GPC-GA II

Essential Body of Work & Knowledge (EBW/EBK)
GEOINT Professional Certification - Geospatial Analysis: Proficiency Level II
8 February 2017 (current version can be found at http://gpc.nga.ic.gov)

Core Competency 1 - Acquire and Prepare Data for Geoprocessing (28%)

A geospatial analyst conducts research to acquire, understand, and prepare information for an intelligence issue with a spatial context. Additionally, a geospatial analyst employs proper data management principles and techniques to verify and maximize the usefulness of the data. Sources of data can include: SIGINT, HUMINT, OSINT, imagery, video, text, databases, tables, presentations, web services, shapefiles, etc.

Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 1: Apply methods to gather and prepare data from internal and external sources
ECO 1.1: Describe the appropriate use of NGA source data (i.e. GeoNames, Digital Terrain Elevation Data (DTED), High Resolution Terrain elevation (HRTe), Overhead Persistent Infra-Red (OPIR), geospatial intelligence feature database (GIFD), vector map (Vmap), Modernized Integrated Database (MIDB), and National Technical Means (NTM).
ECO 1.2: Interpret features and other geographic information from NGA map products and non government produced maps; read a map.
ECO 1.3: Review relevant reporting to identify information and evaluate the appropriate spatial context for assigned issue.
ECO 1.4: Research and acquire geospatial information from internal and external sources.
ECO 1.5: Evaluate accuracy, currency and completeness of data; including spatial metadata.
ECO 1.7: Evaluate data for appropriateness for spatial analysis (adequate sample size, distribution) and attempt to identify data bias.
ECO 1.8: Convert spatial data formats for use in software specific products (e.g. .shp, .kml, .lpt, drw., or geodatabases).
ECO 1.9: Georeference data to the appropriate coordinate system.
ECO 1.10: Attribute data sets with appropriate temporal information.
ECO 1.11: Create a local, structured geodatabase.
ECO 1.12 Explain the importance of topology with spatial data.
ECO 1.13: Develop a topology strategy for a data set (network analysis, terrain analysis, etc.).
TCO 2: Apply methods to obtain and extract geospatial information from imagery in support of an intelligence issue or project
ECO 2.1: Obtain panchromatic imagery and use basic imagery interpretation skills to be aware of cultural and physical features within an area of study.
ECO 2.2: Obtain NTM, civil and commercial imagery (e.g. multispectral imagery (MSI), hyperspectral imagery (HSI), or radar) and interpret the image; extract information in support of intelligence issue.
ECO 2.3: Manipulate panchromatic imagery to maximize utility (software utilization).
ECO 2.4: Digitize features with basic attributes using appropriate techniques and guidance.
ECO 2.5: Explain how to collect elevation points using stereo imagery.
ECO 2.7: Create an orthorectified image using appropriate elevation data and control points from a reference image source (e.g. Digital Point Positioning Database)
TCO 3: Apply methods to initiate geoprocessing and manipulate spatial datasets as appropriate
ECO 3.2: Create a comprehensive dataset from multiple datasets (e.g. merge, append, or mosaic).
ECO 3.4: Subset spatial data (e.g. clip, mask, or erase).
ECO 3.5: Derive a continuous surface from tabular data and discrete features.
ECO 3.6: Create a Triangular Irregular Network (TIN).
ECO 3.7: Create new geometry from points (e.g. Thiessen polygon).
ECO 3.8: Create a terrain dataset from one or more sources (e.g. LIDAR, tables, or stereo).
ECO 3.9: Explain the value of interpolating spatial data (e.g. density or surface modeling).

Core Competency 2 - Leverage Geospatial Information Science and Technology (25%)

A geospatial analyst uses geospatial information science and technology and geoprocessing to properly manipulate spatial data into useful information to support development of intelligence assessments. Through geoprocessing, a geospatial analyst transforms their analytic ideas into concrete datasets, which will be further analyzed.. The results can be data driven (exploration of geospatial data) or model–driven (testing hypotheses and creating models); this includes vector (buffer, route, overlay), raster (slope, hillshade), and attribute GIS analysis.

Terminal and Enabling Certification Objectives (TCOs & ECOs)

