Proposal for:

Early Warning Flood Management Software, Hardware and Related Services

Solicitation RFP #: 2023-060

Submitted by:

TriLynx Systems, LLC

August 29, 2023

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Tab A – Cover Sheet

TXShare
Your Public Sector Solutions Center

REQUEST FOR PROPOSALS
For
Early Warning Flood Management Software, Hardware and Related Services
RFP # 2023-060

Sealed proposals will be accepted until **2:00 PM CT, Tuesday, August 29, 2023** and then publicly opened and read aloud thereafter.

TriLynx Systems, LLC
Legal Name of Proposing Firm

Markus Ritsch — Contact Person
Chief Operating Officer — Title

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Severance/Colorado — City/State
80524 — Zip

40504 Weld County Road 17 — Complete Mailing Address
Severance/Colorado — City/State
80524 — Zip

As of 8/28/2023 there are no addenda.

Acknowledgment of Addenda: #1_____ #2 _____ #3 _____ #4 _____ #5 _____

By signing below, you hereby certify that the information contained in this proposal and any attachments is true and correct, and may be viewed as an accurate representation of proposed services to be provided by this organization. You agree that failure to submit all requested information may result in rejection of your company's proposal as non-responsive. You certify that no employee, board member, or agent of the North Central Texas Council of Governments has assisted in the preparation of this proposal. You acknowledge that you have read and understand the requirements and provisions of this solicitation and that the organization will comply with the regulations and other applicable local, state, and federal regulations and directives in the implementation of this contract. And furthermore that I certify that I am legally authorized to sign this offer and to submit it to the North Central Texas Council of Governments, on behalf of said offeror by authority of its governing body.

Markus Ritsch
Authorized Signature

The North Central Texas Council of Governments (NCTCOG) has identified a need for regional, off-the-shelf (OTS) software operating on a common platform, covering multiple jurisdictions, resulting in a rain/stream gauge network across the North Central Texas region (for use by cities, counties, water districts, NWS, USACE, USGS, TWDB, etc.). In addition, the software should be expandible for utilization by TXShare member entities throughout the United States.

TriLynx Systems, LLC (TriLynx) develops and maintains the NovaStar software solution, which provides real-time environmental data collection, monitoring, and notification, with a focus on flood warning systems. We are proposing the NovaStar system as the primary OTS technology solution for this proposal. The NovaStar system provides extensive functionality, including map displays and information dashboards, interoperability with third party data providers and consumers, and is targeted to the flood warning community. Monitoring rain/stream gauge networks including dams and low-water crossings is often a component of flood warning systems in Texas and the NovaStar software has been in use for more than two decades across the United States (including Texas, City of Dallas, Hays County, Jefferson County, and the City of San Marcos) for regional flood monitoring applications.

The NovaStar system meets all the Software Platform Requirements listed below:

a. Is an existing off-the-shelf (OTS) product that is configurable to serve multiple customers.
b. Is available for use within 3 (three) months of execution of the contract, including applicable training.
c. Includes cloud-based data availability.
d. Provides access to a dedicated software support staff that is available 24/7 to provide troubleshooting and diagnostics of software.
e. Is provided with formal system testing procedures.
f. Includes system diagnostics and evaluation options for hardware, including battery level, etc., are built into the software.
g. Capability includes data that is protected on a recoverable back-up system that includes all history collected on a virtual server.
h. Includes the ability to perform automatic application updates (standard product releases).
i. Includes a web accessible user interface (login portals). The maintenance of this website will be the responsibility of the awarded respondent.
j. Includes the capability to interact with environmental hardware, such as rain gauges and water level sensors.
k. Is compatible with all versions of commonly used internet browsers (Microsoft Edge, Mozilla Firefox, Google Chrome, Safari, etc.).
l. Includes mobile phone accessible data that supports all major mobile operating systems (iOS, Android, etc.).
m. Includes data migration from other databases (import historical data collected through other software).
n. Imports data from external websites and GIS sources, including National Weather Service, US Geological Service, and local data.
o. Supports ingestion of camera feeds; use of cloud-based servers.
p. Is capable of ingesting data from and delivering data to NEXRAD and CASA.
q. Supports redundant communication capabilities both for data input and customer access (radio, satellite, land lines, etc.)

r. Supports the control of external devices such as warning lights, automated barricades, sirens, etc., with the ability to manually manipulate them for testing purposes.
s. Data can be made publicly accessible in real time (all data accessible to the public should contain a disclaimer that the data is raw and should be used at their own risk).
t. Data can be reported to the National Weather Service (NWS) and tied to the hydrologic radio frequency shared data system.
u. Ingests data from stations communicating using Automated Local Evaluation in Real Time (ALERT) and/or ALERT2 and other 2-way protocols. System does process all protocols.
v. Exports data to CSV, SHEF, API and other common formats.
w. Data is compatible for use with ArcGIS. Includes integration with local ArcGIS data and can upload to ArcGIS.
x. Provides an interactive and real-time map view of all monitored sites and sensors, with predefined user views configurable to individual needs.
y. Generates alerts based upon evaluation against user-defined trigger events to specified staff such as emergency responders, public information officers, etc.
z. Is designed for all data to be exported and transferable to other databases and systems in the future, with ownership rights of all regional data retained by NCTCOG.

TriLynx provides software training using a variety of options and delivery methods from virtual to on-site certification training. All training is delivered with extensive user documentation. All on-line system resources, documentation, and training materials are organized in a system dashboard landing page to facilitate access by authorized personnel. Training is provided by senior staff led by Markus Ritsch, P.E., who is a member of the ALERT Users Group, National Hydrologic Warning Council and the ALERT2 Technical Working Group.

Tab B – Executive Summary

The NovaStar system from TriLynx is proposed as the primary technology solution for this project and is described further in the technical approach and project examples. Technologies included in NovaStar were originally developed by the National Weather Service (NWS) in the 1990's for flood warning, using legacy ALERT (Automated Local Evaluation in Real-Time) radio transmissions to collect data in real-time from remote locations. NovaStar has been enhanced over time and now supports the ALERT2 protocol, satellite, cellular, two-way ALERT2, Supervisory Control and Data Acquisition (SCADA) and various internet data protocols including United States Geological Survey (USGS), NWS, National Oceanic and Atmospheric Administration (NOAA), State Water Agencies, and other data sources and protocols.

A wide variety of data collection station hardware is supported, using push or pull of data in standard communication protocols and data formats. NovaStar runs on Debian Linux servers with a PostgreSQL database and can be installed on-site using dedicated or virtual hardware or in the cloud. Debian is used because of its focus on stability and performance for critical operations. For example, the City of Dallas NovaStar system runs two local virtualized servers for data collection system redundancy and an Amazon Cloud server for interagency and public data access. The NovaStar web platform provides maps and dashboards for data visualization and management of historical data through the Operator Interface and Data Explorer web applications. Web services provide data to applications and provide an API for public data access.

The NovaStar system is implemented throughout the US in various configurations that meet the requirements of customers, including on-premises installations, cloud-hosted implementations, and combinations. TriLynx Systems has implemented NovaStar for small and large communities, counties, regional collections of communities and counties, specific government agencies and facilities, and private industry. The TriLynx Systems support staff proactively monitors all systems and works with our customers to ensure uninterrupted operations during events. TriLynx does not sell hardware and collaboratively works with system integrators and hardware vendors to support various equipment. TriLynx staff can also enhance the system by adding additional integrations as needed.

In addition to supporting flood monitoring and warning operations, NovaStar is often implemented to support other operations, including providing information for water supply operations, environmental monitoring, wildfire recovery, water quality monitoring, extreme weather monitoring, and other data collection. TriLynx develops general tools including spatial data and time series analysis tools to implement workflows and create information products for decisions. An investment in NovaStar provides data and information infrastructure that can support multiple organizational outcomes.

We are certain that the OTS NovaStar system will provide all the necessary functionality and will meet all major requirements of the solicitation with no exceptions. TriLynx Systems provide quality products and services and responsive and effective support.

Tab C – Key Personnel

TriLynx Systems (TriLynx, https://trilynx.systems) was founded in 2015 by Markus Ritsch and Steve Malers and is located at 40504 Weld County Road 17, Severance, CO 80524, which is about eight miles east of Fort Collins. The office location was selected because it is an optimal location for radio reception for flood warning systems that are operating in Northern Colorado. TriLynx supports the flood warning mission of many governmental agencies in northern and central Colorado and uses this as an opportunity to drive research and development, which benefits our customers throughout the USA and internationally.

Markus Ritsch and Steve Malers are the founding and current partners of TriLynx and for this project will oversee (manage/supervise) the effort to implement NovaStar. The TriLynx team includes software developers that can enhance the software as needed and support staff who will provide support and training to NCTCOG members and other TexasShare entities as needed.

TriLynx staff members who will be involved in the delivery of goods, services, and training under this RFP include:

- Markus Ritsch – Founding owner, Chief Operating Officer, ALERT/ALERT2 system engineering, software support, software training. (markus.ritsch@trilynx.systems, mobile: 970-443-3399)
- Steve Malers – Founding owner, Chief Technology Officer, NovaStar software lead, third party data integration, data web services. (steve.malers@trilynx.systems, mobile: 970-988-1447)
- Nathan Balliew – Software support team lead, network engineer, database optimization. (nathan.balliew@trilynx.systems, office: 970-818-7761)
- Jason Puccetti – Software support, integration support and software training. (jason.puccetti@trilynx.systems, office: 970-818-7761)
- Catherine Lane – Software developer for the Administrator and Operator web applications. (catherine.lane@trilynx.systems, office: 970-818-7761)
- Elizabeth Mahon – Software developer for the core NovaStar data collection and data management system, web services, Systems Dashboard, GIS integration. (elizabeth.mahon@trilynx.systems, office: 970-818-7761)

Markus Ritsch, P.E., Chief Operating Officer and Principal Engineer

Markus Ritsch has over 25 years of experience conducting hydrologic studies, calibrating hydrologic models, developing rating curves and implementing flood warning data collection systems. Markus brings specific expertise in the planning, design, construction, troubleshooting and maintenance of ALERT/ALERT2 flood detection networks. He has managed the design and installation of many flood warning networks for public agencies and private sector clients in Colorado, California, Arizona, Texas, New Mexico, Nevada, and Kansas as well as internationally in St. Lucia, Peru, Guatemala, and Panama.

Markus's strong background in hydrology allows him to design and install flood warning systems that are robust and maintainable over the long term, that collect and transmit reliable, accurate weather, rain, and stage data. Mr. Ritsch is actively involved and provides technical direction and supervision of every phase of TriLynx's work.

Steve Malers, Chief Technology Officer

Steve Malers has over 30 years of experience developing information technologies for water, including hydrologic data management and modeling, flood warning, and data analysis. Prior to founding TriLynx, Steve worked in consulting to implement hydrologic forecasting systems for the NWS and large entities including Tennessee Valley Authority and Bonneville Power Authority. Steve also led the effort to implement Colorado's Decision Support Systems (https://cdss.colorado.gov/). Steve also founded and is CTO of the Open Water Foundation (https://openwaterfoundation.org), which provides open-source software and open data solutions to make better decisions about water. The Open Water Foundation provides open-source software that is leveraged by TriLynx.

At TriLynx, Steve leads the NovaStar software product team. He focuses on product features, user experience, quality control, and operational efficiency, including automated testing, product builds, and integration. Steve directs other team members to perform product development and support activities. Steve combines his knowledge of water and software engineering to ensure that NovaStar provides needed features and performance for TriLynx customers.

TriLynx Team Approach

All work will be managed by Markus Ritsch and Steve Malers. Markus will prepare quotes, contracts, general scopes of work, invoices, and conduct end user training. Steve will scope and manage software work and oversee any development and integration.

