Geospatial Intelligence: Origins and Evolution

Robert M. Clark (Georgetown University Press, 2020), 346 pp; chapter endnotes, glossary, abbreviations, bibliography, index, 58 b&w and color illustrations.

Reviewed by Joseph W. Caddell Jr.

I have had the good fortune to teach courses on intelligence collection and geospatial intelligence at the National Intelligence University. In discussing geospatial intelligence with NIU students, I often say (only half jokingly) that defining GEOINT in the Intelligence Community is a tautological loop. "What is GEOINT? It's all that stuff NGA does. What does NGA do? Oh, they do GEOINT." Though its component disciplines and concepts are well established—imagery intelligence, cartography, precision navigation and timing, geographic information sciences, geodesy, graphic visualization, and much more—geospatial intelligence suffers the definitional malady of being many things to many people.

Robert Clark's *Geospatial Intelligence: Origins and Evolution* does for GEOINT what his previous books have done for other complex intelligence topics: it offers a primer that, despite certain shortcomings, is the single-best available work on its subject. Clark's *Intelligence Collection* (2013), *Intelligence Analysis: A Target-Centric Approach* (multiple editions), and his coedited volume *The Five Disciplines of Intelligence Collection* (2015) provided readers with a logical structure and comprehensive reference materials on their topics. Like these works, *Geospatial Intelligence* provides clear and relatable definitions, examples, and backstories for the various elements and subelements of geospatial intelligence.

Geospatial Intelligence is best considered as it was intended: a textbook for undergraduate and graduate study. Although the subtitle *Origins and Evolution* might suggest a chronological history, Clark's chapters are arranged in thematic fashion. He deals with the subcomponents of geospatial intelligence individually (e.g. cartography, graphic visualization, geolocation, remote sensing, geographic information systems) before dealing more directly with their interrelationship—though he does allude to tie points and overlap in individual chapters. His diagrams, historical vignettes, and allusions to fiction and film help explain these elements in an engaging, relatable manner. Moving beyond familiar discussions of John Snow's cholera map and the role of imagery intelligence during the Cuban missile crisis, Clark effectively balances historical discussion of maps, charts, and reconnaissance with technical explanations of modern GEOINT data, sources, and analytic methods.

Geospatial Intelligence is weakest in discussing the origins and evolution of imagery intelligence. While imagery is only one element of geospatial intelligence, it is certainly the element that has provided GEOINT's largest unique contribution to the US Intelligence Community. Readers interested in this topic may find themselves frustrated by Clark's errors, mischaracterizations, and omissions.[a] Discussing photo intelligence during the Second World War, for example, Clark flatly states the RAF "early in the war, remembering its World War I history, designed a specific aircraft for [photo reconnaissance]: a fast, small aircraft that would use high altitude and high speed to avoid being detected and attacked." (117) This is almost precisely the opposite of what actually happened. Britain put the Spitfire fighter aircraft into widespread camera-carrying service out of necessity only after its specifically designed reconnaissance aircraft—the Bristol Blenheim and Westland Lysander—proved hopelessly vulnerable to German air defenses.[b]

The element of World War II imagery intelligence most critical to GEOINT's origins and evolution—specialized, multi-phase analysis of reconnaissance photos and spatial data, developed within the Central Interpretation Unit at RAF Medmenham – goes entirely without mention. Instead, Clark briefly references R.V.

a. As will be found in almost any published work there are occasional typos. For example, airfield "runwtays" are labeled on p.174 in a radar image of San Juan, Puerto Rico.
b. Roy Stanley, *World War II Photo Intelligence* (Scribner's, 1981). 107–11.

Jones, director of technical and scientific intelligence in Britain's Air Ministry, and his "long record of success in assisting British photo interpreters." Professor Jones, rightly recognized as a brilliant man and key contributor to Second World War intelligence operations, is a controversial figure in the imagery intelligence community. British photointelligence officers such as Constance Babington-Smith, Ursula Powys-Lybbe, and Douglas Kendall would, I am confident, politely challenge Clark's characterization of Jones's role. Those who actually analyzed the photos often saw Jones as a bit more self-serving than Clark describes.

Clark fails to mention George Goddard, a leading American photo intelligence pioneer, or Kelly Johnson, designer of the Lockheed U-2 and the A-12/SR-71 family of reconnaissance aircraft. Indeed, given the (admittedly excessive) place of pride the Oxcart and Blackbird enjoy in intelligence literature, it is remarkable that Clark does not mention them even once. His brief discussion of the history of Cold War satellite imagery intelligence jumps from the Corona program to the Hexagon program and completely omits the KH-7 and KH-8 Gambit families of high-resolution, film-return systems, the first satellites to yield submeter-resolution photographs and provide truly technical imagery intelligence from space.[a] In another, almost-amusing, error, Clark refers to Dino Brugioni as a "former director of NPIC." (130)[b]

