



NG9-1-1 GIS Products and Service Guide

Version 2021.01.26

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1. Introduction

This Service Guide describes Intrado's Next Generation 9-1-1 ("NG9-1-1") GIS products (collectively, "Products") and services (collectively, "Services").

The National Emergency Number Association's ("NENA") i3 specification includes GIS data as a foundational element of the NG9-1-1 architecture. In NG9-1-1, locally-sourced GIS spatial data forms the basis for 9-1-1 location validation, call routing, and response agency identification rather than the legacy tabular data used in Automatic Location Identification ("ALI") and Master Street Address Guide ("MSAG") databases. GIS data is the core of NG9-1-1.

With spatial data at the center of NG9-1-1, locally sourced GIS data must be accurate, comply with i3 standards, and must be continuously maintained by the local or regional GIS data manager (referred to as a "GIS Authority"). A GIS Authority is considered any entity which maintains GIS data such as road centerlines, address points and emergency service boundaries which is used by a PSAP and emergency personnel affiliated with that PSAP for 9-1-1 purposes. These purposes might include, but are not limited to, 9-1-1 call mapping, in-vehicle mapping, web-based mapping applications, addressing maintenance, call routing or analysis.

GIS data used in an i3 environment must meet legacy system database requirements in addition to NG9-1-1 standards and, in many cases, meet additional local, regional, and state requirements for public safety and other GIS data users.

Intrado's GIS Solutions division has extensive experience working with GIS and public safety agencies across the nation to create, validate, aggregate, and provide ongoing management of GIS data used in both E9-1-1 and NG9-1-1 operations. Intrado offers a broad range of NG9-1-1 GIS data management solutions and GIS professional services to organizations and agencies that manage 9-1-1 and GIS data, whether or not Intrado is providing NG9-1-1 core services.

2. Enterprise Geospatial Database Management System

The Enterprise Geospatial Database Management System ("EGDMS") is Intrado's GIS Data validation and integration system serving as the nexus for all of Intrado's GIS data processing. The EGDMS has integration points for other Intrado GIS products and enables Intrado to provide the comprehensive set of integrated spatial data solutions described in this Service Guide.

The EGDMS is a secure, cloud-based service used by local, regional or state-level GIS data sources for ongoing quality assurance/quality control (QA/QC) validation and reporting, coalescing and provisioning of GIS data. It provides automated GIS data format standardization and data aggregation between regional or state-level individual participating agencies.

When using Intrado's NG9-1-1 core services, the EGDMS serves as the NENA Spatial Interface ("SI"), provisioning the Emergency Services Network ("ESInet") functional elements including the Emergency Call Routing Function ("ECRF") and the Location Validation Function ("LVF").

The EGDMS provides a secure, web-based GIS data upload portal, automated GIS data QA/QC validation and reporting, and provisioning to a coalesced database. In areas where Intrado manages the ALI database directly or on behalf of the Local Exchange Carrier ("LEC"), the EGDMS allows users to automatically initiate ALI-to-Road-Centerline ("RCL") and/or ALI-to-address-point GIS data comparisons and match rate reports. This capability allows the GIS Authority to immediately know if a GIS change or omission may result in an ALI to GIS comparison error or fallout. To support this feature, Intrado requires permission/access to the underlying ALI and MSAG databases of the applicable LEC. Intrado will coordinate with the 9-1-1 Authority and the LEC to obtain permission for this access.

The EGDMS's GIS data validation services include critical error detection and reporting in an automated fashion, so GIS Authorities have immediate feedback and shorten error correction processing timeframes. The EGDMS service provides:

- Secure file transfer via secure two-factor authentication
- Support for file geodatabase and shape file

- Ability for GIS Authority's data to be maintained in its native format and schema
- Automated schema change detection and error notification
- Browser-based attribute field mapping configuration driven by the GIS Authority
- Automated email notifications for upload and processing status
- NG9-1-1 GIS data compliancy checks
- Address Point, Road Centerline, and boundary layer validation checks
- Streamlined ALI-to-RCL and ALI-to-address-point comparisons and reporting
- Validation report retrieval

2.1. EGDMS - Optional Services

In addition to the EGDMS services outlined above, the EGDMS offers additional capabilities and options as described below.

