reported to analysts and decision-makers. However, because of the broad area coverage, and long temporal focus, persistent observation also enables a greater awareness of basic intelligence, or the structural features of the target. While such information is often taken for granted, basic intelligence is absolutely crucial for both basic operational requirements, such as the generation of accurate maps, as well as for providing a database of indicators of interest to policy-makers and strategists. Indeed, the long endurance of persistent observation collection platforms or constellations provides a foundation for conducting new kinds of analysis that will be critical for coercive or defensive military operations, and making Effects-Based Operations possible.¹⁰

5. Intelligence and Decision-Making

Understanding how information gathered through persistent observation establishes the credibility of analytic products and defines areas of certainty and uncertainty. While speculative intelligence enabled analysts to contextualize observations for policy-makers, the futures they project are often unwelcome and controversial. Given the paradox regarding the value of speculative analysis, a deeper understanding of the role of intelligence in decision-making is necessary.

Classical strategic thought can shed light on this paradox by presenting two competing views of the value of intelligence to strategy. On one hand, Sun Tzu embraced the importance of knowing oneself, one's adversary, and the terrain, on which engagements occur.¹¹ Alternatively, Clausewitz dismissed basing decisions on information about the adversary due to the difficulties of accurate recognition – the fog of war.¹² While these two authors appear to have reached dramatically different conclusions, it is important to understand that they had different visions of intelligence in their analysis.¹³

For Sun Tzu, intelligence uncovered information that strategists deemed critical for successful operations. From this point of view, intelligence information collected and analyzed information that made the realization of strategic objectives possible. Thus, the location and disposition of adversary forces, the technical characteristics of enemy weapons, the training and organization of adversary armed forces, and other information and knowledge that informs operators how to protect themselves and exploit adversaries' vulnerabilities are the object of intelligence collection and analysis. The logic of Sun Tzu's views on intelligence demands that a priori intelligence collection be confined to narrowly search for information determined to be important; collection should focus on operationally relevant and actionable information. Thus, intelligence information

allowed for the development of plans and operations that conserved resources, and used knowledge as a force multiplier in the pursuit of strategic objectives.

The alternative perspective on intelligence provided by Clausewitz was part of a much larger problem in inquiry and determining the value of information in helping decision-makers understand the world as it is and determine what their goals should be. The issue was a matter of understanding consequences and choosing between competing goals. For Clausewitz, intelligence does not seek to identify an adversary's strengths and vulnerabilities per se, but helps policy-makers determine whether or not particular microscopic or macroscopic structures or trends are positive, negative, or whether or not they can be changed. From this perspective, intelligence collection was broad, all-inclusive, and not constrained to the collection and analysis of actionable information. Intelligence collection and analysis emphasized discovery and context. Clausewitz adopted a guarded view of intelligence because of the difficulties of accurate recognition, and the inability of analysts to cope with the complexity of their observations. Clausewitz concluded that when surrounded with incomplete, inaccurate, or ambiguous data, analysts would eventually see what they desired, reducing any analysis to a house of cards that could collapse without warning.

Persistent observation must navigate between supporting military operations through narrow, focused searches of collected data, and facilitating strategic decision-making through constant contextualization and re-contextualization of target behavior. While persistent observation has the ability to allow for the surveillance of large geographic areas, operational requirements necessarily constrain searches for interesting properties and patterns to those deemed operationally relevant. While this may enable improvements in the operational use of intelligence, it will have little effect on strategic decision-making if collection and analytic priorities are consistently dedicated towards producing analytic products that are already in demand. For persistent observation to influence strategic decision-making, i.e. the determination of what ends military, diplomatic, and economic means should pursue, collection and analysis should be unconstrained, and focus on the search for novel perspectives that illuminate situations and inform decision-makers about the short and long-term consequences of their choices. While distinctions between decision-making and problem-solving are subtle, their implications for the design of intelligence systems, and the use of information garnered from them, are important.¹⁴

Distinguishing between how to achieve a goal, and determining what the goal or goals should be is a familiar act for analysts, whose formal training and discipline

emphasizes distinctions between facts and values. Within organizations, facts and values are complex concepts that are not easily unraveled. Ultimately, organizational hierarchy and process acts as arbiter, as value judgments by one level are accepted as fact by subordinates.¹⁵ The development of persistent awareness capabilities, and the operational concepts that support their use hinge on the resolution of fact and value propositions and the envisioned role that intelligence will play in the decision-making process. Historically, operational requirements have driven the design and development of collection systems and analytic products. While this has made intelligence useful for determining matters of operational efficiency, successful intelligence operations have not necessarily contributed to strategic effectiveness. Surprise has remained an endemic feature of international affairs, due to the inability to deploy scarce resources against issues or targets that are not considered important when deciding intelligence targets or searching for patterns and signals within data.¹⁶