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TCO 4: Apply image processing
ECO 4.1: Discuss image processing techniques (e.g. mosaicking or contrast enhancement).
ECO 4.2: Use an Electronic Light Table (ELT)/Geographic Light Table (GLT).
TCO 5: Apply analytical methods to identify spatial relationships
ECO 5.1: Discuss what features are preserved in different map projections (e.g. shape, area, distance, or direction).
ECO 5.2: Identify the variety of tools available within the geographic information system (GIS) software.
ECO 5.3: Determine the best method to measure distance between/from two features.
ECO 5.4: Calculate length, area and perimeter using a GIS.
ECO 5.5: Discuss the application of and conduct spatial Boolean queries.
ECO 5.6: Perform vector data manipulation, including but not limited to clipping, selecting, identification, dissolve and smooth.
ECO 5.8: Perform basic terrain analysis as part of an established workflow (e.g. line of sight (LOS), visibility, hillshade, aspect, slope, cut and fill).
ECO 5.9: Perform raster-based analysis (e.g. algebraic operations, frequency, density, rank, or reclassification)
ECO 5.10: Employ tools and methods to perform a proximity study (e.g. buffer tool, near tool, distance).
ECO 5.11: Perform range analysis (e.g. Euclidean buffering, geodesic buffering).
ECO 5.13: Conduct density analysis (e.g. simple, point, or kernel) using appropriate methods.
ECO 5.15: Perform overlay analysis to identify spatial relationships.
ECO 5.16: Compare historical and current data to detect change using vector and raster datasets.
TCO 6: Apply methods to conduct statistical analysis
ECO 6.1: Explain basic concepts of spatial statistics.
ECO 6.2: Perform geographic distribution techniques (e.g. mean center, central feature, or standard distance).
ECO 6.3: Describe the theory behind geostatistical methods (e.g. interpolation or kriging).
TCO 7: Apply methods to improve the geoprocessing model
ECO 7.2: Create and run a geoprocessing model using graphic user interface (GUI) or script (including iterative processing).
Core Competency 3 - Apply Spatial Thinking to Analytic Workflows (25%) A geospatial analyst deconstructs intelligence problems into spatial-temporal components, using concepts such as location, scale, hierarchy, heterogeneity, and adjacency. A geospatial analyst also leverages the appropriate remote sensing and spatial analysis techniques.
Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 8: Apply methods to create a geospatial analysis workflow
ECO 8.1: Describe the GEOINT workflow (Plan, Research, Analysis, Communicate Results) and how it is used in the analytic process.
ECO 8.2: Explain the application of spatio-temporal analysis to analytic workflows.
ECO 8.4: Explain how geoprocessing techniques and tools are applied to an analytic work flow (e.g. terrain, raster, spatial statistics, proximity, or overlay).
TCO 9: Comprehend ways to select data that identifies and supports the geospatial analysis problem
ECO 9.1: Explain how geospatial analysis supports GEOINT.
ECO 9.2: Describe how spatio-temporal methods add value to multidisciplinary research (e.g. social science research, Human Geography, language mapping, epidemiology)
ECO 9.3: Determine appropriate geographic scale to investigate a specific intelligence problem.
ECO 9.4: Describe how sensor capabilities (e.g. band selection, resolution, image swath, or periodicity) of National Technical Means (NTM), civil, and commercial imagery influence analysis.
ECO 9.5: Describe the importance of spatial and attribution accuracy to include absolute and relative accuracy, place name, address matching.
TCO 10: Apply methods to determine the effectiveness of a geospatial analysis workflow and the quality, accuracy, and applicability of geoprocessing results

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ECO 10.2: Describe how geospatial analysis incorporates structured analytic techniques (e.g. scientific method, analysis of competing hypotheses (ACH), or red cell).
ECO 10.3: Develop a list of analytic assumptions based upon previous spatial findings.

Core Competency 4 - Communicate Analytic Findings (22%)

A geospatial analyst communicates complex issues by applying standards and techniques to create textual and visual products (e.g. standards and techniques can include effective data consideration, map design principles, or services, web pages, and metadata documentation).

Terminal and Enabling Certification Objectives (TCOs & ECOs)
TCO 11: Apply methods to document the validity of spatial metadata in accordance with NSG standards
ECO 11.1: Write, update, and validate spatial metadata in accordance with NSG guidance.
TCO 12: Apply GEOINT graphics to communicate analytic findings, utilizing the principles of cartography and NSG standards
ECO 12.1: Understand appropriate basic cartographic principles including scale, projection, reference systems, color, shade, size, text and describe the differences in design needed for a hard copy map versus online products.
ECO 12.3: Discuss advantages/disadvantages of symbolization classification methods (e.g. equal interval, quantiles, or natural breaks) of thematic maps (e.g. choropleth, proportional symbol, isarithmic, or dasymetric).
ECO 12.5: Explain the difference between relative scale and absolute scale and understand the implications when printing.
ECO 12.9: Apply color theory to cartographic products/map graphics using Red-Green-Blue (RGB) and Cyan-Yellow-Magenta-Black (CYMK) values.
ECO 12.11: Create non-traditional cartographic products in accordance with NSG guidance.
ECO 12.13: Symbolize information using the appropriate classification method (e.g. equal interval, quantiles, or natural breaks).
TCO 13: Comprehend the most appropriate method to publish and disseminate GEOINT products and/or reports
ECO 13.2: Communicate GEOINT finding, key judgment, and relevance through geospatial analytic reporting.
ECO 13.3: Communicate geospatial content and GEOINT findings using non-standard reporting methods (e.g. social media, Intellipedia, Inteldocs, Geospatial Web Repository, FTP sites).