- EGDMS Auto-Upload Service
- Standalone EGDMS Training Sessions
- Map Change Request System
- MapSAG™ Data Exchange Service (included w/ MapSAG™)

2.1.1. EGDMS Auto-Upload Service

GIS data sources that wish to submit GIS data to the EGDMS in an automated fashion at scheduled intervals can use the EGDMS Auto-Upload Service. This service provides custom scripts to automatically provision GIS data to a secure FTP site, without the use of the EGDMS portal. This service can save time and provides a mechanism for regular GIS data maintenance uploads. The EGDMS Auto-Upload Service:

- Bypasses web portal for ongoing submissions after initial configuration is completed via the portal
- Includes MoveIt (sFTP) Account creation for secure file transfer
- Provides script/configuration file to automatically submit GIS data at scheduled intervals
- Automatically retrieves file and continues automated QA/QC processing and provisioning steps
- Provides upload and validation reports to the GIS data source via EGDMS web portal

2.1.2. EGDMS Auto-ALI to GIS Comparison Reporting

EGDMS users that wish to perform ALI-to-GIS comparison reporting themselves and in an automated fashion can use the EGDMS Auto-ALI-to-GIS Comparison Reporting feature. This feature allows EGDMS to request automated ALI-to-road-centerline and/or ALI-to-address-point comparisons through the EGDMS interface, and in turn receive automated reporting that identifies which ALI and/or GIS records are discrepant with each other and require further customer investigation and resolution.

This feature requires that Intrado is contracted to provide Automatic Location Information ("ALI") database management services either directly or on behalf of an Originating Telephone Service Provider.

2.1.3. Standalone EGDMS Training Sessions

Individual EGDMS Training sessions are available for customers with access to the EGDMS and are conducted remotely via webinar, lasting two hours each.

Training Session #1

Conducted via webinar following EGDMS user access enablement, this training provides instruction on the following:

- System overview and understanding dataflow
- Understanding GIS Data readiness and file structure requirements
- Navigation of the EGDMS user interface

- How to perform GIS schema field-mapping
- How to perform initial GIS Data upload through successful EGDMS submission

Training Session #2

Conducted via webinar following the initial successful submission of GIS data into EGDMS, this training provides instruction on the following:

- Detailed 9-1-1 EGDMS Data Upload and Validation Report review
- Understanding GIS data validations and error types
- Validation Error corrective action suggestions

2.1.4. Map Change Request System

The Map Change Request System (“MCRS”) is a web-based portal hosted and managed by Intrado that provides a simplified way for non-GIS professionals to submit change requests to Intrado’s GIS Operations team or to another GIS organization.

The MCRS is designed for use by non-GIS professionals, like 9-1-1 addressing coordinators or County assessors, and provides a user-friendly interface to request changes or make additions to the GIS data by performing ‘markup’ directly within the map display. Intrado’s GIS analysts will review each request and then apply the approved changes to the master GIS database after validation. The MCRS is deployed as a cloud-based web service. Intrado will provide the installation services necessary to deploy this system in conjunction with EGDMS base services.

2.1.5. MapSAG™ Data Exchange Service

The MapSAG™ Data Exchange Center includes an interface to Intrado’s EGDMS for integrated GIS data uploads directly within the MapSAG™ user interface. This option is similar to the EGDMS Auto-Upload Service described in Section 2.1.2, but uses tools within MapSAG™ rather than a standalone script, and validates the data prior to upload. This service is included with MapSAG™ and the EGDMS base services.

3. NG9-1-1 GIS Managed Services

Intrado’s NG9-1-1 GIS Managed Services facilitate the implementation and provide ongoing support of NG9-1-1 geospatial location validation and call routing data management. NG9-1-1 GIS Managed Services is tailored specifically to deliver essential GIS data onboarding services and provide ongoing GIS data management support services to the GIS Authority. NG9-1-1 GIS Managed Services is scalable to support individual PSAP or local authority deployments up to the largest regional and state NG9-1-1 implementations.

