

H2020-MSCA-ITN-2016

**Marie Skłodowska-Curie actions (MSCA)
Innovative Training Networks (ITN)**

Grant Agreement Number 722482

ESSENTIAL

***Evolving Security ScienceE through Networked
Technologies, Information policy And Law
EJD***

**WP 2: Training Programme (Training)
LEAD PARTNER – University of Groningen**

**D5.10 - Fellows' Handbook for Big Data and Intelligence
Operations**

List of abbreviations

HUMINT	Human Intelligence
SIGINT	Signals Intelligence
OSINT	Open Source Intelligence

Contents

List of abbreviations	2
Introduction	5
1. Aim of the Handbook.....	5
2. Target group	5
3. Structure	5
Chapter 1 – Intelligence: Definition and Typology	6
Section 1 – Definitions.....	6
Section 2 – History and typology intelligence	6
Section 3 – Intelligence Process	6
Section 4 – Intelligence Sources	7
Section 5 – Intelligence Products	7
Chapter 2 – Human Intelligence (HUMINT)	7
Chapter 3 – Signals Intelligence (SIGINT)	8
Chapter 4 – Open Source Intelligence (OSINT)	9
Section 1 – Definition	9
Section 2 – Methodologies	9
Section 3 – Technologies	9
Section 4 - Products.....	Fout! Bladwijzer niet gedefinieerd.
Chapter 5 – Intelligence Analysis	10
Section 1 – Definition	10
Section 2 - Methodologies	11
Chapter 6 - Big Data Analytics.....	11
Section 1 – Definition and methodologies	11
Section 2 – Examples of big data applications.....	11
Section 3 – Risks and opportunities under Open Data policies (governmental datasets published under open data policies)	12
Useful resources.....	Fout! Bladwijzer niet gedefinieerd.
Conclusions	13

Project co-funded by the European Commission within Marie Skłodowska-Curie actions (MSCA) Innovative Training Networks (ITN)		
Dissemination Level:		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	
EU-RES	Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)	
EU-CON	Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)	
EU-SEC	Classified Information: SECRET UE (Commission Decision 2005/444/EC)	

Document Version Control:		
Version 0.1	Originated by: Aitana Radu	20/April/2019
Version 0.2	Revised by:	
Version 0.3	Reviewed by:	

Introduction

1. Aim of the Handbook

The aim of this handbook is to provide students in the field of security science with a useful set of resources regarding intelligence operations and big data. The sources listed in the handbook cover both essential intelligence-related terminology, but also latest research in the field.

2. Target group

The main target group of this Handbook are the ESSENTIAL Early Stage Researchers, but also any other students from the field of Security Science.

3. Structure

The handbook is structured into six main chapters, which cover key aspects of intelligence theory as well as the link between big data analytics and intelligence. The handbook's various sub-chapters cover a wider variety of topics from intelligence terminology, intelligence collection and analysis, types of intelligence and big data analytics.

The first chapter, entitled Intelligence: Definition and Terminology focuses on key definitions and terms in the field of intelligence studies. As intelligence studies is a relatively young field of study, these resources are of particular importance for ESSENTIAL ESRs trying to design research which heavily relies, methodologically on having a good understand of what intelligence is and what are its underlying processes.

The next three chapters (Human Intelligence, Signals Intelligence and Open Source Intelligence) focus on different types of intelligence, their uses and challenges. The resources included in each chapter provide information on the

history of each category, sub-types as well as the advantages and disadvantages associated with each typology.

The fifth chapter – Intelligence Analysis – covers different aspects of intelligence analysis, such as methods, uses and challenges. It also addresses the link between intelligence and collection, especially in a world of big data.

The sixth and last chapter of this deliverable gives a brief overview of big data analytics, from definition to typologies and challenges. It does not go into a lot of detail, as this topic is treated in more detail (especially from a technical point of view) in other ESSENTIAL Handbooks dealing with Digital Forensics.