Persistent observation capabilities are likely to become a cause of considerable tension within the national security community. It is likely that conflicting priorities will be difficult to resolve and operational priorities that provide actionable information will consistently win out over more diffuse, discovery oriented priorities due to the lack of an operational constituency supporting their collection and uncertainty over the value of the collection priority. However, the diversion of collection and processing resources towards issues that are already regarded as important, increases the likelihood of surprise, and diminishes the opportunity for early identification and intervention in emerging problems. Ironically, the more successful persistent observation capabilities prove to be, the more likely the occurrence of strategic surprise due to the inability to resist the temptation to divert collection and analytic assets to operational matters. Indeed, tension between strategic and operational intelligence priorities have been criticized for preventing the emergence of a collaborative, comprehensive assessment of Iraq's WMD program during the 1990s, and the requirement to make intelligence support to military operations the highest priority has skewed resources away from long-term, strategic targets towards current, operational priorities.¹⁷ Without a clear understanding of the role of military force in strategy, persistent observation capabilities may fail to support the full range of national security policy, and become a niche provider of services rather than a truly transformation capability.

6. The Uses of Military Force

Returning to the fundamental logic behind the use of military force provides a third framework for considering

the uses and utility of persistent observation. From a political point of view, military forces serve four purposes: defense, deterrence, compellence (coercion), and swaggering.¹⁸ Defense is the physical act of protecting a state's territory, population, and allies from aggression through combat. Alternatively, deterrence is the taking of actions designed to dissuade an adversary for undertaking specific acts of aggression out of the fear of retaliation. Compellence consists of actions taken with the objective of having a target undo something they have already done, or make a particular decision based on terminating hostilities, e.g. the targeting of Serb leadership and infrastructure with the goal of having Serb military forces withdraw from Kosovo in order to terminate the bombing. Finally, swaggering, perhaps the hardest to define, looks at the symbolic value of military forces and weapons. Swaggering can seek to impress foreign or domestic audiences. The development of nuclear weapons, space programs, and other highly technologic or grandiose systems can be a source of national pride and acclaim, and legitimize individual leaders, institutions, or socio-political structures, internationally or domestically.

While a relatively simple framework, defense, deterrence, compellence, and swaggering overlap and influence one another, e.g. good defenses may deter adversary attacks, such as the development of siege resistant fortresses in the 17th century. Alternatively, good deterrence may provide little defensive value, as was the case with the Cold War's strategy of Mutually Assured Destruction. Swaggering is perhaps the most difficult aspect of military forces and power to understand because of its deep cultural or normative qualities. Indeed, retrospective analysis of Iraq's behavior in the run up to Desert Storm in 1991 argued that once Saddam Hussein recognized that the U.S. led coalition would employ military force against him, he determined that sacrificing his forces for prestige was more important politically than removing them from Kuwait unharmed for security reasons.¹⁹ Likewise, recent examinations of Iraq's WMD program has determined that Saddam Hussein's regime deliberately engaged in deception in an effort to give the appearance that the regime was still in possession of weapons that had been dismantled precisely because of the domestic prestige they provided his regime and the fear it provoked in Kurd and Shia populations.²⁰

For persistent observation to support defensive operations, it can either provide coverage over blue defensive positions, providing operational and tactical warning and depending upon its underlying architecture, or it may serve as a command and control platform. Alternatively, persistent observation capabilities could provide coverage of enemy staging areas of almost any size and provide strategic and operational warning.

However, in order to directly support military operations, seamlessly integrating persistent observation architectures into sensor-to-shooter networks will be necessary, and a significant portion of this integration and process will need to be automated if time-sensitive, mobile targets are to be engaged. This integration may be more than a technical challenge, however. Should persistent observation capabilities exploit multiple intelligence methodologies, and target a plethora of sources that simultaneously collect against political, military, economic, and other targets, the seamless mixing of information directly challenges the existing classification system and professional organizations that produce and manage classified information.

