HOMELAND SECURITY GEOSPATIAL ENTERPRISE ARCHITECTURE

ATTACHMENT G APP 1
GEOSPATIAL APPLICATIONS

GEOSPATIAL MANAGEMENT OFFICE

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1.0 HLS GEOSPATIAL APPLICATIONS

The following *Geospatial Applications* (application components) are involved in the HLS (Homeland Security) enterprise. Many of these applications include non-geospatial data and technology, and may be predominantly non-geospatial in nature. Many *Geospatial Applications* will have numerous specialized implementations. For example, it is unlikely that there will be a single *Mission Planning* application. Rather, the complexity and diversity of mission operations necessitates the need for specialization and diversity of mission planning business processes/sub-processes/applications. However, there will be a number of common geospatial service components and associated data upon which all *Mission Planning* applications will depend.

	HLS Geospatial Application	Description
1.	Asset Inventory Management	Enterprise-level application(s) that is used to manage fixed and mobile Assets. In particular, to monitor and track the location/time/identity/activity/status for a set of Assets.
2.	Biographical Analysis	The means to analyze person (records) in conjunction with other geospatial data, including events, person/organization affiliations, incidents, threats and intelligence data.
3.	Case Analysis	The means to (data) mine, integrate, and correlate varied types of case-related data for the purpose of extrapolating, analyzing and deriving geospatial data in the form of profiles, patterns, trends, networks, tendencies, indicators, hypotheses, and conclusions, as it pertains to case understanding. Source data include, but are not limited to, intelligence, incidents, occurrences, criminal and suspicious activities, financial transactions, persons, organizations, goods, cargo, hazmat, conveyances, etc. May also involve geoparsing and geocoding functions to scan and annotate associated textual data for geographic and temporal references.
4.	Common Operating Picture (COP) Manager	The means to manage the scope and resources associated with a Common Operating Picture (COP). The scope is defined in terms of geospatial extent (area of interest), timeframe, subject of interest (e.g., threat(s), case, monitor cargo, etc.), operations objectives (e.g., respond to incident, recover from disaster, etc.), the data required to support the execution of operations (e.g., support threat modeling & analysis, case analysis, cargo tracking, etc.), and other operations parameters (e.g., constraints, mission features, etc.). Resources may include physical entities (e.g., personnel, assets, conveyances, technology, etc.) and logical entities (e.g., business components and processes, data, services). The COP Manager provides the means to select and allocate resources, manage and monitor collaboration activities, monitor status and performance of resources, and monitor and manage external communications. The distinction between the COP Manager and other operations applications is that the COP Manager is managing the big picture, whereas other applications focus on Mission-Specific Operating Pictures (MSOP) and other mission-specific operation activities.

	HLS Geospatial Application	Description
5.	Countermeasure Planning	The means to determine and document the countermeasures to secure key, critical and other assets, Events, conveyances and persons, in geospatial context. Plans may contain Maps and Reports.
6.	Critical Infrastructure Inventory Management	The means to keep track of and report on the location and status of critical assets and key assets. To generate reports and maps conveying this information.
7.	Damage Assessment	The means to analyze and determine the extent and nature of damage caused by a threat or natural hazard through the use of imagery and other sensor and human observations. Includes loss estimations. To generate reports and maps conveying this information.
8.	Data Acquisition/ Generation	Generally, the means to acquire, collect, process, and/or generate new data for the enterprise. There are many such specialized applications and tools for collecting, reformatting, verifying, editing, integrating and transforming new data for the enterprise. e.g., Supervisory Control and Data Acquisition (SCADA).
9.	Data Collection Management	The means to submit new data collection requirements and manage these requests through fulfillment or obsolescence. Includes the means to manage requirements for human/sensor collection activities.
10.	Data Collection Planning	The means to plan, schedule, and allocate requests for new data to collection assets; to develop collection plans that convey schedule, tasking and resource allocation for collection assets.
11.	Disaster Assistance	The means to support hazard/disaster related benefits processing. To share hazards and related assessments [e.g., Digital Flood Insurance Rate Maps (DFIRMs) for lending institutions and flood insurance purposes (Human Services – Individual Assistance & Public Assistance), post disaster Housing Habitability data (individual structures and public infrastructure) for rebuilding purposes, etc.]

