The Evolution of the Intelligence Professional: 
Complexity and Tradecraft Transition Lessons from Meteorology, Medicine, and Economics

by

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For more than a decade Major Dan Javorsek has been an intelligence consumer as a US Air Force officer and pilot. However, until recently his exposure to the intelligence community was limited to the interactions associated with his initial duties as an operational F-16 pilot and later as an experimental test pilot and acquisitions professional. Since returning to an academic environment for graduate work he has become interested in the application of complexity theory to intelligence analysis and education.

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Introduction

Technology advances of the last several decades have had a dramatic impact on human interactions and behavior. As the world has gotten increasingly more connected and interdependent we have seen an explosion of globalization where more diverse and adaptive interactions take place nearly instantaneously. This has vital ramifications for the intelligence analyst and the intelligence community (IC). The same technologies that have helped to facilitate globalization have also created a nearly overwhelming amount of intelligence data to be processed, exploited, and disseminated. The compartmented security structure that fundamentally supports the IC has not adapted to this rapidly evolving and dancing landscape. The inherent shroud of secrecy, so necessary for practicing intelligence, has also contributed to the unique environment that has historically resulted in the IC becoming the scapegoat for time asymmetric events resulting from the complexity of systems based on adaptive human behavior.

These challenges fundamentally oppose the overall goal to inform the policymaker, and highlight the most significant gap separating intelligence education and practice. With a lean budgetary future looming, these gaps will widen without a swift intelligence education response. To counter these challenges, the intelligence community must make the necessary transition from tradecraft to profession whereby theory and practice can finally strike an ideal balance in an era of seemingly overwhelming input. Lessons on this transition can be gleaned from the fields of meteorology, medicine, and economics where an educational emphasis has been recently placed on the relatively nascent field studying complex adaptive systems.
The Intelligence Professional’s Evolutionary Past

Throughout American history, intelligence has played an integral role in national security. In spite of the Continental Army’s early reliance on intelligence—as demonstrated by Paul Revere’s famous 1775 ride that ultimately helped bring about the ensuing defeat of the superior British superpower—the emerging steps to professionalize the field would have to wait until the late 19th century.1 It was not until the aftermath of the Civil War, that the Army and Navy both formalized the intelligence career field by setting up dedicated efforts in their respective services. Unknowingly, this began a compartmentalization that persists today with 16 different agencies making up the Intelligence Community (IC) and which has stymied the professional development of the intelligence analyst.

At the turn of the 20th century, scientific and technological developments in the fields of nuclear physics, aerospace, and electromagnetic collection had a tremendous impact on reconnaissance, surveillance, and information security. The development of nuclear weapons was deemed so important that it resulted in the Atomic Energy Act of 1946, which established the U.S. Atomic Energy Commission and introduced another key fragmentation of the IC by compartmentalizing the information security architecture the community has come to rely on. This separation arose because the Atomic Energy Act created a different set of security rules from those in the War Department and introduced the concept of special handling of sensitive materials.2 This resulted in the creation of Sensitive Compartmented Information (SCI) and Special Access Programs (SAP) with origins in the IC and Department of Defense,

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respectively.\(^3\) In the immediate post-World War II era, the number of such programs was manageable. However, this concept of compartmentalization took on a life of its own and as technology rapidly advanced, the ensuing number of programs skyrocketed.

Globalization also galvanized the swift formulation of SCI and SAP programs by providing an environment that encouraged international scientific collaboration thereby increasing the risk of exposure. Unfortunately, intelligence analyst assessments and the analyst-policymaker relationship have been the unexpected casualties, since often the intelligence analyst who performs the assessment does not have the full “un-compartmented” picture. Additionally, the inherent secrecy of this environment has made the IC an easy scapegoat for a public poorly educated on the time asymmetry of complex systems where the role of randomness\(^4\) has not been adequately explained. One only has to Google™, “connect the dots” with Pearl Harbor or the terrorist attacks of September 11\(^{th}\) 2001 to see the extent of the public’s lack of understanding.