TriLynx support staff (Nathan Balliew and Jason Puccetti) are available to answer phone calls and email during normal office hours, Monday through Friday, 8:00 AM through 5:00 PM. After normal working hours and on the weekend, the TriLynx phone support line number is configured to ring the staff member assigned to handle support during the off hours. If that individual is on the line or not available, the phone will ring Markus Ritsch who will take all support calls and route them to appropriate technical staff.

Catherine and Elizabeth will perform technical software development on all aspects of the NovaStar product line including core functionality and user interfaces. Catherine will deliver end user training on the Operator and Administrator Interfaces.

TriLynx uses a cloud-hosted "System Dashboard" to provide contact information, links to system components, and information products for planning and operations. This dashboard will be available to TriLynx and NCTCOG staff.

Subcontractors

No subcontractors or third-party services are envisioned to provide products and services mentioned in the RFP. Note that TriLynx is not proposing to provide or support flood warning system hardware because these services are often provided by integrators or other companies. If subcontractors are required, TriLynx will obtain approval from the contracting entity.

Tab D – Technical Proposal

TriLynx develops and maintains the NovaStar software platform, which provides real-time environmental data collection, monitoring, and notification. The NovaStar system provides extensive functionality, including map displays and dashboards, and is targeted to the flood warning community.

Monitoring dams and low water crossings is often a component of flood warning systems in Texas, and TriLynx has expertise using NovaStar to monitor dams, low water crossings and to provide two-way control of roadway flashers using the ALERT2 protocol. The NovaStar system from TriLynx is proposed as the primary technology solution. The following section describes the project approach using subsections described in the RFP.

The following sections respond to the specific questions in the RFP.

Proposal Item #1: Early Warning Flood Software and Training Services

A. Software Platform Requirements

The following requirements are from the RFP Proposal Item #1, Section B, with letters used instead of bullets to facilitate cross-referencing the requirements. Examples with images are shown after the list to illustrate NovaStar features. **The NovaStar system meets all requirements.**

a. **Should be a modified version of an existing off-the-shelf (OTS) product that is configurable to serve multiple customers**. NovaStar is a commercial off-the-shelf software flood warning system that is a proven solution. NovaStar is implemented in many areas throughout the United States, including Texas, that have complex geographic, hydrologic, and operational conditions. NovaStar can serve multiple customers using various configuration options, including user groups and naming conventions that indicate each customer's stations. Systems have also been implemented where each customer has a node for redundancy, with shared cost.

b. **Must be produced and available for use within 3 (three) months of execution of the contract, including applicable training.** NovaStar is a mature product and is available for immediate implementation. TriLynx can quickly provision cloud Debian Linux servers or work with organizations to implement on-premises physical or virtual servers. Deployment includes all required training, on-site or cloud based.

c. **Must include cloud-based data availability**. NovaStar can be deployed locally on a physical or virtualized server within the customer's network, or it can be deployed as a cloud-based solution. Most of our cloud-hosted implementations run on Amazon Web Services (AWS) or Google Cloud Platform (GCP) environments, and Microsoft Azure and other environments are also options.

d. **Must provide access to a dedicated software support staff that is available 24/7 to provide troubleshooting and diagnostics of software**. TriLynx support staff are always available during normal business hours (Monday-Friday/8AM-5PM Mountain time zone). During non-business hours, a dedicated support line is available that rings to support staff assigned to off-hour support. Issues are managed using a trouble ticketing system and are allocated to support staff that are assigned to the system. TriLynx elevates monitoring and support for systems when weather conditions are critical.

e. **Must be provided with formal system testing procedures**. All NovaStar system software is developed and tested using automated unit and end-to-end tests, with tests run prior to software release. Tests are maintained in Bitbucket repositories. Tests are run on general datasets and databases. As appropriate, customer databases can be used to run tests and for troubleshooting.

Although tests are not typically provided with deployed systems, access to the repositories can be provided if requested.

f. **System diagnostics and evaluation options for hardware, including battery level, etc., must be built into the software.** Software programs typically create log files and provide elevated debug levels that can be used for troubleshooting. System diagnostics and station/data performance evaluation functions available through NovaStar and the "Systems Dashboard" include the following:

- Battery levels for all stations reporting battery voltage with user defined alarms when battery voltage drops.
- ALERT2 GPS synchronization with user defined alarms when GPS station clock drifts after synchronization and when no time sync is available on transmitter power up.
- Station performance metrics for non-rain timer reporting performance and event-based reporting performance. These metrics are automatically accessible from each customer "System Dashboard".
- ALERT2 APDUID performance metrics.
- Radio telemetry analysis showing the base station reception of data from each station through the radio repeater backbone. This analysis is convenient to understand the radio path for each station and to confirm/refine radio repeater pass listing.
- ALERT2 Time Division Multiple Access (TDMA) slot reporting metrics. This analysis shows each station and how accurately it reports on its assigned TDMA slot.
- Base station computer server real-time performance monitoring of CPU usage, memory and diskspace. This is accomplished by the installation of a third-party Zabbix client application agent that monitors server hardware and reports to a cloud-hosted database for monitoring and notification.

NovaStar flags every data value to indicate whether the value is valid or questionable, and the determination may change over time as more data are received. Range limits, rate of change and sequential data report checks can be set to mark clearly erroneous data. Modern data collection systems tend to produce higher quality data than older systems. Once the hardware used at each dam is understood, TriLynx staff can suggest/implement further data quality improvements at the remote stations. NovaStar will be configured to issue alarms for low batteries and failed communications.

All data, valid and questioned, will remain resident in the NovaStar system. Data displays through the Operator will show only data flagged as valid. Questioned data residing in the database are available to support troubleshooting. NovaStar also provides interactive features to edit data.

g. **Capability must include data that is protected on a recoverable back-up system that includes all history collected on a virtual server**. TriLynx provides automated daily backups of the NovaStar database and related system files. These backups are automatically saved to the TriLynx cloud storage system on AWS and are available to download if needed. Daily backups are maintained indefinitely, with periodic culling. TriLynx also works with customers to implement on-site backups for redundancy. Data values within the database are typically not removed but may be flagged as questionable, and can be reviewed later and marked as valid, "maintenance", etc.

h. **Must have the ability to perform automatic application updates (standard product releases)**. NovaStar product releases and updates occur annually (or more often as necessary) and are

performed by TriLynx staff. Software has a version and release notes. The update procedure is automated but does not occur unattended due to complexity of system integrations and the need to maintain operational uptime. Updates are typically performed during the dry (or winter) season. NovaStar servers are typically configured to perform automatic operating system updates, including security updates. Network configurations can complicate automated updates if communications are blocked.

i. **Must include a web accessible user interface (login portals). The maintenance of this website will be the responsibility of the awarded respondent.** NovaStar includes the Administrator web application, which provides features to view and edit database contents, and is typically used by a few people in an organization. The NovaStar Operator web application provides read-only data views and is used by emergency managers and other staff, and the public. Both applications provide a default guest login for view only access, and role-based logins for advanced functionality and control over data displays. TriLynx maintains the web application software and configurations for each system, with access to web applications from the systems dashboard.

j. **Must have the capability to interact with environmental hardware, such as rain gauges and water level sensors.** The NovaStar database includes configurations for stations and sensors for rain, water level, and many other data types. The configuration controls how data are ingested and viewed. Web applications provide interactive displays for interacting with data, including selecting data layers for map interfaces, and views for time series data. Two-way communication with stations depends on available hardware (see question 'u'). Communication with hardware occurs using software specific to the hardware, such as station-configuration software used on field laptops.

k. **Must be compatible with all versions of commonly used internet browsers (Microsoft Edge, Mozilla Firefox, Google Chrome, Safari, etc.).** NovaStar web applications are compatible with commonly used internet browsers.

l. **Must include mobile phone accessible data that supports all major mobile operating systems (iOS, Android, etc.).** Both the NovaStar Administrator and Operator web applications are accessible from a mobile phone or tablet and support commonly used internet browsers. The applications are implemented as web applications, not phone apps.

m. **Must ensure effective data migration data migration (import historical data collected through other software).** The NovaStar database includes tables for various data including stations, sensors, calibrations, rating tables, time series data, and other data. Tools are available to automate data import from other software, including loading historical data. The import process will execute data quality checks and can optionally generate alarms to flag events.

n. **Imports data from external websites and GIS sources, including National Weather Service, US Geological Service, and local data.** NovaStar can import data from external websites including GIS sources, NWS, USGS, local data such as State water agencies, and other sources. General data formats are supported and other formats can be added if necessary. Workflows can be configured to process data.

o. **Must support ingestion of camera feeds; use of cloud-based servers**. Camera feeds are supported and viewable in the Operator Interface. These feeds can be from local camera systems or from cloud-based servers.

p. **Must be capable of ingesting data from and delivering data to NEXRAD and CASA**. NovaStar web applications can display radar static images and loops to inform decisions. NovaStar can export data

in SHEF and other formats for use in ground-truthing radar. NovaStar can integrate with GIS applications that process radar data, for example to calculate basin precipitation estimates.

q. **Must provide redundant communication capabilities both for data input and customer access (radio, satellite, land lines, etc.).** Multiple, redundant communications are supported for data input that include VHF radio (ALERT/ALERT2), satellite, cellular communications, and internet. Redundant data collection can be configured on multiple communication paths and servers to ensure that data are available for decisions.

r. **Must have the ability to control external devices such as warning lights, automated barricades, sirens, etc., with the ability to manually manipulate them for testing purposes.** See answer 'u'. NovaStar can send control messages to devices including warning lights, automated barricades, sirens, etc. The communication approach depends on the capabilities of the hardware and approach taken. Control can be tested by manually sending commands via the NovaStar Administrator and command line tools. Control of devices has been implemented for the City of Dallas and Hays County, TX.

s. **Data should be made publicly accessible in real time (all data accessible to the public should contain a disclaimer that the data is raw and should be used at their own risk).** NovaStar provides features to export data to publish data using a "push" approach. The REST data web services API allows data to be "pulled". Latency of data access is balanced with system load using automated processes and caching. Multiple options are available to customize terms of use for public data. Web applications can also display a disclaimer and terms of use.

t. **Data must be reported to the National Weather Service (NWS) and tied to the hydrologic radio frequency shared data system.** NovaStar can export SHEF and other data formats. The data can be delivered to the NWS, NOAA, and other third parties to integrate with weather and hydrologic forecasting. As with any ALERT system, all data are made available to the NWS and is available through the hydrologic radio frequency as governed by federal radio frequency coordination and Federal Communications Commission.

u. **Data to be communicated using Automated Local Evaluation in Real Time (ALERT) and/or ALERT2 and other 2-way protocols. System must be able to process all protocols.** NovaStar ingests data from ALERT, ALERT2, and other protocols. NovaStar supports sensor inputs for rainfall, water level, weather sensors, flow meters, control devices (sirens, roadway flashers, gates), and other data types. Two-way ALERT2 protocol is supported to control flashers, gates, and other hardware. NovaStar can also integrate with other two-way communication hardware. NovaStar is compatible with the major ALERT/ALERT2 environmental hardware manufacturers including: HydroLynx Systems, Inc., High Sierra Electronics, Cambell Scientific, and Blue Water Designs. NovaStar supports "high data rate" ALERT2 protocol.

v. **Data must be exportable to CSV, SHEF, API and other common formats.** NovaStar includes built-in functionality to export data to third-party applications in SHEF, CSV, and other formats. Data exports can be run on a schedule to "push" data to websites or other systems. The NovaStar REST API also publishes data in various formats to allow "pull" of data. NovaStar includes tools to implement automated workflows to manipulate data and process into various formats. Additional formats can be added if required.