Persistent observation's ability to contribute to deterrence can occur in two ways. Persistent observation can observe red targets, and help analysts understand adversarial decision-making, organization, processes, and capabilities, which can then be used to design deterrence capabilities and inform policy. Alternatively, persistent observation may prove to have a deterrent capability of its own. The very belief that that the U.S. might observe threatening behaviors may prevent adversaries from engaging in them in the first place. The ability to gather information becomes a source of power in its own right.

The deterrent value of information itself warrants deep consideration and caution. If persistent observation platforms do not detect the presence of certain activities, does it mean that those activities are not occurring; that adversarial denial and deception activities are effective; or, that sensors and analyses are poorly matched against the threat? The recent case of Iraqi WMD provides an illustration of the complexities of persistent observation. Did decreasing information regarding Iraqi WMD in the late 1990s indicate Iraqi disarmament or improvements in Iraqi operations security and denial and deception capabilities?

Persistent observation's ability to support compellence is similar to that of defense. Persistent observation can provide tactical and operational support to blue combat operations provided sensor-to-shooter integration is resolved. However, it is important to recognize that compellence considers the use of force for political signaling, of which effective combat operations are important, but not the ultimate objective. Thus, while acts of compellence may seek to destroy adversary forces and operators, their objective is to persuade adversary leaders to make choices, not render them unable to choose. In addition to combat, persistent observation may need to support strategic and operational intelligence collection in which deliberations, reactions, and decisions of adversary leadership are monitored. Moreover, compellence may require a broad background of social, economic, and military structures in order to appropriately target

adversary assets, and generate internal opposition to resisting U.S. coercive demands.

Persistent observation's contribution to swaggering is perhaps the most difficult to ascertain and imagine. Intelligence capabilities rarely inspire populations precisely because of their secretive nature. For persistent observation to provide a swagger to the U.S., it is likely that non-intelligence analogies may need to be operationalized in order to spark domestic and international imagination. Such analogies to support swaggering are not new, as evidenced by the launching of the Sputnik satellite and the subsequent moon landing. A visible, non-stealthy persistent observation capability that has military and non-military use, such as law enforcement, disaster planning and management, environmental protection and planning, etc., could symbolize technological achievement and military power without directly contributing to defense, deterrence, or compellence operations.

Sensors gather data. However, in few cases is data itself decisive, in terms of its impact on decision-making. More often than not, data gathered in real-time will need to be aggregated and/or compared to previous data, or be evaluated within multiple theoretical, methodological, and historical frames. Rarely do observations directly and unambiguously drive action. Thus, persistent observation cannot provide the full range of support across defense, deterrence, and coercion without the framework of complementary capabilities and consideration for a broader context of military, diplomatic, and economic operations.

7. Real-Time Collection, Modeling, and Simulation

Collection activities need to be fused with analytic processes and methods that allow for the gathering of data to be cross-checked and aggregated with previously collected information. Given the proposed resolution of persistent observation capabilities, and the vast area of coverage, there are essentially two ways to make sense of the vast quantity of data from persistent sensors:

1. The use of modeling, simulation, and computational intelligence for pattern recognition, hypothesis generation, and hypothesis testing; and,
2. The use of active sensing to generate knowledge about the area under observation.

In the first case, modeling and simulation, or more generally regarded as a theory about relationships in the area that will be needed to solve the problem of "drinking from the fire hose." The collection of large quantities of

data can be a hindrance to analysis as increased incoming data adds more noise to the search for meaningful signals. Altering conceptual frameworks or how searches for patterns, regularities, and anomalies within data are conducted can often have a greater contribution than more data itself.²¹ Persistent observation will be immediately useful in cases where analysts and operators have a priori knowledge of the structure of the signals they seek, or those that they wish to ignore. However, as signals become increasingly vague, and their signatures are regarded as “non-normal” or anomalous, determining what is normal, positive, or negative becomes problematic. Without models, both theoretical and empirical, simple observations and statistical correlations will be unable to provide decision-makers with a meaningful context, in which reportorial intelligence can be placed, and from which speculative intelligence can be built. Operational collections designed to improve efficiency will have advantage over strategic collection and explorations of frameworks that help strategists determine what goals they should seek. As a result, strategic behavior itself may become biased towards action and the utilization of scarce resources due to the lack of a suitable context for explaining what behavior is or is not threatening. Absent sound theoretical frames and political and strategic context, caution militates towards action.