At almost the same time, the collegial intelligence structure was complicated with the National Security Act of 1947 which added the U.S. Air Force and the Central Intelligence Agency (CIA) thus duplicating intelligence efforts already present in the Army and Navy. Although there have been several attempts to merge the individual IC agencies, it was not until the Executive Order 12333 in 1981 and the Goldwater-Nichols Department of Defense Reorganization Act of 1986 that this paradigm began to shift. The latter introduced a force structure based on combatant commanders instead of the service chiefs, and ultimately


encouraged cooperation but not integration—an important distinction in an increasingly networked battlespace.\textsuperscript{5}

Most recently, the failures to predict the September 11, 2001 terrorist attacks or uncover weapons of mass destruction (WMD) in Iraq led to the latest restructuring of the IC via the Intelligence Reform and Terrorism Prevention Act (IRTPA) of 2004.\textsuperscript{6} In the aftermath, several studies of intelligence failures cited systemic analysis problems and resulted in the Director of National Intelligence’s (DNI) focus on the tradecraft of intelligence analysis.\textsuperscript{7} As a result, the Office of Analytic Integrity and Standards was formulated which dictated standards and performed random intelligence assessment evaluations via the product evaluation board (PEB).\textsuperscript{8}

**The Future of the Intelligence Professional**

As would be expected, the development of the analytic tradecraft standards has simultaneously benefitted and hindered the community. These standards are hopefully the first iteration of what can be viewed as a deliberate transition from a simple tradecraft to a respected and certified profession. As such, in the ensuing years they will be refined to amplify beneficial elements while relegating detrimental ones. Before offering recommendations to address shortfalls of the analytic tradecraft standards, it is helpful to first summarize their many virtues.

\textsuperscript{6} *Intelligence Reform and Terrorism Prevention Act of 2004*, Public Law 108-458, 108th Cong. (December 17, 2004), §1019.
Most importantly the standards have generated internal reflection and discussion, often the trademark of progressive improvement. Although much of the discussion has been critical, many positive aspects have received increased attention at higher levels. This has resulted in improved emphasis on analyst education with respect to cognitive biases\textsuperscript{9} along with techniques to counter them.\textsuperscript{10} Since the focus of the standards has been to more formalize analytic methodology and provide transparency of analysis, the proverbial dichotomy of art versus science, as it applies to intelligence, has been discussed. While the standards represent a community mindset shift from a reliance on intuition to more structured methods, there has been a spectrum of reactions to their introduction that range from condemnation\textsuperscript{11} to support.\textsuperscript{12} As with any complicated system, the simple analogy breaks down when applied from a general perspective. In reality, the art and science elements are not diametrically opposed but rather should be thought of as at two separate ends of a single continuum. Good intelligence analysis, then, encompasses finding the proper location in the spectrum with methods tailored to address the unique conditions associated with each individual problem.\textsuperscript{13}

This has led to an emphasis on the importance of accurate metaphors to help cage both the analyst and policymaker in their respective expectation of the role intelligence should play.\textsuperscript{14} This line of reasoning naturally lends itself to comparisons with other professions that span

\textsuperscript{10} Rob Johnston, \textit{Analytic Culture in the U.S. Intelligence Community: An Ethnographic Study} (Washington, DC: Center for the Study of Intelligence, CIA, 2005) 10.
\textsuperscript{13} Stephen Marrin, “Intelligence Analysis: Structured Methods or Intuition?” \textit{American Intelligence Journal} (Summer 2007) 7-16.
\textsuperscript{14} Josh Kerbel, “Lost for Words: The Intelligence Community’s Struggle to Find its Voice,” \textit{Parameters} (Summer 2008) 102-112.
from medical doctors\textsuperscript{15} to paleontologists.\textsuperscript{16} By extension, such comparisons can be viewed as an interpretation of the proximity an intelligence analyst should have with the policymaker.