w. **Data must be compatible for use with ArcGIS. Includes integration with local ArcGIS data and can upload to ArcGIS.** NovaStar data can be published as GeoJSON and other formats for use with ArcGIS using the REST Data Web Services API. NovaStar Operator, Administrator, and other

mapping applications can consume ArcGIS data layers for displays. Tools are also available to implement automated workflows to process spatial data. The NovaStar database uses PostgreSQL PostGIS to support spatial data queries.

x. **Must be capable of providing an interactive and real-time map view of all monitored sites and sensors, with predefined user views configurable to individual needs.** NovaStar provides the Administrator web application, which focuses on data views to help flood warning system administrators, including real-time maps and dashboards that are used to monitor system performance. The Operator web application provides real-time maps and dashboards to provide situational awareness to support emergency managers and the public. These applications provide extensive built-in functionality that is available "out of the box" and provide user-configurable dashboards. Examples are provided below.

y. **Must generate alerts based upon evaluation against user-defined trigger events to specified staff such as emergency responders, public information officers, etc.** NovaStar allows defining user-configurable alarm triggers that are compared to real-time sensor measurements and generated values. Alarms can be defined on any time series and include monitoring for extreme values, rate of change over a time, missing data reports, and other conditions. Alarm triggers can be configured to generate notifications for specified staff via email and texts to cell phones and can optionally be posted to social media. Alarms result in indicators on web application maps, and station dashboard graphs.

z. **Is designed for all data to be exported and transferable to other databases and systems in the future, with ownership rights of all regional data retained by NCTCOG**. The NovaStar database data can be exported in various formats to transfer data to other systems, using built-in programs, web service API, workflow automation tools, SQL, etc. Database backups are created every day and can be restored on a PostgreSQL database server. TriLynx also uses tools that can transfer data between database technologies in bulk and compare results. TriLynx and NovaStar do not maintain ownership of the data collected. All ownership rights of all regional data will be retained by NCTCOG.

NovaStar Web Applications

For each customer system, TriLynx creates and maintains a "System Dashboard" (Figure 1) that functions as a central landing page for all information related to the data collection system including links to NovaStar operational interfaces, network information, hardware information, points of contact (Trilynx and customer), training materials, frequently asked questions, billing information, database and data file system backups, information products, and other resources. See the following figure for the system dashboard for the City of Dallas.

Figure 1. City of Dallas Systems Dashboard.

All operational interfaces are web-accessible through password protected URLs. TriLynx will manage and maintain user access profiles for each customer.

Three primary interactive web applications are available for NovaStar systems. The Administrator Interface (Figure 2) is used to configure the system and is typically used by a select few personnel with administrative privileges (and TriLynx staff). The Operator Interface () provides situational awareness during events and is used by emergency managers and anyone interested in conditions, including the public. The customer may designate different staff with access to one or both interfaces. TriLynx also provides the Data Explorer, which provides tools to view and download historical data, suitable for general data access.

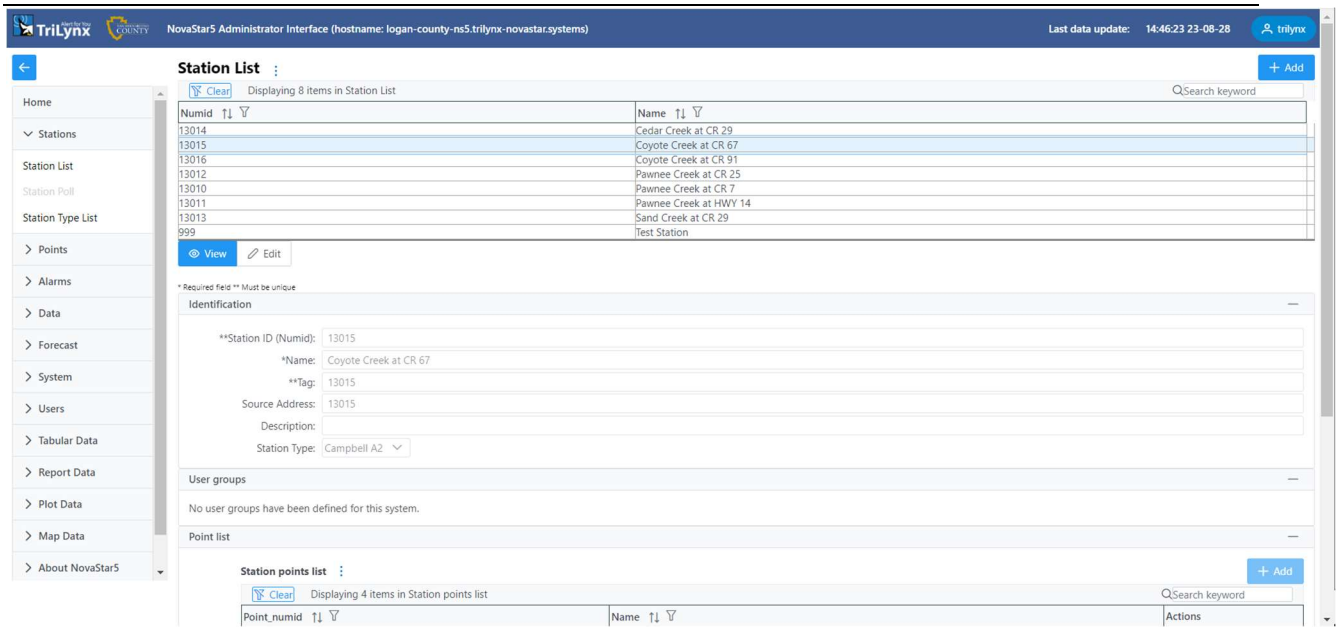

Figure 2. Administrator Interface

The Administrator is typically used in private networks to configure NovaStar data. The following figure illustrates the station list display, which is used to add and configure stations.

The primary interface providing situational awareness is the Operator Interface which is a real-time map-based view of all monitored sites and sensors with predefined dashboards for each station.

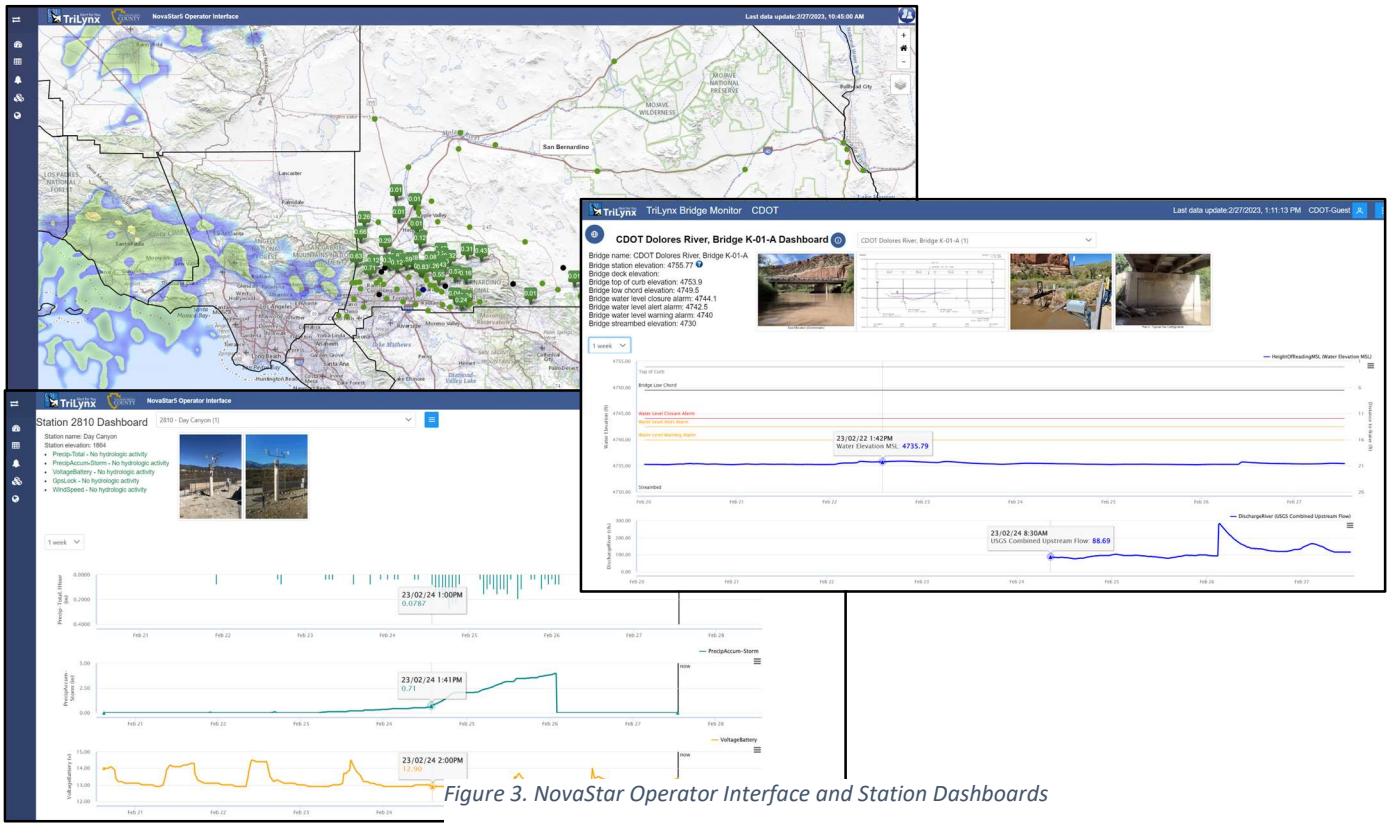

Figure 3. NovaStar Operator Interface and Station Dashboards

The following image (Figure 4) illustrates how the Operator can show precipitation radar as static image or a loop. The application can be configured to include map layers that are suitable for the system, including wildfire burn areas, floodplain basins, FEMA flood map zones, local data layers, and other layers. A hover feature is provided to show a summary of station information. Clicking on a station shows the station dashboard with time series graphs, as shown in the above figure. The "out of the box" Operator dashboards are often suitable for basic data displays. However, because the NCTCOG system contains multiple locations, it may be desirable to create custom dashboards. This can be accomplished in the Operator by TriLynx or NCTCOG staff.