	HLS Geospatial Application	Description
12.	Electronic Navigation	The means to determine, verify, and simulate navigation guidance for mobile assets. To produce navigation instructions and guidance data for use in computer-assisted navigation. These need to be uploaded to conveyances (for navigation) and simulators (for mission rehearsal). Employ navigation technologies such as Long Range Radio Aid to Navigation (LORAN), Global Positioning System (GPS), digital nautical charts (NOAA), and flight planning and management software with digital aeronautical charts (FAA), Automatic Vehicle Location (AVL) and in-vehicle navigation systems, and inertial navigation systems (INS).
13.	Emergency Reporting	The means to document and report the nature and geospatial-temporal context of emergencies to proper authorities; to declare state and federal emergencies. Reference threats, threat consequence assessments, warnings, alerts and other location-based content germane to the emergency.
14.	Evacuation Planning & Management	The means to produce and implement plans that convey the details pertaining to evacuation of a current or planned disaster/threat area. Produces Evacuation Plans.
15.	Event Analysis	The means to (data) mine, integrate, and correlate varied types of events (occurrences, incidents, activities) for the purpose of extrapolating, analyzing and deriving geospatial data in the form of patterns (e.g., cluster), densities, trends, networks, tendencies, indicators, hypotheses, and conclusions, as it pertains to event understanding. The means to document and share the context for National Security Special Events (NSSE). Source data include, but are not limited to, intelligence, incidents, occurrences, case, criminal and suspicious activities, financial transactions, persons, organizations, goods, cargo, hazmat, conveyances, etc. May also involve geoparsing and geocoding functions to scan and annotate associated textual data with geospatial-temporal references.
16.	Event Planning & Analysis	The means to produce Event Plans for major events (e.g., Super Bowl), and to analyze potential threats and vulnerabilities in context with event venue (location/time/activity), facilities, assets, personnel, security plans, evacuation plans, mutual aid support plans, etc.

	HLS Geospatial Application	Description
17.	Exercise Planning	The means to produce plans that convey the details pertaining to a training exercise for simulated threat(s) for a given area/facility/event. Produces Exercise Plans.
18.	Facility Mapping & Management	The means to create and maintain detailed geospatial records of facilities for the purpose of managing the facilities and related land and infrastructure. Used in planning, construction, security and maintenance. Used to produce facility Maps, Plans and Reports. Assure compliance with all applicable laws regulating the development, use or transfer of property. These include the National Environmental Policy Act (NEPA), Americans with Disabilities Act (ADA), Clean Water Act (CWA), Occupational Safety and Health Act (OSHA), Superfund Act, state and local permitting, and so on. Any planned construction activity at federally owned/operated facilities requires compliance with these laws. Used to manage space utilization of existing facilities to assure that space, furniture and equipment are adequate to support current and future mission requirements.
19.	Geospatial Data Transfer	The means to transfer geospatial data between enterprise database nodes, which cuts across the HLS enterprise. Includes operations to support periodic synchronizations of databases based upon update transactions to the master database. Used to accomplish replication operations between redundant nodes to support continuous 24/7 assured mission operations. Used to accomplish data rollup operations for HLS Framework Data (synchronize data up the local-state-federal chain). Includes the required management tools. Produces Transaction Reports and Audit Trails.
20.	Geospatial Integration & Test Tools	Tools that support testing and integration of geospatial component services and applications. Consists of geospatial standards registry, reference implementations and test tools (including simulations and modeling for threat scenarios). Part of the Reference Architecture for the HLS Geospatial Enterprise Architecture (GEA).
21.	Hazard Modeling, Analysis & Mapping	The means to create, model, analyze and maintain detailed geospatial records of hazards for the purpose of characterizing and managing the threats (risks) associated with the hazard. Used in emergency preparedness, response and recovery planning and operations. Used to produce Hazard Maps and related Reports.