Similar to international relations theories, one finds that within the IC there are idealists, who believe in absolute analysis objectivity, and realists who ultimately understand that as human beings, true objectivity is never possible. Human nature is replete with cognitive and cultural biases and makes such attempts quixotic and, in an ironic sense, non-objective.\textsuperscript{17} History is full of examples where the baseline practitioners of the scientific method, so frequently championed by idealists, themselves succumb to human nature and bias in reporting their findings. Again, the result of the reality associated with a complex system is that a singular policy for the proximity to the policymaker is naïve and should, instead, depend on the unique conditions associated with each individual problem.

After in-depth study of the IC response to the analytic tradecraft standards, the need to develop professionals, upon whose judgment the community must rely, is imperative. This must originate with a more rigorous selection process that emphasizes creativity and critical thought\textsuperscript{18} while preserving scientific acumen and intellectual courage.\textsuperscript{19} While the standards provide the underlying groundwork, the community must take the critical next logical step toward certification as a profession by providing more rigorous educational requirements,


\textsuperscript{17} Stephen Marrin, “At Arm’s Length or At the Elbow?: Explaining the Distance between Analysts and Decisionmakers,” \textit{International Journal of Intelligence and Counterintelligence} 20 (2007) 401-414.


structured personnel practices, and individual motivation through assessment quality control.

Educational Growth Potential

Standards of education must be enforced that include requirements for individuals with backgrounds in the more technical aspects of statistics and mathematics. Many analogous professions to which the intelligence analyst is frequently compared have such requirements. Not all meteorologists, medical doctors, or economists are versed in Complexity theory, Chaos theory, Design of Experiments, Randomness, and Game theory, but each community insists upon possessing a core group of their population with educational backgrounds in these fields.\(^\text{20}\) The deliberate selection of such individuals provides both credibility as well as a formal voice in defense of community image and public perception.

While most intelligence analysts intuitively understand the severe limitations of prognostication, due to the time asymmetry associated with complex events, the IC currently lacks the collective educational background to convincingly articulate itself when criticized.\(^\text{21}\) In fact, while Complexity theory has been used in reference to the IC structure of several interacting agencies, it misses the important potential role the theory could play to help solve the impending challenge of overwhelming data.\(^\text{22}\) Ideally, an educational background in Complexity theory helps to identify the tradeoff between exploration and exploitation when encountering an abundance of data from a dancing landscape. In short, the IC must establish a


collective educational baseline that will both improve the quality of individual assessments as well as affect public opinion.

For example, when the precise touchdown location of a tornado is not well-predicted; a case of Coccidioidomycosis is misdiagnosed as simple pneumonia; or the Dow Jones Industrial Index drops 500 points in a single day; those impacted are disappointed but still seem to understand that although an explanation exists in hindsight, these unpredictable events were unavoidable due to the limited understanding of system complexities. In contrast, the September 11, 2001 terrorist attacks were almost unanimously viewed as an intelligence failure. Additionally, when the potential impact analysis of hurricane Katrina on New Orleans was not appropriately heeded by the Federal Emergency Management Agency (FEMA), the public readily connected this to a policy failure. However, when the dearth of supporting evidence on Iraqi Weapons of Mass Destruction (WMD) from intelligence analysts resulted in a lack of WMD in Iraq, the public did not view it as a policy failure but rather blamed IC analytic methods. Clearly the efforts to establish a core educational understanding of complex systems in the fields of meteorology, medicine, and economics have influenced public perception. This perception has been bolstered by the respective professions’ ability to articulate their associated limitations and has realistically shaped expectations.

In the current environment where the volume of data collected is increasing exponentially, there will be a need for analysts with an ability to manage these data sets. Inevitably, much of the more rudimentary tasks will be outsourced to computers with the increasing need to expeditiously process, exploit, and distribute information. In such situations, an understanding of the underlying principles will be vital to accurate assessments based on the statistical data that will be provided. Fortunately this will also provide a mechanism for
intelligence analytical skill assessment, an element of the standards not currently rated by the product evaluation board (PEB).