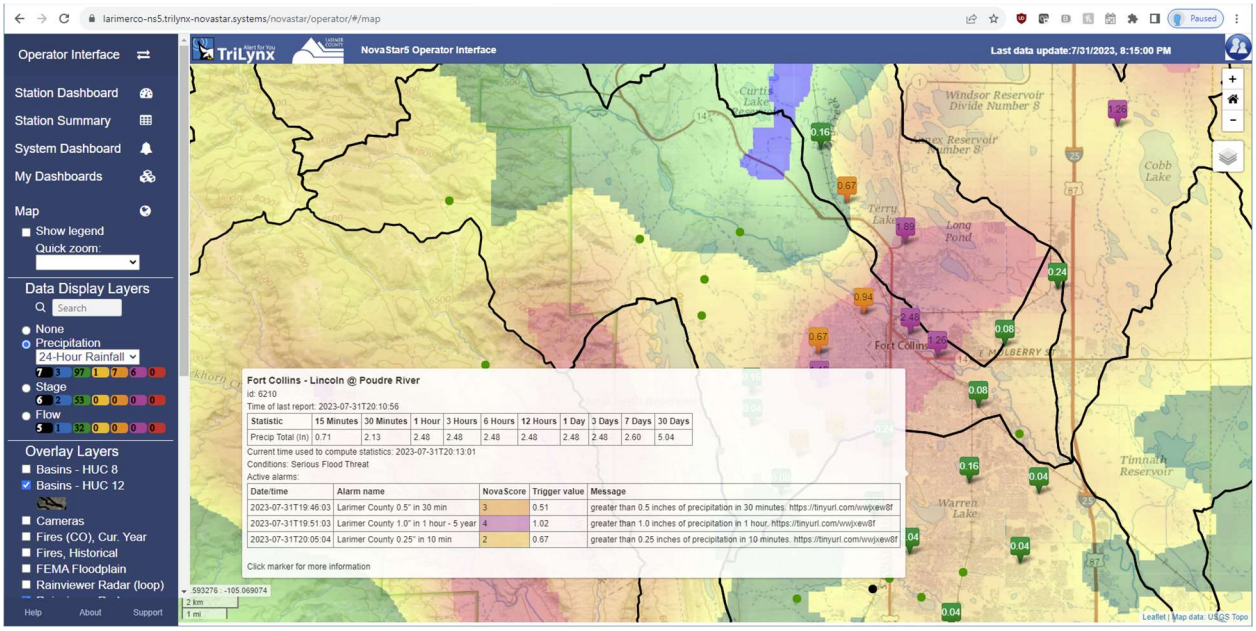

Figure 4. NovaStar Operator Interface Showing Radar Rainfall and Station Precipitation

NovaStar includes REST data web services to access various data including station properties and time series data. Web services provide various formats including CSV, JSON, and GeoJSON for maps. The Operator web application uses web services to provide maps, dashboards, and other displays. Data web services can also be used to feed data to alternative technologies, such as Esri ArcGIS Online and custom applications. TriLynx has several clients that use Esri dashboards. The TSTool software mentioned in the response to "Proposal Item #3, Additional Related Services" below provides features to automate workflows to process NovaStar data using web services. The final design for any NCTCOG system may include multiple tools to provide redundancy and potentially private and public data access.

The Data Explorer web application obtains data from the NovaStar database using data web services presenting the user with a list of available time series that can be downloaded. The Data explorer is suitable for applications that need large data downloads, such as researchers and modelers. Filters are provided to aid the user in selecting the desired station and the resulting statistical out for any time series. For example, the Data Explorer can generate time series information for a desired interval (e.g., 5 minutes up to 24 hour of a day) and for any desired statistic (mean daily values, period totals, min/max values for any period, etc.). Once the desired station time series are selected, the Data Explorer can output data in a variety of formats conducive for third-party analyses.

The combination of data web services, interactive web applications, and third-party tool integration provides a suite of tools that can provide effective flood warning system information products for emergency management while also supporting other uses.

B. Software Security Requirements

This section corresponds to Proposal Item #1, Section B of the RFP.

ALERT/ALERT2 flood warning systems are implemented using stations that transmit data via radio, satellite, or cellular modem, radio repeaters that resend data, and radio receivers/decoders that decode data for ingestion into base station software such as NovaStar. In a region, it is possible that one flood warning systems' stations can be received by neighboring flood warning system base stations, and base stations can export/import data to share with each other. This flexibility allows neighboring systems to provide a level of redundancy and cost-distribution.

Security in NovaStar flood warning systems mainly involves hardening servers because many stations are typically broadcast-only. Stations that can receive and transmit data can also be locked down, depending on the capabilities of hardware manufacturers and communication protocols.

NovaStar systems are typically implemented using servers in one of the following three configurations:

- Private network on-site server(s), which may be physical or virtual.
- Cloud-hosted virtual server(s).
- Combination of the above, for example on-site virtualized data collection server, cloud-hosted virtualized data collection server for redundancy, and a cloud-hosted data node to publish data.

A system with only one server means that maintenance on the system will result in a period of down-time, and there will be no redundancy. Maintenance is typically performed during the dry season. Relying on cloud-hosted and virtualized systems can provide increased reliability, flexibility, and the ability to restore snapshots. However, every system has specific information technology (IT) and security considerations.

Because of the variety of constraints encountered with NovaStar systems and because many systems have been in place for a long period, TriLynx has not attempted to receive third party certification from any of the formal standards mentioned in the RFP (Texas CSF, FedRAMP, etc.). However, TriLynx has implemented protocols consistent with certifications and is willing to pursue a specific certification if required by our clients.

NovaStar systems do not involve any personal or financial data other than login credentials to access flood warning system data (rain, water levels, etc.). Security concerns are typically related to denial-of-service attacks and compromise of NovaStar web applications, which might lead to other access and malfeasance. Consequently, TriLynx focuses security measures on features that interface with the public internet.

NovaStar flood warning systems require an annual license fee, which funds a base level of research and development and annual software updates. Implementing specific security measures beyond the base level as required for a specific system may require payment through the hourly support plan. TriLynx dedicates support staff to each system. To minimize costs, staff utilize automated monitoring rather

than frequent manual checks. NovaStar systems, when performing well, run unattended and do not require manual intervention.

The following address the items mentioned in the RFP.

a. **Cybersecurity strategy and governance** – TriLynx implements cybersecurity measures at application, subsystem, and system level, based on the technologies that are involved in a solution. Overarching themes including encryption and multi-factor authentication (MFA). User roles and permissions are considered in each product. For example, the NovaStar Administrator web application is used by a few users to edit and configure the database and is typically only used in private networks and for authenticated users. The NovaStar Operator web application provides read-only data viewing capabilities and may be available on the public internet. Database server applications adhere to PostgreSQL database authentication conventions. Subsystems like the core data collection system involve a collection of applications and services. Security is handled at the software installation step by checking important system settings. At a system level, TriLynx minimizes access points and uses non-privileged accounts to publish data. Every software developer and support person is aware of and helps address security issues.
b. **Risk management framework** – TriLynx generally implements the components of the NIST Risk Management Framework (RMF), with examples summarized below:
    i. **Prepare** – Application, subsystem, and system assets, and roles related to security are identified. For example, service accounts with appropriate levels of access are identified for specific tasks and data. Operating system and software configurations are identified and are implemented in installation and monitoring programs. TriLynx uses Zabbix and other software to monitor systems, including security parameters.
    ii. **Categorize** – Concerns about security are primarily related to impacts on the performance and accuracy of the flood warning system, including timeliness and accuracy of information used by emergency managers. System information is documented in the system information page of the system dashboard that is available for each system. The system dashboard also provides access to monitoring information for system performance and security information.
    iii. **Select** – Controls necessary to protect the system include, for example, general operating system configuration (e.g., only enable network access that is needed), configuration of network-facing components (e.g., firewall restrictions), and authentication. Known operating system vulnerabilities are disabled.
    iv. **Implementation** – One-time settings are configured during system setup using automated system configuration tools. Tools are also implemented to check the configurations and are run on a schedule. The Zabbix monitoring software checks security settings and allows TriLynx staff to monitor all systems on a unified dashboard. TriLynx is also using AWS Security Hub features to check and monitor security of cloud-hosted servers.
    v. **Assess** – Because flood warning systems are real-time systems, TriLynx regularly evaluates system performance. We work to optimize performance by evaluating performance trends and specific events. Security events impacting NovaStar, client systems, and the internet are taken into consideration to improve protocols.

vi. **Authorize** – Security issues are discussed during daily check-ins and focused work sessions. Options are discussed among the team, recommendations are made, and implementation is agreed to by the team, including the team lead.

vii. **Monitor** – Zabbix monitoring and other scheduled security checks are implemented to monitor security and performance. TriLynx also periodically responds to audits performed by our clients, which point out issues specific to a system's implementation.

c. **3rd-party/Supply Chain risk management** – TriLynx relies on hardware and communication protocols developed by industry partners. We are involved in groups including the ALERT Users Group, which is implementing additional security protocols in flood warning systems. Most data collaborators now use HTTPS protocol for public web services or will do so soon. The NovaStar system uses open-source software including Linux operating system, PostgreSQL database, Angular web application framework, and other software. Each software application (and dependencies) has ongoing development programs that address security issues. We attempt to keep software current by responding to known security issues and updating software components accordingly.

d. **3rd-Party penetration testing, including frequency** – Because NovaStar systems often involve integration with customer systems, we coordinate with IT departments to leverage their penetration testing and security audits. Care is taken to focus on firewall rules and other core security measures.

e. **Data security** – NovaStar data are primarily scientific in nature and reflect physical conditions (precipitation, water level, etc.). User information is restricted to basic authentication and contact information for support. Data are often publicly accessible via web services or other applications and therefore the values do not need to be encrypted. Databases in data collection systems are secured behind firewalls. Data accessed on public websites is encrypted using HTTPS.

f. **Encryption in transit and at rest** – See the previous answer. Encryption in transit is implemented using HTTPS and encrypted database connections. Encryption at rest is typically not a requirement, other than for authentication data. TriLynx support staff use SSH to access systems to provide support.

g. **Data access by support personnel** – Each system that is implemented and supported by TriLynx staff has an account that is used by TriLynx staff. Access to cloud servers is typically more convenient for TriLynx staff. Access to servers behind private firewalls involves the protocols implemented for the system.

h. **Personnel screening** – TriLynx has low staff turnover. Staff are screened before hiring. Staff adhere to additional screening and training for each system, as required. Staff typically do not have access to client systems containing personal or financial data.

i. **Physical security** – TriLynx owns its physical office facilities and employees are given keys. Employees agree to the employee manual, which stipulates the use of equipment. NovaStar operational systems are hosted on premises for client systems (typically in a data center or emergency operations center) or in the cloud and staff access those systems using agreed upon protocols including multi-factor authentication (MFA). Access to cloud-hosted servers is controlled by Amazon and other providers.

j. **Software development life cycle security** – Software code and other electronic assets are maintained in Atlassian Bitbucket, with authentication imposed by Bitbucket. Only TriLynx staff

and verified collaborators have access to code via Bitbucket authentication. Staff develop software on assigned computers that are dedicated to TriLynx project work.

k. **Network access controls** – Cloud servers have strict controls including only enabling HTTP and HTTPS ports for general traffic, and specific ports and whitelisted hosts for specific applications. HTTP always redirects to HTTPS. SSH is restricted to requiring keys (passwords are not allowed so brute force password attacks are ineffective). Servers that are within a private network adhere to additional constraints for those systems and TriLynx may also install a firewall to implement additional restrictions.

l. **Privileged level access controls** – Public facing resources require appropriate authentication to gain access to web applications. A default guest read-only level is used for general read-only data publishing. Authenticated logins are used to control access to specific dashboards, map configurations, etc. Internal applications that are run within private networks as part of data collection systems use additional levels of access to allow editing NovaStar configuration data. Only a small number of people are given administrative privileges.

m. **Disaster recovery and business continuity** – The NovaStar database and important files are backed up daily to an AWS S3 bucket for each system. Backups are retained for a period and then are culled to retain period copies. Many systems implement redundant servers that ensure system operations in case one of the NovaStar nodes fail and new servers can be built from the redundant servers. Custom programs and other files are also saved in system specific Bitbucket repositories that are updated when system maintenance or project work occurs. TriLynx also encourages our clients to make local copies of database backups and other files. TriLynx backs up its organization files to cloud servers.

n. **Software Development Framework** – TriLynx uses an agile approach with daily check-ins that involve developer and support staff. TriLynx uses the Atlassian suite for software development, including version control and support issue management.

C. Software Training Requirements

TriLynx can provide training using a variety of options and methods to sufficiently accommodate different entity needs, including, but not limited to:

- Specific training targeted to different user levels that includes options for initial training, as-needed, and refresher training to ensure effective use of the software.
- NovaStar is provided with online user manuals.
- TriLynx provides a “System Dashboard” with access to training materials including video and slides of any custom training provided to NCTCOG users.
- TriLynx can provide training using various methods (i.e., step-by-step manual, online platform, in-person, on-demand video, etc.).
- Certification level training can be provided that ensures that sufficient instruction has been completed for an entity to assume technical and functional responsibilities for executing program responsibilities with the new flood warning software.