NG9-1-1 GIS Managed Services is powered by coupling the EGDMS with an assigned Intrado i3 GIS Coach. The Intrado i3 GIS Coach is not only an expert with GIS data and technology, but also possesses a deep understanding of E9-1-1 and NG9-1-1 data structures and how they must work in unison with the NENA Spatial Interface and other downstream systems in order to drive successful NG9-1-1 geospatial call routing. An i3 GIS coach is assigned to each GIS Authority, or EGDMS GIS data submitting agency, and is available to help manage the project, provide system access and training, GIS data upload assistance, error report interpretation, go-live support and ongoing consultation and support.

NG9-1-1 GIS Managed Services are provided in two stages, Onboarding and Ongoing Support. Onboarding services are described in full detail in section 3.1 and deliver services, training, and support needed to successfully deploy NG9-1-1 GIS data within Intrado’s EGDMS prior to NG9-1-1 go-live. The Ongoing stage of NG9-1-1 GIS Managed Services provides continued support of the Customer’s NG9-1-1 GIS data following the successful completion of the Onboarding stage. Intrado’s NG9-1-1 GIS Managed Services provides support throughout all phases of deployment on the EGDMS.

After the conclusion of the Onboarding services, Ongoing NG9-1-1 GIS Managed Services continues and maintains the lines of communication between Intrado, the 9-1-1 Authority and the NG9-1-1 service provider. End users will continue to receive i3 GIS coaching and support along with periodic system refresher training services.

Ongoing NG9-1-1 GIS Managed Services includes the following services provided by an assigned i3 GIS Coach including:

- GIS data layer and schema mapping assistance
- GIS data troubleshooting for geospatial call routing issues
- EGDMS report interpretation and error resolution assistance
- Provisioning Boundary management and conflict remediation
- Refresher training courses

Note: NG9-1-1 GIS Managed Services billing is based on the population serviced by the GIS Authority. If Intrado is contracted to provide these services to multiple GIS Authorities billed to a single entity, pricing is not based on the aggregate population of the entity to be billed, but will be calculated for each individual GIS Authority submitting data through EGDMS based on the population serviced by each GIS Authority.

3.1. NG9-1-1 GIS Onboarding

The Onboarding services included with NG9-1-1 GIS Managed Services can also be purchased as a standalone service.

Intrado's NG9-1-1 GIS Onboarding delivers the essential services, training, and support needed to successfully deploy NG9-1-1 GIS data and the EGDMS within a NG9-1-1 environment.

Intrado will provide web-based training and setup of the EGDMS system and assist with the initial GIS data load, clarifying the role of the EGDMS as the NENA Spatial Interface, and defining its features and functionality. NG9-1-1 GIS onboarding services establish communication between the end customer, Intrado, and the NG9-1-1 service provider throughout the GIS onboarding phase and the EGDMS implementation.

NG9-1-1 GIS onboarding includes EGDMS setup and the following services:

- Assignment of an i3 GIS Coach
- NG9-1-1 GIS onboarding kickoff meeting
- EGDMS overview, user training, and field mapping training (web-based)
- EGDMS report interpretation & error correction consultation training (web-based)
- ALI to GIS report review and error correction consultation training (web-based)
- GIS data testing and remediation
- General NG9-1-1 GIS Q&A support
- EGDMS and NG9-1-1 GIS go-live support

Note: When purchased outside of NG9-1-1 GIS Managed Services, NG9-1-1 GIS onboarding includes up to 50 hours of GIS consultation services delivered by a Intrado GIS professional ("i3 GIS Coach"). End customers requiring additional time, support or project management may be required to purchase additional services.

NG9-1-1 GIS onboarding services will be billed up front upon initiation of the project. NG9-1-1 GIS onboarding services will be determined to be complete following the first successful end customer provisioning of all required GIS data layers into the ECRF.

3.2. Advanced NG9-1-1 GIS Data Managed Services

Advanced NG9-1-1 GIS Data Managed Services are available for 911 and GIS Authorities that require additional assistance beyond what is covered by NG9-1-1 GIS Managed Services or TDMS Services. This

is a custom solution that includes robust project management services and dedicated support staff along with continuous monitoring and oversight to support a successful geospatial call routing operation.