Chapter 1 – Intelligence: Definition and Typology

Section 1 – Definitions

- ✚ Gill, P. (ed), Marrin, S. (ed.), Phythian M. (ed) (2009). *Intelligence Theory: Key Questions and Debates (Studies in Intelligence)*. Routledge
- ✚ Goldman J. (2011). *Words of Intelligence: An Intelligence Professional's Lexicon for Domestic and Foreign Threats*. The Scarecrow Press
- ✚ Johnson, L. (2003). 'Bricks and Mortar for a Theory of Intelligence', *Comparative Strategy*, 22, pp.1-28.
- ✚ Clark, J. R. (2007). *Intelligence and National Security: A Reference Handbook*. Praeger Security International

Section 2 – History and typology intelligence

- ✚ Wilson, J. H. (2017). *The Secret State: A History of Intelligence and Espionage*. Pegasus Books
- ✚ Aldrich, R. and Andrew, C. (2008). *Secret Intelligence: A Reader*. London: Routledge
- ✚ Omand, D. (2014). *Securing the State: Intelligence and Security*. Oxford: OUP
- ✚ Herman, M. (1996). *Intelligence. Power in Peace and War*. Cambridge: Cambridge University Press
- ✚ Shulsky, A. & Schmitt, G. (2002). *Silent Warfare. Understanding the World of Intelligence*, Washington DC: Brassey's Inc

Section 3 – Intelligence Process

- ✚ Lowenthal, M. M. (2016). *Intelligence: From Secrets to Policy*. CQ Press

-
- + Treverton, G. F. (2011). *Intelligence for an Age of Terror*. Cambridge University Press
 - + Leigh, I. & Wegge, N. (2018). *Intelligence oversight in the Twenty-First Century: Accountability in a Changing World (Studies in Intelligence)*. London: Routledge
 - + George, R.Z. (2020). *Intelligence in the National Security Enterprise: An Introduction*. Georgetown University Press
 - + Dover, R. (ed), Goodman, M. S. (ed), Hillebrand, C. (ed) (2014). *Routledge Companion to Intelligence Studies*. Routledge
 - + Hulnick, A.S. (2006). 'What's wrong with the Intelligence Cycle', *Intelligence and National Security*, 21:6, 959-979

Section 4 – Intelligence Sources

- + Lowenthal, M. M. & Clark, R. M. (2015). *The Five Disciplines of Intelligence Collection*. CQ Press
- + Johnson, L. (2010). *The Oxford Handbook of National Security Intelligence*. Oxford : Oxford University Press

Section 5 – Intelligence Products

- + Peterson, M. (2005). *Intelligence-Led Policing: The New Intelligence Architecture*, available at <http://www.ncjrs.gov/App/publications/abstract.aspx?ID=210681>
- + John T., Maguire M. (2004). *The National Intelligence Model: key lessons from early research* available at https://www.researchgate.net/profile/Mike_Maguire/publication/242484328_The_National_Intelligence_Model_key_lessons_from_early_research/links/560284ef08aeaf867fb6b6d0/The-National-Intelligence-Model-key-lessons-from-early-research.pdf
- + Ratcliffe, J. (ed) (2009). *Strategic Thinking in Criminal Intelligence: 2nd Edition*. The Federation Press
- + Gentry, J. A., (2016). Managers of Analysts: The Other Half of Intelligence Analysis, *Intelligence and National Security*, 31:2, 154-177
- + Hershkovitz, S. & Siman-Tov, D. (2018). Collaboration Between Intelligence and Decisionmakers: The Israeli Perspective, *International Journal of Intelligence and CounterIntelligence*, 31:3, 568-592

Chapter 2 – Human Intelligence (HUMINT)