All training will be led by or provided under the direction of Markus Ritsch. Markus is a licensed civil engineer who has been working in the flood warning industry for more than 25 years and has provided training on flood warning system design, the ALERT/ALERT2 protocol and on NovaStar for more than 15

years. Markus was awarded an Outstanding Service Award by the ALERT Users Group in 2018 for his work in the flood warning community.

Proposal Item #2: Flood Monitoring Hardware and Hardware Maintenance Services

TriLynx does not manufacture flood monitoring hardware nor does TriLynx provide hardware maintenance services. The TriLynx NovaStar system is hardware-agnostic and integrates with hardware and data from multiple vendors. TriLynx works with system integrators and hardware providers based on the requirements and parameters of specific projects.

Proposal Item #3: Additional Related Services

The project provides opportunities for innovation including determining how to minimize costs and maximize benefits to the NCTCOG. TriLynx has experience with various technologies including databases, web services, and tools, which will allow innovation to be evaluated by the NCTCOG and its constituents. For example, TriLynx can help systems evaluate performance, monitoring latency, quality control, and effectiveness of notifications and visualizations.

Specific examples of innovation and additional products and services are listed below. TriLynx can provide feedback on whether we can assist NCTCOG with products and services that are not mentioned.

TriLynx Commitment to Open Innovation and Collaboration

TriLynx is a small business and we pride ourselves on providing quality products and services and developing durable relationships with our customers. Our goal is to grow at a rate that is sustainable while providing a high level of support and enhancing NovaStar products to meet the increasingly challenging needs of our customers. We strive for transparency and want our customers to understand our software and business model so that they can provide feedback and identify new opportunities to leverage NovaStar and collaborate on solutions. Our goal is not to sell any specific hardware or system configuration. We work with our clients and our partners to evaluate and provide the best options for each system. The investment in a NovaStar system returns its value many times.

TriLynx is based in Colorado, with NovaStar implementations throughout the USA and internationally. Although we work with many issues (e.g., snow monitoring in Colorado, water quality monitoring for agriculture and urban areas, extreme weather due to hurricanes and atmospheric rivers), we have a particular appreciation of the issues faced in the Western US, including cycles of drought and floods. We do not take ownership of our customers data and feel that public access to data and education about climate, weather, and water issues is one of the major benefits to implementing NovaStar. We view the flood warning system community as key to addressing challenges that communities are facing as they grow and must provide services and safety to their citizens.

TriLynx uses an agile approach. Our core team meets daily to discuss work that has been completed and tasks for the day. Management, software developers, and support staff are each involved so that knowledge is transferred and critical issues receive priority attention. We continue to improve our awareness of system performance and response to weather and technological events.

TriLynx invests in innovation to improve operational efficiency. We recognize that all organizations are being faced with challenges including workforce development and retention, technologies, funding, security, etc. Our goal is to use general research and development investment and enhancements from specific projects to improve the NovaStar product for all our customers. There are many problems to solve and we strive to reduce barriers to solutions. Tools, datasets, workflows, and information products are shared with customers to ensure that investment and innovation are part of a virtual cycle.

Cloud Hosted Data and Information

TriLynx uses its cloud-hosted system dashboard to provide access to information products including automated workflows. Although this RFP focuses on flood warning systems, the NovaStar system and related products and services provided by TriLynx Systems can support other uses related to climate and water data and decision support. A cloud-hosted approach can simplify sharing data and information within an organization and externally. TriLynx has experience that can be leveraged to help organizations implement cloud solutions and minimize costs from various vendors that sell software as a service (SaaS) solutions with recurring costs.

Time Series Analysis and Workflow Automation Using the TSTool Software

The open source TSTool software (https://opencdss.state.co.us/opencdss/tstool/), has been developed by the Open Water Foundation (OWF) for the State of Colorado to support decision-making. TSTool provides features to automate time series processing, translate data from one format to another, and create information products. TSTool has had nearly 30 years of development and supports integration with many data formats, including those of interest to NovaStar users: Regional Climate Center Applied Climate Information System (RCC-ACIS) for climate data, United States Geological Survey (USGS) web services for water level and flow data, Natural Resources Conversation Service (NRCS) web services for snowpack and reservoir levels, and others. TSTool also can convert time series to formats used in modeling, such as for HEC-RAS, NWS streamflow forecasting software, and other models. TriLynx has created TSTool plugins for NovaStar database and web services. OWF has recently created TSTool plugins for the Kisters WISKI web services (https://software.openwaterfoundation.org/tstool-kiwis-plugin/), AWS integration, and Zabbix web services. TriLynx and OWF collaborate to develop new TSTool plugins to access data used in flood warning systems.

The TSTool software can read data from many sources and formats and convert into formats that work with NovaStar, such as ingestion into NovaStar for presentation and real-time analysis. TSTool workflows are also used to create useful information products that are uploaded to the cloud and are linked to the System Dashboard. The following example (Figure 5) illustrates the analysis of station reports to identify those that do not report regularly. Yellow/orange/red indicate periods where less data than expected is being received. Once implemented, these products are published on the Systems Dashboard and can be used to ensure system performance.

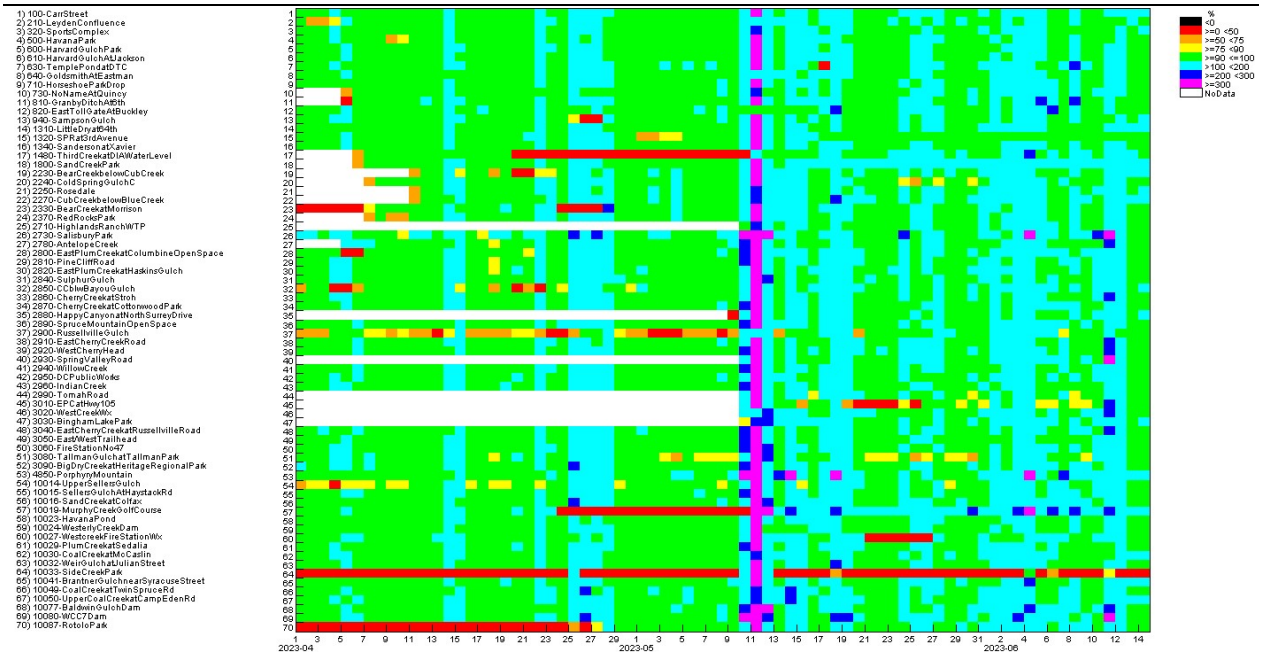

Figure 5. TSTool Software Display of Station Reporting Performance

TriLynx is using TSTool and other tools to implement automated workflows for system/station performance evaluation, quality control, and to create useful information products such as storm frequency duration intensity changes over time. One innovation that could benefit the NCTCOG would be to develop additional TSTool plugins and workflows for data systems used by NCTCOG. For example, data in other data management systems could be compared to ensure that NovaStar data that has been ingest into these systems is correct and that changes to the ALERT-based data collection system such as for stream ratings are reflected in the archival data.

Spatial Data Analysis and Workflow Automation

TriLynx can provide products and services to provide spatial data analysis tools and automate workflows. For example, TriLynx can use ArcGIS, QGIS, spatial databases, and other software to automate processing flood warning system data into information products for modeling, planning studies, policies, etc. NovaStar customers have implemented custom ArcGIS Online applications that integrate with NovaStar data web services.

Custom Database and Web Service Features

The NovaStar database can be extended to provide custom features. For example, TriLynx has been working with the Mile High Flood District in Colorado to implement a “data node” to provide optimized public access to NovaStar data. Additional database tables, views, and other features can be defined to augment the core NovaStar database features to meet the specific needs of a customer. TriLynx is happy to collaborate with organizations to extend the NovaStar database to meet specific requirements. TriLynx can also develop web services to web-enable database enhancements, which will allow others to access the data over private or public networks.

Software Development and Support Services

The NovaStar system uses multiple software technologies and programming languages. Consequently, TriLynx software developer staff are skilled with multiple development environments, version control, automated testing, etc. We support custom applications for some of our customers because they lack workforce skills or capacity to do so themselves. TriLynx can discuss whether we can develop or support existing custom applications, especially those that are related to flood warning systems.

Integration of Flood Warning System and Other Systems and Uses

Although TriLynx has attempted to develop NovaStar features that meet all expected requirements, there may be cases where NovaStar software must be enhanced to integrate with a third-party system. Or, the software may be adequate but additional training or configuration is necessary to integrate systems. TriLynx can provide services for integration and can ensure that NovaStar data are being used efficiently and effectively. For example, TriLynx has helped the City of Dallas integrate NovaStar with its SCADA system and some systems use third party time series database products such as provided by Kisters and other vendors.

TriLynx has been working to enhance the core NovaStar data collection and flood warning system to support use for multiple purposes. TriLynx staff have spoken to the staff of numerous cities and counties and recognize that the flood warning system is only a part of a larger IT ecosystem that supports operations and decisions. This ecosystem includes platforms such as Esri ArcGIS, infrastructure asset tracking, and other systems. Integration of NovaStar with these platforms will require ongoing collaboration. TriLynx can support these efforts by ensuring that NovaStar web service APIs provide needed data in suitable formats. Workflows can also be implemented to automate data processing and ensure that human resources can focus on important tasks rather than data manipulation. Integrations can be described in information products linked to the Systems Dashboard so that TriLynx and government organization staff have access to the same information. The NovaStar data is a resource that can be used to support other efforts.

TriLynx will continue to work with NCTCOG member agencies to develop open and scalable solutions to integrate NovaStar with other government systems, including APIs and automated workflows. TriLynx staff and its collaborators can help ensure that the flood warning system data integrates with GIS, modeling, and website technologies.

Data Quality Review

Flood Warning System data quality has improved as ALERT2 has been implemented. ALERT2 also generally results in a more complete dataset, for example with one-hour regular reports. Consequently, many systems are being looked at as sources of data for other uses. However, earlier historical data may be of a low quality due to issues with legacy ALERT. TriLynx can provide tools and workflows to help an organization quality control its data so that it can be used more effectively. Workflows can also be implemented to compare a system's data with neighboring flood warning systems, and other sources such as the NWS and USGS. The workflows used in the analysis can also be operationalized so that the organization's staff can use for periodic or continues data quality review.