Advanced NG9-1-1 GIS Data Managed Services include the tools and services required to get GIS data ready for NG9-1-1 ahead of an ESInet or NG9-1-1 Core Services contract as well all of the tools and support to maintain the mission critical GIS data used to drive the NG9-1-1 geospatial call routing operation. These services include access to the EGDMS and NG9-1-1 GIS Managed Services, but also includes the following:

- Dedicated Project Management and Support
- NG9-1-1 GIS Data Assessment and Report (described in section 5.1)
- Custom i3-compliant GIS Data Model Creation
- Workflow Plan: Roles and Responsibilities
- QA/QC Plan: Detailed processes and workflow
- Outreach and Education
- Source Data Acquisition Process
- Source Data Gap Analysis
- Database completion and workflow integration
- Boundary conflict facilitation
- Continuous GIS data submission monitoring
- Custom reporting and analysis

Note: Advanced NG9-1-1 GIS Managed Services is a custom solution that requires custom pricing on a per customer basis.

4. Transitional Data Management Services

Where Intrado is contracted to provide Automatic Location Information (“ALI”) database management services, the below Transitional Data Management Services (TDMS) options are available.

TDMS Services enables end customer to upload GIS road centerline data (RCL) and updates. Changes within the RCL data are identified automatically and updates to end customer’s applicable Master Street Address Guide (“MSAG”) are made per customer’s separate ALI Data Management contract.

Intrado’s TDMS Services reduce the amount of the work for both 9-1-1 coordinators and the GIS Authorities that make frequent edits to its RCL data, and keeps these changes automatically synchronized with the MSAG.

TDMS Services deliver the following benefits:

- **Operational Efficiency**
 - Provides 9-1-1 address management using GIS road centerline (RCL) data instead of traditional MSAG data, eliminating the need to synchronize and maintain synchronization between disparate GIS and MSAG databases
- **Improved Data Accuracy**
 - Utilizes GIS data which typically is more precise than the traditional MSAG and provides continuous GIS to MSAG and ALI synchronization
- **No Changes Required for OSPs (Carriers)**
 - Supports legacy OSP provisioning and ALI database management and is fully transparent to OSPs
- **Improves i3 Readiness**
 - Facilitates the transition to NG9-1-1 by keeping the GIS data synchronized with the MSAG and ALI until fully transitioned to NG9-1-1 and the MSAG / ALI are replaced by Location Information Server (LIS) and Location Validation Function (LVF) Services
- **Supports i3 Interim Geospatial Routing**
 - Significantly streamlines deployment to Intrado or channel partner’s NG9-1-1 Core Services for geospatial routing

4.1. One-time geoMSAG Replacement Service

The geoMSAG Replacement Service includes a one-time replacement of the legacy MSAG with a geoMSAG.

The geoMSAG Replacement Service includes:

- Road Centerline QA/QC reporting
- ALI to road centerline match rate reporting
- Creation of a geoMSAG file once an agreed upon ALI to road centerline match rate has been achieved (NENA recommends a 98% or greater match rate)
- Replacement of the legacy tabular MSAG with the geoMSAG

The geoMSAG Replacement Service follows the steps outlined below:

1. A Customer agreement is initiated between the Customer and Intrado or the Customer and the channel partner or OSP. Intrado, or the channel partner or OSP, will secure permission to extract Customer ALI and MSAG data from the appropriate databases.
2. Access is provided to the EGDMS for GIS data upload and GIS error detection. The Customer will then have the opportunity to resolve errors within the RCL layer until all critical errors have been corrected.
3. Intrado provides a one-time ALI to RCL comparison report. The Customer will then have the opportunity to resolve errors within the RCL layer and/or the ALI database if required.
4. Once the ALI to RCL match rate meets the recommended 98% match rate, Intrado will create a geoMSAG file. Any geoMSAG build errors will be identified and the Customer will have the opportunity to resolve errors.
5. Intrado will then perform a one-time TN simulation to identify discrepancies between the newly-created and ALI TNs. Intrado will provide the discrepancies between the geoMSAG and ALI data and the customer will have the opportunity to correct any errors in the GIS and/or ALI database.
6. After all comparison and simulation testing outputs result in the recommended 98% or greater match rate between the ALI and geoMSAG, or an agreed-to match rate is achieved, Intrado replaces the legacy MSAG with the geoMSAG. The new geoMSAG is then used as the MSAG database of record.