-
- ✚ Steele, R. (2010). *Human Intelligence: All Humans, All Minds, All the Time*. Military Bookshop
 - ✚ Sims, J. E. & Gerber, B. (2005). *Transforming U.S. Intelligence*. Georgetown University Press
 - ✚ US Army (2019). *Human Intelligence Collector Operations: FM 2-22.3*. Independently Published
 - ✚ Berntsen G. (2008). *Human Intelligence, Counterterrorism, and National Leadership: A Practical Guide*. Washington D.C. : Potomac Books
 - ✚ Herman, M. (1996). *Intelligence. Power in Peace and War*. Cambridge: Cambridge University Press
 - ✚ Gill, P. (ed), Marrin, S. (ed.), Phythian M. (ed) (2009). *Intelligence Theory: Key Questions and Debates (Studies in Intelligence)*. Routledge
 - ✚ Clark, R. M. (2014), *Intelligence Collection*, CQ Press
 - ✚ Sano, J. (2015). "The Changing Shape of HUMINT". *Intelligencer Journal*. Vol. 21, no. 3, Fall/Winter 2015.
 - ✚ Nygaard, R. (2014). *How Can Human Intelligence Enhance Collection in an Era of Un-manned Technology and Reduced Personnel?*. Master's Thesis, U.S. Army Command and General Staff College
 - ✚ Baker, W.R. (2017). "HUMINT: A Continuing Crisis?" *Small Wars Journal*.
 - ✚ Croston, M. & Valli, F. (2017). 'An Intelligence Civil War: "HUMINT" vs. "TECHINT"', *INSS Publications*. Vol. 1, no. 1, 2017.
 - ✚ Pomerleau, M. (2017). 'Is Technology a Threat to Human Intelligence?' *C4ISRNET*. 25 Aug 2017.

Chapter 3 – Signals Intelligence (SIGINT)

- ✚ Matthews, P. (2013). *SIGINT: The Secret History of Signals Intelligence in the World Wars*. The History Press
- ✚ Madsen, W. (2013). *National Security Agency Surveillance: Reflections and Revelations 2001-2013*. Lulu.com
- ✚ Gentry, J. (2019). Selective SIGINT: Collecting Communications Intelligence While Protecting One's Own. *International Journal of Intelligence and Counter Intelligence*, 32:4, 647-676
- ✚ Lasoen, K.L. (2019). Belgian Intelligence SIGINT Operations, *International Journal of Intelligence and CounterIntelligence*, 32:1, 1-29
- ✚ Franz, G., Kane, G., Fair, J. (2019). Reshaping Intelligence Operations in the Cyberspace Domain. *The Cyber Defense Review*, Vol. 4, No. 1 (SPRING 2019), pp. 33-40

Chapter 4 – Open Source Intelligence (OSINT)

Section 1 – Definition

- ✚ Steele, R. (2000). *On Intelligence: Spies and Secrecy in an Open World*. AFCEA International Press
- ✚ Williams, H.J., Blum, I. (2018). *Defining Second Generation Open Source Intelligence (OSINT) for the Defense Enterprise*. RAND Corporation
- ✚ Davitch, J. M. (2017, October). Open sources for the information age: Or how I learned to stop worrying and love unclassified data. *Joint Force Quarterly* 87
- ✚ Hribar, G., Podbregar, I. & Ivanuša, T. (2014) OSINT: A “Grey Zone”?, *International Journal of Intelligence and CounterIntelligence*, 27:3, 529-549
- ✚ Andrew, C., Aldrich, R. J., Wark, W. (ed) (2009) *Secret Intelligence: A Reader*. Routledge
- ✚ Miller, B. M. (2018) Open Source Intelligence (OSINT): An Oxymoron?, *International Journal of Intelligence and CounterIntelligence*, 31:4, 702-719,