Flood Simulations and Training Tools

The NovaStar system is a real-time monitoring system. However, data that are collected can also be used to simulate historical flood events for training and emergency management simulations. TriLynx

has helped several customers carry out simulations and can help an organization prepare and execute the flood simulation.

Process for Responding to an Order for Product

TriLynx will develop a technical scope upon request for a product. The technical scope is critical for both TriLynx and the NCTCOG to understand both the requirements and the delivered solution. The delivered solution may consist of OTS software with user training, additional workflows for data analyses and visualization, integration with customer systems, and other products and services. The technical scope will also include a description of the delivery timeline. Once the technical scope is approved by the NCTCOG, the cost will be developed based on TriLynx published OTS catalog pricing and pricing for specific products and services.

Process for Delivering Orders for Respective Clients

Once the technical scope and associated costs are approved by the NCTCOG, a project manager will be assigned from TriLynx to oversee the delivery of the order. The TriLynx project manager will be the primary focal point for product delivery, questions, adherence to timelines, and final acceptance of the delivered order. Once order delivery has been completed and accepted by the client, TriLynx will submit an invoice based upon the approved costs developed in the technical proposal. Large projects may be billed as phases are completed.

Process for Customer Satisfaction Services

TriLynx prides itself on prompt customer support and satisfaction. Both Markus and Steve (joint owners) are available directly for any customer input regarding product delivery, software functionality, and to ensure the satisfaction of our customers. By and large, the TriLynx support staff are attentive to requests for service and support. All technical support is provided through a ticketing system that allows TriLynx staff to track the time it takes to address a support issue and to ensure the successful completion of all support requests. Any issues will be resolved to the customer's satisfaction.

Process for Invoicing

NovaStar license and custom service fees are invoiced upon the successful completion of a NovaStar order. Additionally, NovaStar includes an annual license fee that funds product development, automatic product updates, installation of new releases and technical support from TriLynx support staff. Annual software support fees are invoiced at the beginning of the fiscal year for each client. Additional support can be purchased as a block of hours.

Project implementation costs beyond the product license may be billed using a fixed price or time and materials approach, depending on the project and customer preferences.

Assumptions

No assumptions were made in response to this RFP. If we have misunderstood any application questions, we would appreciate the opportunity to clarify answers given that we feel our product and services meet the RFP requirements.

Exceptions

TriLynx will enter into an agreement without exceptions. TriLynx will ensure that it complies with all insurance and other requirements. We would like to point out that we have tried to provide a Pricing Proposal that addresses the core parts of a flood warning system software project as we understand it. It is our hope that the information provided is easy to understand. We would be happy to answer questions about anything in this proposal.

Special Features

TriLynx provides maintenance, upgrades and support for users of the NovaStar base station software. TriLynx also has significant experience with software and hardware integration issues including hardware configuration, establishing system-wide redundancy, assessment of alarms, ALERT2 Time Division Multiple Access (TDMA) planning, integration with flood response plans and dam safety emergency action plans. TriLynx staff have experience working with field equipment from every ALERT vendor including High Sierra Electronics, Campbell Scientific Inc., and HydroLynx Systems, Inc.

The flood warning system is generally comprised of the NovaStar system for data collection and notifications, as well as other related components and hardware that TriLynx does not provide or maintain. It can be difficult for TriLynx and local government (City and County) staff to understand how various components are integrated. To address this, TriLynx has developed the "TriLynx Systems Dashboard" which is accessible to flood warning system staff (not the public). The initial generation of this dashboard provides links to flood warning systems and related web resources within the City or County internal network (which requires authentication) as well as public components. This dashboard and linked resources allow TriLynx and flood warning system staff to easily access relevant resources. The System Dashboard also provides a link to the Zabbix software dashboard, which is used to display information about system health including system component uptime and performance from an information technology perspective. Automated workflows have been implemented to process Zabbix data to monitor computer health (CPU, memory, disk space, computer core usage, etc.) in real-time and provides notification if computer resources are struggling.

TriLynx also works closely with Kisters/Hydstra to support the integration of data from NovaStar to the Hydstra data management system either through REST data web services or through direct SQL connections.

Access to high-quality data with minimal latency is becoming increasingly important for decision-making during emergencies and for planning and operations. Implementation of the ALERT2 protocol and improved data quality allows for greater utilization of collected data. A flood warning system focuses on rain and water levels to indicate flooding. However, the ability to collect data in remote areas provides opportunities to use the flood warning system to support other interests such as monitoring the environment (water supply, water quality, fire conditions, etc.). Data from the flood warning system is typically needed for the following cases:

- Recent data and forecasts to make decisions about flooding.
- Seasonal and annual data to evaluate system performance and provide context.
- Full historical record for additional context and data for modeling and analysis.

TriLynx has implemented read-only data web services, which provide a REST application programming interface (API) to support NovaStar software and other applications. The first generation of web services was implemented to support NovaStar enhancements including the Operator. Web services also support integration with applications such as Esri ArcGIS Online dashboards.

TriLynx is working with the Mile High Flood District to implement a high-performance "data node". This streamlined NovaStar node is intended to provide internal and public access for many concurrent web sessions and support less frequent actions such as historical data downloads for researchers. Data in the data node database are synchronized with redundant data collection NovaStar nodes and the data node implements features such as caching to ensure that requests can be efficiently handled. The data node will also include relevant datasets beyond the data collection system, including comparing storms with NOAA Atlas-14 frequency duration intensity data. Appropriate features from the data node can be implemented to support flood operations.

TriLynx is very well-qualified to make recommendations about new flood warning technologies. First, TriLynx is familiar with the specific conditions affecting flood warning operations from supporting many ALERT2 upgrades. TriLynx has assisted many communities with the transition from legacy ALERT to ALERT2 telemetry. In addition, TriLynx makes specific and consistent efforts to remain appraised and knowledgeable as new technologies are developed, tested and implemented in the field of flood warning. For example, Markus Ritsch is a member of the Technical Working Group established by the NHWC for the development of the ALERT2 protocol. Other TriLynx Team personnel are members and active participants in the ALERT Users Group (AUG) and the National Hydrologic Warning Council (NHWC). TriLynx will remain at the forefront of technological innovations in flood warning in order to understand and appropriately recommend the adoption of new technology for all of our clients. In addition, our broad base of flood warning clients exposes us to different ways that our client entities operate given their particular operational or topographic or technical challenges. Helping a variety of clients overcome these issues leaves us with a complete toolbox of options when other clients encounter challenges that could benefit from a similar, or modified, approach.

TriLynx is also very experienced with network design and expansion, and able to make recommendations both in terms of telemetry infrastructure and for the siting of specific rain or stream gages. TriLynx has provided remote station siting services and/or the overall design of flood warning system networks, including siting individual gages AND determining how telemetry will be handled for the system as a whole, for the vast majority of our clients: the MHFD, Denver, CO, Larimer and Douglas Counties, CO, Hays County, TX and many others.

TriLynx offers capabilities in hydrometeorological data calculation, modeling, and visualization; however, most data aggradation and summarization calculations are native to NovaStar, so that data can be displayed, plotted or reported in the ways that are most useful. The NovaStar Operator Interface provides secure access to the visualization of data from the sensor network. The Operator displays real-time data from the remote monitoring system and can also display radar images, NWS watches and warnings, images from remote still and video cameras, and other relevant information for interpreting the real-time data, assessing flood threat and supporting emergency responders.

Designated Contact

TriLynx designates the following individuals for the following phases:

- Bid process – Markus Ritsch and Steve Malers
- Contracting process – Markus Ritsch
- Contract administration – Markus Ritsch
- Receiving orders from participating entities – Markus Ritsch
- NovaStar technical development – Steve Malers

Tab E – References

The following pages include short project descriptions that highlight recent projects. The following table lists the projects along with references.

Project	Client	Relevance to This Project	Contact
MHFD Flood Warning System	Mile High Flood District	Illustrates a large NovaStar system including many stations and sensors, including dams.	Bruce Rindahl, P.E., Flood Warning Manager (303-749-5417, brindahl@mhfd.org)
Hays County, Texas, Flood Roadway and Dam Monitoring	Office of Emergency Management	System that focuses on dam monitoring and low-water crossings using NovaStar for data management.	Mike Jones, Director Office of Emergency Management (512-393-5538, mike.jones@co.hays.tx.us)
City of Dallas, Texas, Flood Warning System Software	City of Dallas Water Utilities	System that uses NovaStar for the collection and management of ALERT/ALERT2 data and two-way control of roadway flashers.	Steven Anderson, Manager II, Floodway Operations (214-671-0424, steven.anderson@dallas.gov)

Project – MHFD Flood Warning System

The MHFD has contracted with TriLynx since 2015 to provide NovaStar software services. MHFD operates a flood warning system including over 350 stations. TriLynx provides support for the MHFD's dual-node NovaStar base station software system, including its redundant backup and a third "data" node, to ensure that notifications are reliably provided to affected cities and counties within the MHFD in the event of a developing flood threat.

TriLynx has developed several web tools for the MHFD including a map-based public webpage to help convey information to the responding entities served. The webpage provides maps and station dashboards for real-time data from the remote monitoring system that can simultaneously display RADAR images, NWS watches and warnings, and other relevant information for assessing flood threat and initiating response.

In addition, TriLynx also provides a wide range of engineering support services to the MHFD as they fulfill their mission. TriLynx performs monthly QA/QC on data collected by the system to detect problems with sensors, calibrations or ratings and improve the accuracy and usability of data. TriLynx has enabled the Sacramento Soil Moisture Account model within NovaStar for one of the MHFD's basins

in a demonstration project intended to explore the viability of using that method to quantify watershed response and forecast flood threats in the smaller basins that are the MHFD's responsibility. TriLynx has assisted the MHFD's ongoing updates to Flood Response Plans for seven basins to ensure that the information provided to responders is up to date.

TriLynx has assisted the MHFD in determining alarm threshold criteria and National Weather Service (NWS) E-19 values (stage values specific to individual stream gauges) associated with the NWS definitions for Bankful, Action, Flood, Moderate Flood and Major Flood conditions. TriLynx maintains a database of current E-19 values that are also displayed on the MHFD's flow hydrographs as a visual aid in interpreting the significance of real-time stage data. The flow hydrographs also include elevation data for significant physical features at the gauge site, for example, spillway elevations for stage gauges sited at dams.

Project – Hays County, Texas - NRCS and SCS Dam Monitoring and Low-Water Crossings

NovaStar is used as the dam monitoring, flood detection and inundated roadway system in Hays County, Texas. Located in central Texas, Hays County receives a yearly average precipitation of about 35 inches that falls on large watersheds dominated by water bearing limestone units and is therefore very susceptible to heavy flooding.

The system consists of 5 receiving ALERT2 data decoders located at fire statins, a dual-node NovaStar master/backup architecture, monitoring sensors at 10 earthen dams, 22 low water crossings with roadway flashers, and 10 rain gauges. Using ALERT2, 2-way radio technology for communications and advanced water level sensors, stations activate roadway flashers and transmit real-time data to a dual-node, TriLynx NovaStar mirrored base station architecture. Web platform, operational dashboards are updated every minute with data for battery voltage, water level, rainfall, and flasher status.

For this project two map-based data visualization web applications were implemented. A restricted version that can be viewed by the Hays County Government and a public version that is available online. In the restricted version the government can see battery voltage, water level, flow, rainfall, weather, and flasher status. The public version focuses on communicating which roadways have water over them or are completely closed. The map shows a green dot to represent that the road is free of inundation; yellow to show there is water on the road but it is still drivable; and red to show the road is closed. The public are also able to view the water level, rainfall, and weather at each station.