	HLS Geospatial Application	Description
22.	Health & Safety Monitoring	The means to track the locations of notice of violations (NOV) and reported incidents to assess problem work sites or otherwise dangerous conditions. Perform pre-deployment environmental health and safety evaluations of potential work sites, such as disaster field offices (DFOs) or other temporary work environments.
23.	Hydraulic-Hydrographic Modeling	The means to create, control, display and store the results of hydraulic and hydrographic models, e.g., Hydrologic Engineering Center 2 (HEC2), Better Assessment Science Integrating Point and Nonpoint Sources (BASINS), and others.
24.	Incident/Event Management	The means to support command and control for an incident or event, including situation awareness, monitoring threats and threat assessments, coordinating and monitoring response activities, assets, personnel, etc., and reporting status to persons in the command and control chain (see incident reporting). Create and manage incident/event data. Generate and disseminate alerts and warnings. Support pertinent communications. Reference relevant weather and other supporting geospatial data. Determine containment areas, logistics and deployment plans and ingress/egress routes for incidents. Update incident/event records to reflect response results.
25.	Incident Reporting	The means to generate reports about incidents for proper authorities.
26.	Location Search & Reporting	The means to search person, case, event, facility and property records using geospatial-temporal criteria, and then generate Location Reports conveying query results.
27.	Logistics Planning	The means to produce logistics plans that convey the movement and deployments of goods, cargo, conveyances, assets and related personnel, for HLS operations.
28.	Map Publication	The means to produce finished softcopy and hardcopy maps for use in HLS operations. Includes the assembly and integration of data, symbolization, annotation, legend/marginalia generation and placement, and cartographic finishing. This capability is required throughout the HLS enterprise.
29.	Mission Planning	The means to plan, schedule, and allocate assets to a mission; to develop data collection plans that convey schedule, tasking and resource allocation for collection assets.

	HLS Geospatial Application	Description
30.	Mission Rehearsal	The means to verify and simulate pre-planned missions involving navigation guidance for mobile assets. Employs Mission Rehearsal Models. Input to these models consists of terrain, threats, threat avoidance constraints, features, weather, other environmental conditions, planned/predicted navigation guidance, asset operating constraints, etc. Outputs consist of 4D, simulated rehearsals, in their projected operating environments.
31.	Mitigation Planning & Analysis	The means to determine and assess impact of the root cause of an incident/event and to produce mitigation plans and supporting Geospatial Products (assessments, maps, reports, etc.) for natural and human induced threats, hazards and disasters, in order to support future emergency response and recovery efforts for impending or possible disasters. Also, the means to analyze post-disaster response effectiveness (post mission assessments and after action reports) and create mitigation plans and supporting Geospatial Products to enhance future planning, safety, preparations, response and recovery operations, countermeasures and training for cases, threats, hazards and disasters.
32.	Monitor Assets	The means to monitor Assets for change in location/activity/status. To determine and record the current and historical location/time/identity/activity/status of mobile assets, including capital assets, key assets, law enforcement assets, and operational materials and equipment, through observation, tracking and analysis. To perform situation awareness. May lead to reporting of occurrences (e.g., Suspicious Activity Reporting), alerts or Situation Reports.
33.	Monitor Conveyances	The means to monitor Conveyances for change in location/activity/status. To determine and record the current and historical location/time/identity/activity/status of conveyances through observation, tracking and analysis. To perform situation awareness. May lead to reporting of occurrences (e.g., Suspicious Activity Reporting), alerts or Situation Reports.