While it is unnecessary to dwell on modeling and simulation capabilities, it is sufficient to note the opportunity that persistent observation presents regarding the development of new knowledge. Despite many of the difficulties regarding the collection and analysis of large quantities of data over a broad area, persistent observation presents important opportunities that should not be neglected. Broad area, multi-int coverage over long periods of time provide numerous opportunities, such as definitive temporal and spatial coding of all collections.²² However, improvements in collection will not be enough to transform the role of information during international conflict. Absent considerations for the credibility of intelligence, the role of intelligence in decision-making, and the general purposes of the use of force, technological capabilities, regardless of their sophistication, will disappoint the very people they intend to support. Making persistent observation a reality will require more than technological development. The ability to support multiple analytic requirements, including sorting through fact and value propositions and modeling and simulation will be essential to the success of any persistent observation system.

8. A Consideration of HUMINT

Many observers have noted that today’s strategic challenges are not easily observed or understood through technical intelligence methods, and that HUMINT has become a critical intelligence capability. This view has merit, but also mischaracterizes the threat environment. For example, terrorism is largely considered a threat that emanates from individual intentions that can only be uncovered through observing and interacting with the individuals involved in terrorist groups. However, terrorism is threatening because of its ability to threaten complex, interdependent processes in ways that could not have been achieved by small, non-state groups a few decades ago.²³

Shifting attention from intentions to processes reframes the notion of a threat in important ways. First, intentions only matter if individual behavior is rationalized with individual desires; a claim that has occupied social scientists for decades.²⁴ Individuals matter because how people behave is the fundamental ingredient in social, political, economic, environmental, and military processes. The context of local interactions, the micro-level details that link individual, group, national, and regional behaviors create pathways that enable any process to be threatening; whether deliberate acts of terrorism, inadvertent outages in networked infrastructure, or the spread of disease or economic crises, for which the notion of intention is not applicable.²⁵ HUMINT’s value in dealing with emerging strategic threats is its ability to observe and describe micro-level interactions, not in uncovering secret and nefarious plots that may never come to be, or have any effect if implemented. Strategic success will result in the ability to understand how micro-level interactions produce macro-level outcomes, and developing systems that can mitigate deliberate or unintentional shocks at local levels, attempting to anticipate the specific, detailed actions of aggrieved individuals and groups with enough precision to enable timely interventions, cannot succeed over the long-run.

From the perspective of persistent observation, HUMINT is a necessary, complementary capability. Human collectors cannot be persistent. They are simply incapable of observing targets on without pause or invariance, and many targets of interest are specifically evolved to mitigate the effectiveness of penetrations by intelligence and law enforcement personnel.²⁶ Moreover, HUMINT is not a real-time collection capability. The availability of sources, the availability of safe houses, the availability of communications, etc., all affect the ability to gather and send collected information to analysts and decision-makers in a timely fashion. Additionally, the local-level, microscopic perspectives gained through

HUMINT can obscure large-scale patterns of behavior even though these behaviors are the result of observable micro-level interactions.

HUMINT's value, from persistent observation perspective is its ability to gather and specify contextually relevant search parameters and models of individual, organizational, and national, and regional behaviors; and the ability to explore the veracity of macro-level observations and explanations of a target's behavior by actively engaging the target at lower levels of observation. Therefore, HUMINT has an essential role in decision-making, even as it stands apart from technical architectures.

9. Making Persistent Observation a Reality

Can persistent observation meet the demands of transformation? Answering this relatively straight-forward question is anything but straight-forward. From a technological perspective, the ability to design and deploy long-endurance sensor systems capable of fulfilling decades-old visions is an approaching reality. However, whether operational concepts for managing and exploiting these systems ever mature is harder to discern. The twin failures of 9/11 and Iraq's WMD arsenal reveal that decision-making and analysis are simultaneously capable of missing what is in sight, and seeing what isn't there. The technological challenge is only the first hurdle.

Assuming persistent observation systems can be built, their deployment and exploitation will require deeper consideration over how collected information is to be used, what kind of credibility it will have with decision-makers, and what kinds of activities it will support. Moreover, theories and models that link micro and macro-levels of behavior must be developed, tested, and empirically operationalized. While persistent observation's proponents advocate the benefits of more and better sensors, absent new analytic tools, and the ability to cue, and be cued by micro-level contextual information, whether gained through HUMINT or otherwise, persistent observation will be unable to fulfill transformation's vision.

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