Project – City of Dallas, Texas - Flood Warning and Flooded Roadway System

The City of Dallas has contracted with TriLynx since 2015 to provide NovaStar flood warning software and supporting services. The city has used NovaStar since 2008 when the software was still a part of the HydroLynx Systems product suite. Dallas operates a flood warning system including over 220 stations including ALERT2 rain, water level and weather stations and flooded roadway stations. TriLynx provides support for the city's three-node NovaStar base station software system (primary master, redundant backup, and a data node for public access) to ensure that data is reliably collected, notifications are reliably provided to affected communities in the event of a developing flood threat.

Data from remote stations are transmitted via ALERT2 radio technology to base stations operating the NovaStar software. NovaStar performs data checking to both validate values and compare them with customized alarm criteria (including rainfall, water level max value and rate of rise, discharge or flasher status). NovaStar processes incoming data in real-time with delays due only to software processing of captured data and transmission time. NovaStar automatically issues alarm notifications to required personnel when flooding is imminent.

TriLynx is working with the City of Dallas to implement two-way, ALERT2, control communications to activate/deactivate roadway flashers at flooded intersections and low water crossings.

Tab F – Proposal Pricing

This section of the proposal provides the rates for new NovaStar systems and individual software tools and products. These costs are included in the first year for new systems and subsequent years require support service costs as per the annual support agreement (NovaStar Basic Annual Maintenance, Support and Software Updates Pricing).

This section of the proposal provides the rates for a typical new NovaStar system and annual maintenance and support. Costs shown are typical and are 0% discounted. Project costs may sometimes be discounted based on the situation.

NovaStar New System Software Pricing

NovaStar is a comprehensive data collection and management system that utilizes the open-source PostgreSQL database running on the Linux operating system. NovaStar collects data from ALERT/ALERT2 radio decoders and satellite, cellular, two-way radio, web sources, and video cameras. A web interface is provided to edit content, set alarm/notification functions, create reports and manage the data archive. NovaStar data also can be exported to other system components such as custom websites and modeling tools. A NovaStar node may be installed on a dedicated computer or on a virtual machine within a client's network or in the cloud.

TriLynx encourages the implementation of a system with redundant servers, consisting of a master/backup architecture (two nodes). The master/backup system includes automated replication of the database and automated failover in the event of a base station failure. Ideally the master and backup reside at different physical locations with data feeds from two physically different ALERT/ALERT2 radios. The master and backup nodes must maintain network connectivity in order to synchronize site and sensor metadata as well as incoming data reports. The data feed from the ALERT/ALERT2 receiver and decoder can be through direct serial connection or from a serial/IP device installed at the decoder. Locating the master and backup computers at separate physical/cloud locations ensures a level of redundancy should the operation of one node be disrupted. Pricing for new NovaStar systems is provided (Table 1).

Table 1. New NovaStar Pricing

Item	Description	Price

NovaStar Initial License Fee	NovaStar Initial Software License to Include:
	• Linux Debian Operating System
	• PostgreSQL Database
	• NovStar5 Core Components:
	  ○ ALERT/ALERT2 data ingest
	  ○ Alarm/notification functions
	  ○ Station/point configuration
	  ○ Point computations ratings/equations
	  ○ Database backup/archival
	  ○ Data displays tabular/plots/maps
	• NovaStar Administrator Interface
	• NovaStar Operator Interface
	• NovaStar Data Explorer
	• NovaStar Web Services (2)
	• Client System Dashboard
	• Zabbix server monitoring
		$15,000/node (1)

(1). A node is defined as a primary, backup, or data instance of NovaStar, whether installed on a stand-alone computer or virtual machine. A backup node will fail-over when the primary node fails. A data node replicates data but does not perform data collection. The license fee does not include configuration and setup which will be negotiated for new systems based on the size and complexity.

(2). Web services can be provided to remotely query the NovaStar database for time series and station/point metadata. Web services are designed to efficiently extract and present data in various formats (csv, xml, etc.) using a standard web URL query format. Web services also provide data to ArcGIS and other third-party components.

The above costs (Table 1) do not include computer servers, either virtual machines or rack/desktop computers. Pricing for new computer hardware and cloud-based virtual servers is provided (Table 2).

Table 2. New Server and Cloud-Hosting Computing Pricing

Item	Description	Typical Price
Physical Computer	NovaStar desktop (or rack mount) base station computer server: • 64-bit architecture • 12 cores • 3.4 GHz – CPU • 32 GB RAM • 4x mirrored 1 TB hard drives (RAID 10) • Network card (10/100/100) • Multiple USB ports	$7,500
Cloud-hosted Virtual Server (1)	TriLynx uses Amazon AWS cloud services for our cloud-hosted solutions: • AWS VM Instance – EC2 – t2.xlarge • 4 cores • 32 GB RAM • 64-bit • EBS storage – 100 GB • Network interface with Elastic IP	$3,500/year

(1). TriLynx can install NovaStar onto a virtual environment hosted by TriLynx on the Amazon Cloud or on any virtual environment hosted by the customer or another platform such as Google or MS Azure.

NovaStar Basic Annual Maintenance, Support and Software Updates Pricing

TriLynx provides software maintenance and support for installed NovaStar systems in accordance with the following rates. Software updates are included in the NovaStar "Basic Annual Maintenance and Support" fee.

TriLynx includes support for the Operator Interface and Data Web Services in the basic annual maintenance and support fee for NovaStar because these products are being used to support core system functionality and integration with other systems. Basic annual maintenance, support and software update pricing is shown (Table 3).

TriLynx recognizes that fiscal budget cycles often drive the schedule for paying annual maintenance and we will work with customers to ensure that NovaStar systems are functioning as annual maintenance payments are being processed. However, it is expected that annual maintenance will be paid in a timely manner, based on annual quotes that are provided each year. Annual maintenance fees allow TriLynx to maintain the NovaStar product at a high functional level, implement new features that benefit all NovaStar users, and to maintain a line of communication with customers.

Table 3. NovStar5 Basic Annual Maintenance, Support and Software Updates

Item	Description	Price
NovaStar Basic Annual Support	NovaStar basic annual software maintenance and support: • updates to the operating system to the current supported version • updates to the NovaStar system software, including core NovaStar software • updates to the PostgreSQL database • software updates throughout the year to address bugs identified in the general NovaStar product • security updates • 10 hours per node of remote support during regular business hours (support requests beyond 10 hours in a year must be paid for using an extended support agreement.) • Updates to the Operator Interface and Web Services.	$11,000/node (1)

(1). A node is defined as a primary, backup, or data instance of NovaStar, whether installed on a stand-alone computer or virtual machine. A backup node will fail-over when the primary node fails. A data node replicates data but does not perform data collection.

Annual updates include the following system enhancements and reflect TriLynx investment in the NovaStar product throughout the year:

- Operating system updates (e.g., to ensure that security features are up to date).
- Third-party software updates (e.g., for the PostgreSQL database).
- Updates to NovaStar system software to be compatible with operating system and third-party software updates.
- Bug fixes in the core NovaStar system identified proactively by TriLynx and reported by clients.
- New features and software components implemented by TriLynx to enhance overall functionality of the system.
- Enhancements to address changes in industry specifications such as the ALERT2 protocol, ALERT2 two-way functions, etc.

Examples of items that are not included in the annual software support are as follows and will require an additional support agreement for custom services:

- Support beyond 10 support hours per node (either telephone or email) per year.
- Transfer of a node/system from the current installed system to a new stand-alone computer or virtual machine.
- Reinstalling the system because of a hardware failure, other than simple backup restore.

- Initial implementation of, enhancement of, or support for custom websites (annual updates will provide support for core system features that serve data to custom websites but only for standard features).
- Integration support, for example to integrate the NovaStar system with third-party hardware or software systems.
- Development of custom features outside of normal maintenance upgrades.

TriLynx rates for custom services are provided (Table 4).

Table 4. TriLynx Rates for Custom Services

Description	Price
Custom programming and software development	$200/hour
On-site visit labor for one TriLynx staff	$1,600/day
Travel per diem	$300/day (1)
Travel airfare and car rental	Market rate

(1). Per diem rate will adhere to approved government IRS food, lodging, and mileage rates for the area.

Options for Extended Support Beyond Basic Annual Maintenance, Support and Software Updates

The following options are recommended for additional hourly maintenance support to ensure continuous system operations:

- provide TriLynx with a purchase order to cover a certain number of support hours, in response to specific issues
- or, pay for a block of support hours up front at the standard rate, in which case:
    - TriLynx will track hours expensed on client-authorized support tasks and will provide cost tracking information to the customer as hourly support is billed against the pre-paid hours – TriLynx will provide a notice when the hourly support balance is getting low.

Options for Special Projects

At the discretion of the customer, specific projects can be treated separately from NovaStar annual maintenance and support. For example, a large integration project can be handled with a separate scope of work and budget. The rates for such work may be the same as support or can include more category rates if the personnel that are involved are different from typical support and maintenance tasks.

Tab G – Required Attachments (Attachments I-IX)

REQUIRED ATTACHMENT CHECKLIST

Please utilize this checklist to ensure that all required attachments are included with your proposal. IF AN ATTACHMENT DOES NOT APPLY, PLEASE MARK AS "**NOT APPLICABLE**" AND SUBMIT WITH THE PROPOSAL. FAILURE TO SUBMIT **ALL REQUIRED DOCUMENTS** MAY NEGATIVELY IMPACT YOUR EVALUATION SCORE.

- ☒ Page 1 - Cover Sheet
- ☒ Page 20 - Attachment I: Instructions for Proposals Compliance and Submittal
- ☒ Page 21 - Attachment II: Certification of Offeror
- ☒ Page 22 - Attachment III: Certification Regarding Debarment
- ☒ Page 23 - Attachment IV: Restrictions on Lobbying
- ☒ Page 25 - Attachment V: Drug-Free Workplace Certification
- ☒ Page 26 - Attachment VI: Certification Regarding Disclosure of Conflict of Interest
- ☒ Page 28 - Attachment VII: Certification of Fair Business Practices
- ☒ Page 29 - Attachment VIII: Certification of Good Standing Texas Corporate Franchise Tax Certification
- ☒ Page 30 - Attachment IX: Historically Underutilized Businesses, Minority Or Women-Owned Or Disadvantaged Business Enterprises
- ☒ Page 31 - Attachment X: Federal and State of Texas Required Procurement Provisions
- ☒ Page 35 - Exhibit B: Service Questionnaire and Pricing Proposal
- ☒ Page 36 – Exhibit C: Service Area Designation Forms

- ☒ Respondent recognizes that all proposals must be submitted electronically through Public Purchase by the RFP due date and time. All other forms of submissions will be deemed nonresponsive and will not be opened or considered.

ATTACHMENT I:
INSTRUCTIONS FOR PROPOSALS COMPLIANCE AND SUBMITTAL

Compliance with the Solicitation

Submissions must be in strict compliance with this solicitation. Failure to comply with all provisions of the solicitation may result in disqualification.

Acknowledgment of Insurance Requirements

By signing its submission, Offeror acknowledges that it has read and understands the insurance requirements for the submission. Offeror also understands that the evidence of required insurance may be requested to be submitted within ten (10) working days following notification of its offer being accepted; otherwise, NCTCOG may rescind its acceptance of the Offeror's proposals. The insurance requirements are outlined in Section 6.04.

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch Markus Ritsch

Date: August 23, 2023

ATTACHMENT II:
CERTIFICATIONS OF OFFEROR

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch

Date: August 23, 2023

ATTACHMENT III:
CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

This certification is required by the Federal Regulations Implementing Executive Order 12549, Debarment and Suspension, 45 CFR Part 93, Government-wide Debarment and Suspension, for the Department of Agriculture (7 CFR Part 3017), Department of Labor (29 CFR Part 98), Department of Education (34 CFR Parts 85, 668, 682), Department of Health and Human Services (45 CFR Part 76).