	HLS Geospatial Application	Description
34.	Monitor Goods	The means to monitor Goods and Cargo for change in location/activity/status. To determine and record the current and historical location/time/identity/status of goods and cargo through observation, tracking and analysis. To perform situation awareness. May lead to reporting of occurrences (e.g., Suspicious Activity Reporting), alerts or Situation Reports.
35.	Monitor Locations	The means to monitor Locations for change in activity/status. To determine and record the current and historical time/activity/status at a location through observation and analysis. To perform situation awareness. May lead to reporting of occurrences (e.g., Suspicious Activity Reporting), alerts or Situation Reports.
36.	Monitor Parties	The means to monitor Parties (Persons or Organization) for change in location/activity/status. To determine and record the current and historical location/time/identity/activity/status of persons in geospatial context and cyberspace, through observation, tracking and analysis. To perform situation awareness. May lead to reporting of occurrences (e.g., Suspicious Activity Reporting), alerts or Situation Reports.
37.	Monitor Recovery	The means to monitor incident locations for change in activity/status pertaining to cleanup, decontamination and restoration. Employ recovery plans to support recovery operations. Determine and record the current and historical time/activity/status at recovery locations through observation and analysis for subsequent analysis and legal implications. Produce location-based After Action Reports that contain recovery progress, and environmental impact assessments.
38.	National Security Special Event (NSSE) Reporting	The means to report suspicious activities in geospatial context for consideration as National Security Special EVENTs (NSSEs). Reports may reference mission plans, incidents, occurrences, assets, persons, organizations, cases, risks/threats/vulnerabilities, risk/threat/vulnerability assessments, threat intelligence, conveyances, goods, cargo, or hazmat records. Reports may contain interlinked, multi-media data that characterize the nature and context of the EVENT.
39.	Operational Planning	The means to plan, schedule, and allocate personnel and assets for emergency operations. To develop Operational Plans.

	HLS Geospatial Application	Description
40.	Performance Planning & Analysis	The means to determine system performance based upon geospatial-temporal factors and criteria. Track and report on Events, incidents, key assets, vulnerabilities, grants, expenses and funding by geospatial areas (congressional district, state, territory, county, reservations, and cities) for DHS activities. Create and evaluate performance criteria and annual performance plans (including accountability reports).
41.	Post Mission Analysis	The means to assess the performance of a mission and assess effectiveness of mission, event, preparation, logistics, response, deployment, evacuation, search & rescue, security, countermeasures, (training) exercise and recovery plans, and the effectiveness of mission operations (assess incident and situation reports). The ability to compare plans with mission operations details and determine lessons learned. The means to produce post mission assessments that convey analysis results (maps and location-based reports), and to produce and after action reports.
42.	Preparation Planning	The means to preplan, schedule, and allocate personnel and assets to a potential disaster/threat; to develop operations plans that convey schedule, tasking and resource allocation for preplanned operations, in a geospatial-temporal context. The means to produce deployment and contingency plans.
43.	Program Planning	The means to preplan, schedule and allocate personnel and assets for an HLS activity; to develop activity plans that convey schedule, tasking and resource allocation for preplanned activities, in a geospatial-temporal context. The means to produce Program Plans.
44.	Public Information Outreach	The means to inform the public on the basis of location. Portray maps (e.g., National Flood Insurance Program (NFIP) floodplain maps) and location-based information reports, alerts, warnings and emergency declarations concerning threats, threat consequences, response and recovery status, mitigation and situation reports, and benefits locations through public information (media) channels. Allow the public to interact through these channels (e.g., explore what's happening in their area of interest). Support electronic registration (geocoding) for the application of benefits. Numerous types of geospatial products produced by geospatial applications across the enterprise may be distributed through public information channels.