4.2. Ongoing TDMS Services

Ongoing TDMS Services includes the EGDMS and GIS Director applications as well as NG9-1-1 GIS Onboarding services as described in section 3.1 and deliver the essential services, training, and support needed to successfully deploy GIS data and the EGDMS within a NG9-1-1 environment and to support ongoing Transitional Data Management Services. Ongoing TDMS Services include the initial replacement of the legacy MSAG with the geoMSAG as described in section 4.1, but also provide ongoing MSAG synchronization and maintenance as changes to the GIS road centerline data are received from the 9-1-1 Authority.

TDMS Services significantly reduce the work effort required by 9-1-1 coordinators and GIS Authorities that make frequent edits to GIS data by automatically updating the MSAG using the customer's GIS data as the source. TDMS Services enable the 9-1-1 Authority to upload their GIS Road Centerline (RCL) data to the EGDMS, and changes that impact the geoMSAG (for example: address range, street name, ESN and MSAG Community changes) are identified and the updates are applied to the geoMSAG in an automated fashion.

The Ongoing TDMS Services process follows the steps outlined below:

1. Customer submits GIS data to the EGDMS.
2. EGDMS processing including validation, reporting and error correction (if necessary).
3. GIS data updates are applied to the GIS Director map display.
4. RCL changes that impact the geoMSAG are either automatically applied or sent for approval to the GIS Director Map Display

5. Customer reviews the geoMSAG changes/errors and either corrects the RCL data and resubmits via the EGDMS or updates TN/ALI record.
6. geoMSAG changes that pass validations and are approved are applied to the production geoMSAG.

Note: Ongoing TDMS Services billing is based on the population to be serviced by the GIS Authority. In the event Intrado is contracted to provide TDMS Services to multiple GIS Authorities billed to a single entity, pricing is not based on the aggregate population of the entity to be billed but will be calculated for each individual GIS Authority Intrado has engaged to deliver TDMS services based on the population serviced by each GIS Authority.

4.3. GIS Director

Ongoing TDMS Services include access to Intrado's GIS Director application. GIS Director is the next-generation interface replacement for 9-1-1 NET®. Training for the GIS Director is included with ongoing TDMS Services.

GIS Director allows the Customer to review its legacy 9-1-1 data (geoMSAG and ALI) and GIS data through a map-based user interface. The application provides a hosted web-based and collaborative user interface for discrepancy reporting and error resolution of ALI/TN records, and will also provide future Location Validation Function (LVF) services.

Although GIS Director is the NG9-1-1 map-based interface replacement for 9-1-1 NET, currently not all 9-1-1 NET functionality is contained within GIS Director. As such, certain functions may require the continued use of 9-1-1 NET.

4.4. TDMS Service Requirements

Implementation of TDMS Services requires the following:

- ALI data must be managed by Intrado
- Intrado must manage the MSAG for the area of interest
- A mutually agreed upon ALI and RCL data match rate is to be achieved as a condition of geoMSAG implementation
- Intrado requires that all critical errors be resolved within the RCL feature class
- Customer's GIS data must contain the required data fields and attributes. *Note: Refer to Table 1 for a list of required fields and attribute examples*
- The geographic area covered by the RCL data must be equal to or larger than the area covered by the legacy MSAG

4.4.1. Required Road Centerline Fields

Table 1 includes the required RCL fields for TDMS Services.

Note this list includes only those fields required for the geoMSAG; it does not include all i3/NG9-1-1 required fields.