Section 2 – Methodologies

- ✚ Gupta, R., Brooks, H. (2013). *Using Social Media for Global Security*. John Wiley & Sons
- ✚ Bazzell, M. (2014). *Open Source Intelligence Techniques: Resources for Searching and Analyzing Online Information*. CCI Publishing
- ✚ Hassan, N.A. (2018). *Open Source Intelligence Methods and Tools: A Practical Guide to Online Intelligence*. Apress
- ✚ Gruters, P.C. & Gruters, K. T. (2018) Publicly Available Information: Modernizing Defense Open Source Intelligence, *Special Operations Journal*, 4:1, 97-102
- ✚ Olcott, A. (2012). *Open Source Intelligence in a Networked World*. Continuum Intelligence Studies
- ✚ Reuser, A., *Reuser’s New Repertorium* available at <http://rr.reuser.biz/>

Section 3 – Technologies

- ✚ Layton, R., Watters, P.A. (2015). *Automating Open Source Intelligence: Algorithms for OSINT*. Elsevier Science

-
- ✚ Akhgar, B. Bayerl P.S. (2016). *Open Source Intelligence Investigation: From Strategy to Implementation (Advanced Sciences and Technologies for Security Applications)*. Springer
 - ✚ Azevedo, R., Medeiros, I. and Bessani, A. (2019). "PURE: Generating Quality Threat Intelligence by Clustering and Correlating OSINT," *18th IEEE International Conference On Trust, Security And Privacy In Computing And Communications/13th IEEE International Conference On Big Data Science And Engineering (TrustCom/BigDataSE)*, Rotorua, New Zealand, 2019, pp. 483-490.
 - ✚ Quick, D., Choo K. (2016). 'Digital forensic intelligence: Data subsets and Open Source Intelligence (DFINT OSINT): A timely and cohesive mix'. *Future Generation Computer Systems*. Volume 78, Part 2, January 2018, Pages 558-567
 - ✚ Neri, F. and Geraci, P. (2009). "Mining Textual Data to Boost Information Access in OSINT," *13th International Conference Information Visualisation*, Barcelona, 2009, pp. 427-432.

Chapter 5 – Intelligence Analysis

Section 1 – Definition

- ✚ George, R. Z. & Bruce, J. B. (2014). *Analyzing Intelligence: National Security Practitioners' Perspectives*. Georgetown University Press
- ✚ Johnston, R. (2012). *Analytic Culture in the US Intelligence Community: An Ethnographic Study*. CreateSpace Independent Publishing Platform
- ✚ Major, J. S. (2014). *Communicating with Intelligence: Writing and Briefing for National Security*. Rowman & Littlefield Publishers
- ✚ Clark, R. M. (2016). *Intelligence Analysis: A Target-Centric Approach*. CQ Press
- ✚ Heuer, R. J. (2017). *Psychology of Intelligence Analysis*. Echo Point Books & Media
- ✚ Jensen, C. J., McElreath, D. H., Graves, M. (2017). *Introduction to Intelligence Studies*. Routledge

Section 2 - Methodologies

- + Moore, D. T. (2011). *Critical Thinking and Intelligence Analysis*. Lulu.com
- + Hibbs-Pherson, K. & Pherson, R. (2016). *Critical Thinking for Strategic Intelligence*. CQ Press
- + Heuer, R. J. Jr & Pherson, R. (2014). *Structured Analytic Techniques for Intelligence Analysis*. CQ Press
- + Lahneman W. J. (ed), Arcos R., (ed) (2014). *Art of Intelligence: Simulations, Exercises, and Games*, Rowman & Littlefield Publishers
- + Lahneman W. J. (ed), Arcos R., (ed) (2019). *The Art of Intelligence: More Simulations, Exercises, and Games (Security and Professional Intelligence Education Series Book 2)*, Rowman & Littlefield Publishers
- + Beebe S.M., Pherson R. (2014). *Cases in Intelligence Analysis: Structured Analytic Techniques in Action*, CQ Press
- + Fingar, T. (2011). *Reducing Uncertainty: Intelligence Analysis and National Security*. Stanford: Stanford University Press