	HLS Geospatial Application	Description
45.	Recovery Planning	The means to preplan/plan, schedule and allocate personnel and assets for incident recovery; to develop recovery (operations) plans that convey schedule, tasking and resource allocation for recovery operations, sharing amongst government and non-government relief organizations. Publish locations and route directions to crisis counseling, housing and other recovery centers; share with public.
46.	Response Planning	The means to preplan/plan, schedule and allocate personnel and assets to a disaster/threat/incidents/events, given possible risks, public safety considerations and potential affected locations, facilities, key or critical assets, etc.; to develop response operations plans that convey schedule, tasking and resource allocation for response operations, in a geospatial-temporal context. The means to produce Response Plans.
47.	Risk Analysis	The means to determine and assign risks and risk assessments for key assets, critical assets, key persons or conveyances. To analyze associated geospatial risk factors, in conjunction with related threat, vulnerability, threat intelligence and other intelligence. Consists of mapping and correlating threats to vulnerabilities. Means of analysis may consist of: (data) mine, integrate, correlate, extrapolate, and analyze data for patterns, densities, trends, networks, line of sight, tendencies, indicators, hypotheses, and conclusions, as it pertains or may pertain to risks. May also involve geoparsing and geocoding functions to scan and annotate textual risk, risk assessment, threat, threat assessment, vulnerability, vulnerability assessment, person, conveyance, threat intelligence and other all-source intelligence for geographic and temporal references.
48.	Screening and Risk Analysis	The means to determine and assign risks and risk assessments for parties (persons or organizations) and goods, and to screen accordingly. Analyze geospatial risk factors (e.g., physical address, place of birth, citizenship, travel history, travel itineraries, geographic/national affiliations, etc. for persons and organizations, and place of origin, place of manufacture, shipping route and place of destination for goods) in conjunction with party and goods records and related intelligence. Data mining and correlation applies here. May also involve geoparsing and geocoding functions to scan and annotate associated textual data for geographic and temporal references.

	HLS Geospatial Application	Description
49.	Search and Rescue Planning	The means to preplan/plan, schedule and allocate personnel and assets for search and rescue missions. The means to develop Search & Rescue Plans that convey schedule, tasking and resource allocation for search & rescue operations, in a geospatial-temporal context. Create and manage related incident/event data. Generate alerts and warnings, as needed. Support pertinent communications.
50.	Search and Rescue Response	The means to support command and control for an incident or event that requires search and rescue. Involves creating and managing situation awareness, monitoring threats and threat assessments, coordinating and monitoring response activities/assets/personnel, communicating with response personnel, etc., and reporting status to persons in the command and control chain (Situation Reports). Create pertinent communications. Update incident/event records to reflect response results.
51.	Security Planning	The means to determine and document the security plans, in geospatial context, to secure and protect fixed and mobile assets, persons, goods, conveyances, etc.
52.	Security Protection & Management	The means to secure and protect fixed and mobile assets, persons, goods, conveyances, etc. (in geospatial context). (e.g., Where to place barriers, guard posts, sensors, etc. Where are the guards, sensor alerts, etc.). Includes integration with sensors and other security monitoring tools and the means to process and display observations. May lead to reporting of events or alerts.
53.	Sensor Management	The means to manage sensor assets and the allocation of data collection requirements and tasks to sensors.
54.	Site Modeling & Analysis	The means to analyze, model and delineate areas based upon site characteristics (e.g., to locate ideal sites for a facility). To produce Site Plans.

	HLS Geospatial Application	Description
55.	Situation Awareness	The means to combine varied sources of data to create the situational context associated with threats, vulnerabilities and friendly forces for the purpose of understanding their nature and disposition and to support decision making for threat response and mitigation. In particular, view near-real time threat disposition, related observations, and friendly force disposition in geospatial context, with the appropriate level of detail. Leads to a shared, collaborative COP, or specialized views of the COP that convey actionable information, a.k.a. MSOP. The means to generate Situation Reports.
56.	Suspicious Activity Reporting	The means to analyze and report suspicious/criminal/terrorist activities to proper authorities (e.g., indications of a threat, notifications of suspected criminal activities, etc.).
57.	Tariff Management	The means to manage tariffs for goods, in a geospatial context.
58.	Threat Analysis	The means to define threats and threat assessments. For terrorism, the means to (data) mine, integrate, and correlate varied types of geospatial data for the purpose of extrapolating, modeling, analyzing and deriving geospatial data in the form of patterns (e.g., cluster), densities, trends, networks, line of sight, tendencies, indicators, hypotheses, and conclusions, as it pertains to threats and the understanding of threat behaviors in their environment, in order to minimize the risks associated with the threat. Source data include, but are not limited to, intelligence, incidents, events, criminal and suspicious activities, financial transactions, persons, organizations, goods, etc. For terrorism and natural hazards, this includes the means to conduct Threat Consequence Assessments and Hazard Modeling, Analysis & Mapping. May also involve geoparsing and geocoding functions to scan and annotate associated textual data for geographic and temporal references.