Table 1: RCL Fields Required for geoMSAG

Descriptive Name	Example	Type
RCL Unique ID	13575@county.st.us	A
Left From Address	101	N
Left To Address	199	N
Right From Address	102	N

Descriptive Name	Example	Type
Right To Address	198	N
Legacy Street Name Pre Directional*	S	A
Legacy Street Name*	Main	A
Legacy Street Name Post Type*	ST	A
Legacy Street Post Directional*	N	A
ESN Left	356	A
ESN Right	356	A
MSAG Community Name Left	Smithville	A
MSAG Community Name Right	Smithville	A

*Street name elements should be parsed and abbreviated to match existing / legacy ALI and MSAG format.

A = Alphanumeric text / string field

N = Number field

Note: For ongoing services, if any of the fields listed above or associated attributes are not available in the RCL data, Intrado can discuss options and alternatives available to the Customer.

5. NG9-1-1 GIS Data Reports

Intrado offers a variety of standalone GIS and NG9-1-1 readiness and accuracy reporting services. Many of these reporting services are included with managed service offerings, but are also available for purchase as one-time individual reports.

5.1. NG9-1-1 GIS & 9-1-1 Data Assessment

This is provided as a one-time service and delivers a comprehensive analysis of the GIS Authority's existing GIS and 9-1-1 data (MSAG and ALI) and a report detailing GIS data readiness in preparation for migration to NG9-1-1.

Intrado will perform an in-depth analysis on the GIS data layers required to implement NG9-1-1. This analysis is followed by detailed reports of Intrado's findings and recommendations for the steps needed to achieve full i3 GIS data readiness.

Intrado will perform the data analysis and assessment, develop detailed reports of findings, and communicate these findings and recommendations to end customer.

After Intrado presents the report findings and recommendations, the jurisdiction or GIS Authority may elect to manage the data directly or contract with Intrado for additional GIS data professional services, solutions, and support.

For customers requiring analysis and reporting only on existing GIS layers used in E9-1-1 applications, Intrado offers Spatial data analysis performed only on layers impacting E9-1-1 operations.

The NG9-1-1 GIS & 9-1-1 data analysis will be performed on and between the following layers:

- Road Centerlines
- Address Points
- PSAP Boundary Layer
- Emergency Service Boundary Layers(s)
- Provisioning Boundary Layer

- ALI-to-GIS and MSAG-to-GIS comparisons

The report delivered to end customer will contain:

- GIS data readiness process
- Documented data standards
- GIS data validation reports
- Data analysis recommendations
- Reference documentation for i3
- Conclusion

Note: End customer will be required to provide Intrado with GIS and 9-1-1 data in order for Intrado to perform the analysis and reporting described above.

5.2. ALI to Road Centerline Comparison Report

This is provided as a one-time service and delivers a comprehensive analysis of end customer's RCL data and end customer provided ALI data managed for the jurisdiction.

Using GIS and 9-1-1 data, Intrado will run QA/QC validations between the 9-1-1 ALI data and the RCL GIS data layer. Intrado uses proprietary 9-1-1 GIS data validation tools to determine conformance to GIS schema requirements and performs QA/QC for critical errors.

A report will be created and provided to end customer identifying the ALI-to-RCL match rate and critical errors which would prevent data from being suitable for use in NG9-1-1 call routing.

Intrado will perform the data analysis and assessment, develop a detailed report with findings, and communicate these findings to end customer.

Note: End customer will be required to provide Intrado with GIS and 9-1-1 data in order for Intrado to perform the analysis and reporting described above.

5.3. ALI to Address Point Comparison Report

This is provided as a one-time service that compares the customer's Address Point data and customer provided ALI data.

Using GIS and 9-1-1 data, Intrado will run QA/QC validations between the 9-1-1 ALI data and the Address Point GIS data layer. A report will be created and provided to end customer identifying the ALI-to-Address Point match rate.

Intrado will perform the data analysis and assessment, develop a detailed report with findings, and communicate these findings to end customer.

Note: End customer will be required to provide Intrado with GIS and 9-1-1 data in order for Intrado to perform the analysis and reporting described above.

5.4. Geospatial Call Routing Accuracy Report

This report is provided as a one-time service and delivers a comprehensive report from analyzing the end customer's Address Point and PSAP boundary data against end customer provided ALI data and identifies ALI records that have different ESN-based PSAP routing when compared to geospatial call routing. With the information provided in this report, the end customer is able to investigate and resolve the potential identified issues within the ALI or GIS database.