Geospatial Intelligence compensates for its questionable treatment of earlier history with a valuable synopsis of the creation of the National Imagery and Mapping Agency, its transition to becoming the National Geospatial-Intelligence Agency, and the evolution of IC GEOINT over the past 35 years. Chapter 16, "The Story of the National Geospatial-Intelligence Agency," is a good example of this. Clark draws upon excellent source material to describe the complex, convoluted bureaucratic and individual drivers that led to the merging of imagery and mapping elements that eventually (sometimes painfully) yielded GEOINT's modern form within the IC.[c]

Clark's discussion of modern GEOINT—both inside and beyond the IC—is also strong. He provides an excellent survey of current developments in commercial smallsat remote sensing; automated imagery detection and recognition efforts; volunteered geographic information; and the GEOINT implications of cybersecurity and critical infrastructure concerns. One particularly insightful passage on the US raid that killed ISIS leader al-Baghdadi in 2019 well summarizes GEOINT's IC role in terms of multi-INT fusion:

> *US intelligence already knew from HUMINT that many Daesh troops had fled to Idlib province as their last holdings in Syria collapsed. The wife of an al-Baghdadi aide and one of al-Baghdadi's couriers had been captured in Iraq earlier in 2019 and interrogated. They gave their interrogators names and locations—enough leaders so that Iraqi and Kurdish intelligence officers could establish al-Baghdadi's pattern of travel. . . . With the help of these sources, along with satellite and UAV imagery, US intelligence began surveillance of the routes al-Baghdadi used and identified his movement pattern. . . . The al-Baghdadi raid was an exemplar of GEOINT in a combat situation, but it also points to the direction that all GEOINT is taking at the national level. (319–20)*

Clark's use of the al-Baghdadi raid as a GEOINT "exemplar" reminds readers of the IC's challenge to define GEOINT in terms of resources and responsibilities. Should this entire affair be considered "GEOINT" because so much of it revolved around spatiotemporal data? Or is "time and space" too broad of a portfolio to assign to a single intelligence discipline or agency?

As Clark makes clear, the private sector and academia define geospatial intelligence differently than the IC does.

a. For an excellent discussion of the impact of the Gambit systems see Bruce Berkowitz, "The Soviet Target: Highlights in the Intelligence Value of Gambit and Hexagon, 1963–1984," *National Reconnaissance: Journal of the Discipline and Practice* Issue 2012 U1: 103–20. Available at https://www.nro.gov/Portals/65/documents/history/csnr/articles/docs/gh%20journal_web.pdf.

b. Many NPIC alumni will bristle at this error and point out that not only was Dino Brugioni never the director of NPIC he was not, strictly speaking, an imagery analyst. Dino, who passed away in 2015 at the age of 93, managed NPIC elements dealing with collateral research and intelligence production, ultimately retiring as a GS-15 division chief. Owing to his success as a published author and frequent interview appearances on matters related to imagery intelligence, Dino is frequently mischaracterized as a photointerpreter or imagery analyst (technically incorrect, though Mr. Brugioni obviously knew a great deal about these topics). This is the only place I have seen Mr. Brugioni mischaracterized as NPIC director.

c. These sources include an interview with former NIMA/NGA Director James Clapper; Jack O'Connor's *NPIC: Seeing the Secrets, Growing the Leaders* (Acumensa Solutions, 2015); and Ann Daugherty Miles' excellent monograph *The Creation of the National Imagery and Mapping Agency: Congress' Role as Overseer* (Joint Military College, April 2002).

Individuals engaged in commercial or academic GEOINT focus primarily on geographic information systems and the analysis and visualization of spatial data—data that may or may not be derived from remote sensing. By contrast, though certainly concerned with spatiotemporal analysis of geospatial data, GEOINT in the IC tends to deal more closely with classified (and unclassified) remote sensing data. NGA is the IC's primary source of imagery analysis and reporting; IC GEOINT devotes a greater percentage of budgets and billets to specialized remote sensing data than does corporate/academic GEOINT. Moreover, many IC and military individuals engaged in tasks Clark describes as GEOINT (e.g., geolocating activities via MASINT or analyzing data by visualizing it in digital mapping software) would not describe their activities as geospatial intelligence—or themselves as part of the GEOINT enterprise. Clark generally sidesteps the aforementioned tautological loop of "GEOINT is what NGA does and NGA does GEOINT"—a loop the IC itself has yet to fully address—by both acknowledging the importance all geospatial intelligence concepts have for the IC and allowing that NGA cannot claim to own all parts of geospatial intelligence.

As a primer on the complex subject of geospatial intelligence, *Geospatial Intelligence* is without peer. This book should be assigned in any survey course on geospatial intelligence. Clark's summary of cartographic principles, imaging and nonimaging sensors, spatiotemporal analysis, and the fusion of these disparate concepts to form a larger (if occasionally murky) whole is exactly what study of this subject requires.

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