**Examples from Meteorology, Medicine, and Economics**

Other similar fields of study have already chartered the path of standardized education and professionalization. Certifications are a fundamental aspect of meteorology (Certified Consulting Meteorologist program), medicine (American Board of Medical Specialties), and economics (Certified Economic Developer). In each case, the certification has had the effect of providing legitimacy and has helped raise standards of each career field by providing impartial, third-party endorsement of education, knowledge, and experience.\(^23\) Since certifications are earned from a professional society and not the government, the IC would need to find an appropriate professional body to provide oversight of the program, such as the International Association for Intelligence Education (IAFIE) or the Armed Forces Communication and Electronics Association (AFCEA). Although certification programs exist in a variety of fields unrelated to the intelligence analyst (pilots, lawyers, electricians, etc), those in the areas of meteorology, medicine, and economics have already addressed challenges similar to those being faced by the IC. In each case, practicing members must perform tasks that include both near-real time situation assessments as well as projections based on incomplete data from highly complex and adaptive systems.

Meteorology, medicine, and economics relies on the skill of their practitioners that, when coupled with academic preparation, provide assessments that are generally more accurate

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than would be determined by naïve methods alone. In this context, a naïve method would be one that is deduced from simple extrapolation of historical data. This might be a weather prediction based on almanac data for a given date or an expected stock value based on recent trends. The effective skill of the practitioner then arises from their ability to consistently outperform the naïve prediction by applying their unique experience and education to modify the naïve assessment. The skill would then be a reflection of how harmoniously each analyst integrates both the art and science of their tradecraft; topics sometimes thought of as in opposition to each other.\footnote{Mark M. Lowenthal, “The Real Intelligence Failure? Spineless Spies,” The Washington Post (25 May 2008) B1.} This internal strife arises from the notion that the character traits facilitating the intuitive ability to theorize (willingness to focus on abstract problems) appears at odds with those for good observation (which requires patience and attention to details). In the professions of meteorology, medicine, and economics a level of analyst subjectivity is always applied to an accepted model output.

Unfortunately this type of analysis, embraced by other career fields, has encountered strong resistance by intelligence analysts and the community in general. This is largely because of the almost “union-like” culture within the IC that has significantly opposed efforts to quantify uncertainty or volatility in their estimates. In a system that inherently embraces the craft versus the profession aspects of practice, this provokes substantial external criticism\footnote{Michael Schrage, “What Percent is Slam Dunk?” The Washington Post, February 20, 2005.} since fields with similar uncertainties have adopted standardized methods for certification and evaluation of practicing members. The IC culture must change if the intelligence analyst is to adapt to the current environment of globalized information. This would enable progress from the static craft definition it has been bound to since Sherman Kent’s 1955 articulation of the
need for formalized intelligence literature.\textsuperscript{26}

The lack of the intelligence analyst to be viewed as a profession has had a negative impact on policymakers as well. Consumers of intelligence feel they cannot trust the reliability of the intelligence production process since the competency of individual analysts is not ensured.\textsuperscript{27} This problem is compounded by an antiquated security archetype that degrades perceived intelligence analyst reliability. The intelligence analytical standards are surprisingly absent of requirements for analyst compartmented information access when producing assessments.

\textbf{The Shackles of an Antiquated Compartmented Security Archetype}

As with any career field, one must have access to the full complement of the tools at their disposal. Sun Tzu, the Chinese military strategist, is often quoted, “Know the enemy and know yourself; in a hundred battles you will never be in peril.”\textsuperscript{28} Unfortunately, the antiquated U.S. information security system, based on compartmentalization, presents major analytic tradecraft obstacles by prohibiting analysts from obtaining all the necessary relevant information for an assessment. With the current security architecture, the focus on cooperation (instead of integration) results in an analyst making an assessment of the enemy without knowing the true current state of the technology. The intelligence analyst frequently does not “know themselves” due to lack of access—a condition not even discussed by Sun Tzu because of the obvious shortfalls associated with it. To get reliable assessments, the analyst must be