A report will be created and provided to end customer identifying existing PSAP routing contained in the ALI record that differs from the PSAP destination determined when using NG9-1-1 geospatial call routing.

Intrado will perform the data analysis and assessment, develop a detailed report with findings, and communicate these findings to end customer.

Note: End customer will be required to provide Intrado with GIS and 9-1-1 data in order for Intrado to perform the analysis and reporting described above.

6. Custom GIS Data Professional Services

Intrado offers a wide selection of GIS data and professional services to assist 9-1-1 and GIS data authorities assess, plan, collect, cleanse, implement and maintain mission critical GIS data used in E9-1-1 and NG9-1-1 environments, and beyond. These can be purchased and performed separately or combined with other product and service offerings to provide a complete and comprehensive solution set, specific to the needs of each Customer.

Often, when it comes to GIS professional services, “one size does not fit all”, and some level of customization is required to meet specific needs and situations. Intrado offers custom solutions to meet the particular needs of our clients and their constituents through close partnership and understanding of specific problems and situations that need to be taken into account when developing a solution. The following are just some of the GIS Data Services Intrado provides:

- NENA i3 compliant NextGen 9-1-1 GIS database creation
- Field data collection and verification
- GIS data validation and enhancement
- GIS data synchronization with MSAG and ALI databases
- geoMSAG GIS data requirements development
- Oblique aerial imagery derived attribute data (public safety specific)
- Geocoding/location intelligence
- Cache tile creation and support
- Advanced professional consultation and workflow analysis

7. MapSAG™

MapSAG integrates closely with ESRI's ArcGIS® for Desktop to streamline GIS data maintenance and accuracy.

MapSAG enables the synchronization of MSAG and GIS data. MapSAG delivers GIS data maintenance tools including:

- Street and structure editing
- Street, structure, and response boundary validations
- MSAG and ALI compare and synchronization tools
- Easy to use reporting tools

Street and structure editing tools simplify common tasks by pre-populating attributes, accelerating the data management process, and reducing the potential for errors.

MapSAG validations use over 30 proprietary algorithms to analyze GIS data to locate errors. MapSAG then presents the errors in an easy-to-use format, which enables the streamlined correction of the errors through tools specifically designed for the error type being corrected.

Reporting tools enable generation of reports in Adobe PDF format. Reports are generated on validations and MSAG/ALI compares. Users may customize reports by adding specific elements such as an agency logo, custom titles, and customized headers and footers.

MapSAG enables Customer to create and maintain accurate 9-1-1 GIS data and to synchronize the GIS and 9-1-1 databases.

MapSAG is installed locally, at Customer's location, and operates through an interface within ESRI's ArcGIS Desktop (ArcView®, ArcEditor®, or ArcInfo®) product. Various toolbars are available for accessing the

available tools and features. The functionality that resides in the ArcGIS Desktop framework remains available while using MapSAG, including editing, drawing, layouts, and/or spatial queries.

Using MapSAG and ArcGIS Desktop, new GIS data records (streets, structures, polygons, etc.) can be input into Customer's GIS data through multiple methods including field GPS, on-screen digitizing, import, and auto-generation. GIS data is stored in an ESRI format. MapSAG supports ArcGIS Desktop 10.1 through 10.7 and requires a file geodatabase or an Enterprise Geodatabase through ArcGIS Server ("ArcSDE[™]").

7.1. Versions

Beginning with release 6.4, MapSAG is offered in four versions, as described below. Each version is designed to accommodate specific GIS data management requirements and functionality. These range from editing and data maintenance to integration with Intrado's map display system and synchronization of GIS data with MSAG and ALI data. Customer may upgrade from one version to another, adding functions and features as GIS data management needs evolve toward i3 migration.

7.1.1. Professional

MapSAG Professional combines all features and functions provided in MapSAG Edit, Data Exchange, and 9-1-1 Sync (individually described below) into a single GIS data management platform configured for GIS power users.