Chapter 6 - Big Data Analytics

Section 1 – Definition and methodologies

- + Prabhu, C.S.R., Sreevallabh Chivukula, A., Mogadala, A., Ghosh, R., Livingston L.M.J. (2019). *Big Data Analytics: Systems, Algorithms, Applications*. Springer
- + Härdle, W. K. (ed), Horng-Shing Lu, H. (ed), Shen, X. (ed) (2018). *Handbook of Big Data Analytics (Springer Handbooks of Computational Statistics)*. Springer
- + Ghavami, P. (2019). *Big Data Analytics Methods: Analytics Techniques in Data Mining, Deep Learning and Natural Language Processing*. DEG Press

Section 2 – Examples of big data applications

- + Quick, D. & Choo, K.R. (2018). *Big Digital Forensic Data: Volume 2: Quick Analysis for Evidence and Intelligence (SpringerBriefs on Cyber Security Systems and Networks)*. Springer

-
- + Rothberg, H. and Erickson, G. (2017). "Big data systems: knowledge transfer or intelligence insights?", *Journal of Knowledge Management*, Vol. 21 No. 1, pp. 92-112
 - + Smith, C. M., Scherer, W. T., Todd, A., & Maxwell, D. T. (2019). Quantitative Approaches to Representing the Value of Information Within the Intelligence Cycle. In I. Management Association (Ed.), *National Security: Breakthroughs in Research and Practice* (pp. 459-478). Hershey, PA: IGI Global.
 - + Khan, M., Jan, B., Farman, H. (2019). *Deep Learning: Convergence to Big Data Analytics*. Springer
 - + Nasraoui, O. (ed), Ben N'Cir, C. (ed) (2019). *Clustering Methods for Big Data Analytics: Techniques, Toolboxes and Applications (Unsupervised and Semi-Supervised Learning)*. Springer
 - + Hsu, H., Chang, C., Hsu, C. (2017). *Big Data Analytics for Sensor-Network Collected Intelligence*. Elsevier Science
 - + Shahbazian, E., Rogova, G. (2015). *Meeting Security Challenges Through Data Analytics and Decision Support*. IOS Press
 - + Alsmadi, I. M. (ed), Karabatis, G. (ed), Aleroud, A. (ed) (2017). *Information Fusion for Cyber-Security Analytics*. Springer
 - + Akhgar, B., Saathoff, G. (2015). *Application of Big Data for National Security: A Practitioner's Guide to Emerging Technologies*. Butterworth-Heinemann

Section 3 – Risks and opportunities under Big Data & Open Data policies (governmental datasets published under open data policies)

- + Craig, T., Ludloff, M. (2011). *Privacy and Big Data*. O'Reilly.
- + Joshi, R.C., Gupta, B. B. (2020). *Security, Privacy, and Forensics Issues in Big Data*. IGI Global
- + Bunnik, A. (ed), Cawley, A. (ed), Mulqueen, M. (ed), Zwitter, A. (ed) (2016). *Big Data Challenges: Society, Security, Innovation and Ethics*. Palgrave Macmillan
- + Cannataci, J. (2018). *United Nations Special Rapporteur on the right to privacy Big Data-Open Data interim report Consultation*. Available at https://www.ohchr.org/Documents/Issues/Privacy/SR_Privacy/ConsultationB_DODReportDec2017.pdf
- + Australian Government. *Open Data Toolkit*. Available at <https://toolkit.data.gov.au/Policy.html>

Conclusions

The aim of this deliverable is to provide a useful, but by no means comprehensive, set of resources aimed at helping both students and supervisors achieve better results in the long journey of doctoral studies. The handbook addresses a wide diversity of issues related to big data and intelligence, from terminology to practical applications as well as privacy and ethical challenges. The key readings included in the handbook are both classical readings in the field and very up to date articles, which together are meant to provide readers with a comprehensive image of this field.