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\textsuperscript{26} Sherman Kent, “The Need for an Intelligence Literature,” \textit{Studies in Intelligence} (Spring 1955) 1-11.
empowered by allowing them to leverage knowledge of our own capabilities and limitations. Although this would lead to a slightly increased risk of mirror-imaging cognitive biases, education and training can help mitigate these such that the rewards associated with accurate assessments outweigh the risks. In some contexts, deliberately withholding information could even be considered an ethical issue, since the production of an assessment without access to all the facts might be interpreted as intentional misinformation.29

Most important to the IC is the debilitating impact this lack of access has on the value of an assessment to the policymaker. Based on their position, the policymaker is more likely to be knowledgeable of the compartmented information, thereby affecting their interpretation of an assessment’s validity and hurting the analyst’s reputation. This can dangerously lead to the assumption that analysts are out of touch and not value added beyond data collection. In the current fiscal environment, the lack of proper access to compartmented classified information coupled with the perceived lack of analyst reliability due to unenforceable standards, has dramatic implications regarding the future of the IC.

Conclusions

Intelligence is the dial tone of national security but is in jeopardy of being relegated to a simple data collection service. In today’s technological environment this is a foreboding notion, since the volume of collected data is growing exponentially and data tagging/mining is vital to good assessments. Filtering the plethora of collected information will require a reliance on educated and skilled professional analysts to process, exploit, and disseminate relevant

information. All of these tasks are hindered by the policymaker’s lack of trust in the intelligence analyst, brought about by the inconsistencies in analyst reliability (which might be mitigated via professional certification and standardized education) and limitations from the current information security structure.

Although born out of a misunderstanding of intelligence limitations, the DNI analytical integrity standards have yielded a multitude of virtues. The community has been forced to internally reflect on the importance of analyst education, cognitive biases, and transparency of assessments. However, the IC has an unfortunate penchant for indefinitely admiring the problem when action must be taken. The standards are a necessary first step toward certification to reclaim public and policymaker trust but are incomplete in their present form. This is exemplified by the IC leadership’s feigned interest in consolidating management via the DNI while not actually providing them with any leverage. In the current system, the DNI does not control funding and cannot affect analyst employment. This enables a system where policy requirements like the standards of analytic integrity or PEB results are unenforceable.

To counter such shortfalls, intelligence analyst education must be required a priori, or at a minimum indigenously improved, to include a better community understanding of the mathematics and statistics governing complex adaptive systems. Although much emphasis has been placed on a small set of simple methodologies (such as the Alternative Competing Hypotheses\(^ {30} \)) little effort has been placed on understanding the role of emergence and complexity theory applications to IC problems. Simultaneously, we must caution that insistence on scientific and objective methods should not cut off our connection with how the world works.

at its core. Policymaking in such a complex adaptive environment relies as much on cultural and political values as it does on logical analysis.

The IC leadership must have the courage to implement analyst accountability and provide mechanisms for independent, impartial endorsement of education, knowledge, and experience. In light of the recent DNI focus on objectivity, the standards need to preserve and reward the intuition of its analysts in much the same way other professions do while still holding them accountable. Referencing naïve assessments is currently the best method for evaluating practitioner skill and the community must be willing to eliminate analysts that do not meet standards.

Finally, the IC leadership must restructure the compartmented information security architecture to empower analysts with the knowledge necessary to provide sound assessments. Self-imposing artificial security restrictions has the following four major repercussions: First, it impacts foreign policy decisions due to inaccurate analyst assessments because of lack of access to the real capabilities of a given technology. Second, it often leads to parallel but independent paths of technology development resulting in a considerable waste of fiscal resources that are increasingly important in the current domestic political environment. Third, it limits the intellectual capital we may leverage against solving today’s complicated technical problems. Fourth, it severely inhibits integration from the tactical to the strategic levels by preventing communication during development and employment.