7.1.2. Edit

MapSAG Edit includes the primary tools for editing and maintaining accurate GIS data. MapSAG's data validation tools, combined with its powerful and easy to use editing tools, enable GIS professionals to reduce errors in the data set and save time managing GIS data.

7.1.3. Data Exchange

MapSAG Data Exchange includes all features and functions provided in MapSAG Edit and adds the Data Exchange Center. The Data Exchange Center provides simplified tools enabling users to exchange data with Intrado's MapFlex[®] PSAP mapping system. Data Exchange enables MapFlex to be updated directly from MapSAG without exporting and copying files between systems. Additionally, discrepancies identified by 9-1-1 call takers and dispatchers can be flagged through MapFlex and reported to the MapSAG user to locate and correct within the GIS data set. This functionality is available in MapSAG release 6.4. The Data Exchange Center includes an interface to Intrado's EGDMS for use with NG9-1-1 and TDMS, in version 6.5.

7.1.4. 9-1-1 Sync

MapSAG 9-1-1 Sync includes all features and functions provided in MapSAG Edit and adds 9-1-1 Sync tools which enable the synchronization of MSAG and ALI data with GIS data. The synchronization of MSAG and ALI data is considered an important first step to achieving i3 success. MapSAG delivers the tools and step-by-step processes to make this difficult task easier.

7.2. Single User and Concurrent Use Licenses

All releases and versions of MapSAG are available in two licensing options, Single User and Concurrent Use. The Single User license is installed on a single workstation and can be used full-time on that workstation. A Concurrent Use license can be shared by up to three MapSAG users but only one workstation at a time can use the license.

7.3. System Requirements

Intrado does not provide workstation or server equipment for this application and is only supported on Microsoft Windows based platforms. MapSAG supports published ESRI hardware and software

requirements for Microsoft Windows systems. For Customer using ArcGIS for Server, MapSAG supports only Microsoft SQL and Oracle databases.

MapSAG is highly configurable and is designed to work with most end customer GIS data. The data must be in ESRI format such as Geodatabase, File Geodatabase, or ArcGIS for Server (SDE). An Intrado GIS professional will review the data format and communicate any changes necessary for the deployment of MapSAG.

The most current version of MapSAG requires ESRI ArcGIS version 10.4.x through 10.7.x. Intrado must be notified of end customer's ESRI software release version and request a version of MapSAG which is compatible with Customer's ArcGIS software.

Older versions of MapSAG provided to accommodate Customers with older versions of ArcGIS software are billed at the same rate as MapSAG Professional, and may not include all features and functionality offered in the most current MapSAG Professional version.

7.4. Implementation and Support

MapSAG will be installed on end customer systems remotely by an Intrado GIS professional. Implementation of MapSAG includes user training delivered by an Intrado GIS trainer. Training can be conducted remotely via webinar or onsite at end customer location. Onsite training will include additional travel fees for the Intrado GIS trainer. Additional training may be purchased by end customer desiring periodic refresher training or training for new users following system implementation.

New MapSAG systems include one year of Annual Support and Maintenance services. This provides telephone support for all users during normal business hours and software updates (including patches and updates of major and minor releases). Starting in year two, Customer will be required to renew its support and maintenance services to maintain access to support and software updates. Support and maintenance renewals may be purchased annually or prepaid for multiple years.

Intrado will provide MapSAG software, remote installation, and configuration of the MapSAG software on Customer-provided workstations, and onsite or remote MapSAG user training.

Additional training sessions following system implementation may be purchased separately if an agency requires additional user training. Additional training will be performed by an Intrado GIS trainer.

7.5. End Customer Responsibilities

Each Customer deploying MapSAG will be responsible for providing the hardware and additional software necessary for MapSAG installation and operation, including the proper ArcGIS license(s).

MapSAG is an add-on to ESRI ArcGIS for Desktop and requires an active ArcGIS for Desktop license at each MapSAG-enabled workstation. End customer is responsible for acquiring and maintaining the necessary ESRI licensing. At the customer's request, Intrado can facilitate acquiring the necessary ESRI licensing.

Each Customer requiring MapSAG training will be responsible for providing a suitable training facility and the equipment required for delivering MapSAG training.