	HLS Geospatial Application	Description
59.	Threat Consequence Assessment	The means to understand the consequences of terrorist and natural threats as determined by modeling/simulation and analysis (e.g., Consequences Assessment Tool Set (CATS)). The means to produce Threat Consequence Assessments for threats to key assets, critical assets, key persons or conveyances (and associated routes). Means of analysis may consist of: (data) mine, integrate, correlate, extrapolate, and analyze data for patterns, densities, trends, networks, tendencies, indicators, hypotheses and conclusions, which pertains or may pertain to threats. May also involve geoparsing and geocoding functions to scan and annotate associated textual data for geographic and temporal references.
60.	Threat Detection	The means to detect chemical and biological threats in air and water through the employment of sensors. The means to access sensors as network resources to meet rapid response and risk mitigation requirements. Detect threats through screening and analysis of sensor observations. Create, reference, and share alerts.
61.	Training Exercise Simulation	Provide training simulations capabilities to support training exercises. The simulations employ geospatial data and technology to simulate different attack scenarios. Uses training models and supporting databases.
62.	Training Planning & Support	The means to plan training exercises and produce geospatial training aids in the form of maps, reports and plans.
63.	Travel Planning	The means to plan secure and safe travel for individuals. Produces itineraries.
64.	Vulnerability Analysis	The means to determine and assign vulnerabilities and vulnerability assessments for key assets, critical assets, key persons or conveyances (and associated routes). Means of analysis may consist of: (data) mine, integrate, correlate, extrapolate, and analyze data for patterns, densities, trends, networks, tendencies, indicators, hypotheses and conclusions, which pertains or may pertain to vulnerabilities. May also involve geoparsing and geocoding functions to scan and annotate associated textual data for geographic and temporal references.
65.	Warning/Alert Management	The monitoring and processing of Alerts in a geospatial-temporal context. The means to generate Warnings.

	HLS Geospatial Application	Description
66.	Waterway Management	The means to perform waterways management to provide a safe, efficient and navigable waterway system to support domestic commerce, international trade and military sealift. Provide long-range and short-range aids to navigation (buoys/sensors/breaking ice), electronic charting and tide/current/pilotage information through Notices to Mariners services, weather services, vessel traffic services, technical assistance and advice, vessel safety standards and inspection, and bridge administration standards and inspections.
67.	Weather Modeling & Analysis	The means to model/simulate and analyze weather conditions at specified locations. The means to determine hindcasts, nowcasts and forecasts for a location and share this information with HLS users. The means to generate and disseminate Weather Alerts & Warnings.

2.0 ACRONYMS

Acronym	Definition
ADA	Americans with Disabilities Act of 1990
AVL	Automatic Vehicle Location
BASINS	Better Assessment Science Integrating Point and Nonpoint Sources
CATS	Consequences Assessment Tool Set
COP	Common Operating Picture
CWA	Clean Water Act
DFIRMs	Digital Flood Insurance Rate Maps
DFO	Disaster Field Office
EA	Enterprise Architecture
FAA	Federal Aviation Administration
GPS	Global Positioning System
HEC2	Hydrologic Engineering Center 2
HLS	Homeland Security
INS	Inertial Navigation System
LORAN	Long Range Radio Aid to Navigation
MSOP	Mission-Specific Operating Picture
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NOAA	National Oceanic & Atmospheric Administration
NOV	Notice of Violation
NSSE	National Security Special Event
OSHA	Occupational Safety and Health Act of 1970
SCADA	Supervisory Control and Data Acquisition