The undersigned certifies, to the best of his or her knowledge and belief, that both it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency;

2. Have not within a three-year period preceding this contract been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction, violation of federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false Proposals, or receiving stolen property;

3. Are not presently indicated for or otherwise criminally or civilly charged by a government entity with commission of any of the offense enumerated in Paragraph (2) of this certification; and,

4. Have not within a three-year period preceding this contract had one or more public transactions terminated for cause or default.

Where the prospective recipient of federal assistance funds is unable to certify to any of the qualifications in this certification, such prospective recipient shall attach an explanation to this certification form.

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch

Date: August 23, 2023

RFP 2023-060

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ATTACHMENT IV:
RESTRICTIONS ON LOBBYING

Section 319 of Public Law 101-121 prohibits recipients of federal contracts, grants, and loans exceeding $100,000 at any tier under a federal contract from using appropriated funds for lobbying the Executive or Legislative Branches of the federal government in connection with a specific contract, grant, or loan. Section 319 also requires each person who requests or receives a federal contract or grant in excess of $100,000 to disclose lobbying.

No appropriated funds may be expended by the recipient of a federal contract, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any federal executive department or agency as well as any independent regulatory commission or government corporation, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered federal actions: the awarding of any federal contract, the making of any federal grant, the making of any federal loan the entering into of any cooperative agreement and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

As a recipient of a federal grant exceeding $100,000, NCTCOG requires its subcontractors of that grant to file a certification, set forth in Appendix B.1, that neither the agency nor its employees have made, or will make, any payment prohibited by the preceding paragraph.

Subcontractors are also required to file with NCTCOG a disclosure form, set forth in Appendix B.2, if the subcontractor or its employees have made or have agreed to make any payment using nonappropriated funds (to include profits from any federal action), which would be prohibited if paid for with appropriated funds.

LOBBYING CERTIFICATION
FOR CONTRACTS, GRANTS, LOANS, AND COOPERATIVE AGREEMENTS

The undersigned certifies, to the best of his or her knowledge or belief, that:

1. No federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an officer or employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal loan, the entering into of any cooperative Contract, and the extension, continuation, renewal, amendment, or modification or any federal contract, grant, loan, or cooperative contract; and

2. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federal contract, grant, loan, and or cooperative contract, the undersigned shall complete and submit Standard Form – LLL, "Disclosure Form to Report Lobbying", in accordance with the instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers and that all sub-recipients shall certify accordingly.

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch

Date: August 23, 2023

ATTACHMENT V:
DRUG-FREE WORKPLACE CERTIFICATION

The TriLynx Systems, LLC (company name) will provide a Drug Free Work Place in compliance with the Drug Free Work Place Act of 1988. The unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited on the premises of the TriLynx Systems, LLC (company name) or any of its facilities. Any employee who violates this prohibition will be subject to disciplinary action up to and including termination. All employees, as a condition of employment, will comply with this policy.

CERTIFICATION REGARDING DRUG-FREE WORKPLACE

This certification is required by the Federal Regulations Implementing Sections 5151-5160 of the Drug-Free Workplace Act, 41 U.S.C. 701, for the Department of Agriculture (7 CFR Part 3017), Department of Labor (29 CFR Part 98), Department of Education (34 CFR Parts 85, 668 and 682), Department of Health and Human Services (45 CFR Part 76).

The undersigned subcontractor certifies it will provide a drug-free workplace by:

Publishing a policy Proposal notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the workplace and specifying the consequences of any such action by an employee;

Establishing an ongoing drug-free awareness program to inform employees of the dangers of drug abuse in the workplace, the subcontractor's policy of maintaining a drug-free workplace, the availability of counseling, rehabilitation and employee assistance programs, and the penalties that may be imposed on employees for drug violations in the workplace;

Providing each employee with a copy of the subcontractor's policy Proposal;

Notifying the employees in the subcontractor's policy Proposal that as a condition of employment under this subcontract, employees shall abide by the terms of the policy Proposal and notifying the subcontractor in writing within five days after any conviction for a violation by the employee of a criminal drug abuse statue in the workplace;

Notifying the Board within ten (10) days of the subcontractor's receipt of a notice of a conviction of any employee; and,

Taking appropriate personnel action against an employee convicted of violating a criminal drug statue or requires such employee to participate in a drug abuse assistance or rehabilitation program.

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch

Date: August 23, 2023

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ATTACHMENT VI:
CERTIFICATION REGARDING DISCLOSURE OF CONFLICT OF INTEREST

The undersigned certifies that, to the best of his or her knowledge or belief, that:

"No employee of the contractor, no member of the contractor's governing board or body, and no person who exercises any functions or responsibilities in the review or approval of the undertaking or carrying out of this contract shall participate in any decision relating to this contract which affects his/her personal pecuniary interest.

Executives and employees of contractor shall be particularly aware of the varying degrees of influence that can be exerted by personal friends and associates and, in administering the contract, shall exercise due diligence to avoid situations which give rise to an assertion that favorable treatment is being granted to friends and associates. When it is in the public interest for the contractor to conduct business with a friend or associate of an executive or employee of the contractor, an elected official in the area or a member of the North Central Texas Council of Governments, a permanent record of the transaction shall be retained.

Any executive or employee of the contractor, an elected official in the area or a member of the NCTCOG, shall not solicit or accept money or any other consideration from a third person, for the performance of an act reimbursed in whole or part by contractor or Department. Supplies, tools, materials, equipment or services purchased with contract funds shall be used solely for purposes allowed under this contract. No member of the NCTCOG shall cast a vote on the provision of services by that member (or any organization which that member represents) or vote on any matter which would provide a direct or indirect financial benefit to the member or any business or organization which the member directly represents".

No officer, employee or paid consultant of the contractor is a member of the NCTCOG.

No officer, manager or paid consultant of the contractor is married to a member of the NCTCOG.

No member of NCTCOG directly owns, controls or has interest in the contractor.

The contractor has disclosed any interest, fact, or circumstance that does or may present a potential conflict of interest.

No member of the NCTCOG receives compensation from the contractor for lobbying activities as defined in Chapter 305 of the Texas Government Code.

Should the contractor fail to abide by the foregoing covenants and affirmations regarding conflict of interest, the contractor shall not be entitled to the recovery of any costs or expenses incurred in relation to the contract and shall immediately refund to the North Central Texas Council of Governments any fees or expenses that may have been paid under this contract and shall further be liable for any other costs incurred or damages sustained by the NCTCOG as it relates to this contract.

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch

Date: August 23, 2023

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY
Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

TriLynx Systems, LLC does not have a business relationship with any local governmental entities.

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

None

Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No Not Applicable

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No Not applicable

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

Not applicable

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7 *Markus Ritsch*

Signature of vendor doing business with the governmental entity

August 23, 2023

Date

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 1/1/2021

ATTACHMENT VII:
CERTIFICATION OF FAIR BUSINESS PRACTICES

That the submitter has not been found guilty of unfair business practices in a judicial or state agency administrative proceeding during the preceding year. The submitter further affirms that no officer of the submitter has served as an officer of any company found guilty of unfair business practices in a judicial or state agency administrative during the preceding year.

Name of Organization/Contractor(s):

TriLynx Systems, LLC

Signature of Authorized Representative:

Markus Ritsch

Date: August 23, 2023

ATTACHMENT VIII:
CERTIFICATION OF GOOD STANDING
TEXAS CORPORATE FRANCHISE TAX CERTIFICATION

Pursuant to Article 2.45, Texas Business Corporation Act, state agencies may not contract with for profit corporations that are delinquent in making state franchise tax payments. The following certification that the corporation entering into this offer is current in its franchise taxes must be signed by the individual authorized on Form 2031, Corporate Board of Directors Resolution, to sign the contract for the corporation.

The undersigned authorized representative of the corporation making the offer herein certified that the following indicated Proposal is true and correct and that the undersigned understands that making a false Proposal is a material breach of contract and is grounds for contract cancellation.

Indicate the certification that applies to your corporation:

X — The Corporation is a for-profit corporation and certifies that it is not delinquent in its franchise tax payments to the State of Texas.

_____ — The Corporation is a non-profit corporation or is otherwise not subject to payment of franchise taxes to the State of Texas.

Type of Business (if not corporation):

- ☐ Sole Proprietor
- ☒ Partnership
- ☐ Other

Pursuant to Article 2.45, Texas Business Corporation Act, the North Central Texas Council of Governments reserves the right to request information regarding state franchise tax payments.

Markus Ritsch
(Printed/Typed Name and Title of Authorized Representative)

Markus Ritsch
Signature

Date: August 23, 2023

ATTACHMENT IX:
HISTORICALLY UNDERUTILIZED BUSINESSES, MINORITY OR WOMEN-OWNED OR DISADVANTAGED BUSINESS ENTERPRISES

Historically Underutilized Businesses (HUBs), minority or women-owned or disadvantaged businesses enterprises (M/W/DBE) are encouraged to participate in the solicitation process. Representatives from HUB companies should identify themselves and submit a copy of their certification.

NCTCOG recognizes the certifications of both the State of Texas Program and the North Central Texas Regional Certification Agency. Companies seeking information concerning HUB certification are urged to contact:

State of Texas HUB Program
Texas Comptroller of Public Accounts
Lyndon B. Johnson State Office Building
111 East 17th Street
Austin, Texas 78774
(512) 463-6958
http://www.window.state.tx.us/procurement/prog/hub/

Local businesses seeking M/W/DBE certification should contact:

North Central Texas Regional Certification Agency
624 Six Flags Drive, Suite 100
Arlington, TX 76011
(817) 640-0606
http://www.nctrca.org/certification.html

Submitter must include a copy of its minority certification documentation as part of this solicitation.
If your company is already certified, attach a copy of your certification to this form and return with your proposal.

Indicate all that apply:

_____Minority-Owned Business Enterprise — TriLynx is not minority-owned

_____Women-Owned Business Enterprise — TriLynx is not women-owned

_____Disadvantaged Business Enterprise — TriLynx is not a disadvantaged business

ATTEST TO Attachments of Certification:

_____
Authorized Signature

Markus Ritsch
Typed Name

August 23, 2023
Date

Subscribed and sworn to before me this _____day of _____ (month), 20__ in

_____ (city), _____ (county), _____ (state).

_____ **SEAL**

Notary Public in and for _____ (County),
State of _____ Commission expires: _____

ATTACHMENT X
NCTCOG FEDERAL AND STATE OF TEXAS REQUIRED PROCUREMENT PROVISIONS
The following provisions are mandated by Federal and/or State of Texas law. Failure to certify to the following will result in disqualification of consideration for contract. Entities or agencies that are not able to comply with the following will be ineligible for consideration of contract award.

PROHIBITED TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT CERTIFICATION

This Contract is subject to the Public Law 115-232, Section 889, and 2 Code of Federal Regulations (CFR) Part 200, including §200.216 and §200.471, for prohibition on certain telecommunications and video surveillance or equipment. Public Law 115-232, Section 889, identifies that restricted telecommunications and video surveillance equipment or services (e.g., phones, internet, video surveillance, cloud servers) include the following:

A) Telecommunications equipment that is produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliates of such entities).
B) Video surveillance and telecommunications equipment produced by Hytera Communications Corporations, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliates of such entities).
C) Telecommunications or video surveillance services used by such entities or using such equipment.
D) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, Director of the National Intelligence, or the Director of the Federal Bureau of Investigation reasonably believes to be an entity owned or controlled by the government of a covered foreign country.

The entity identified below, through its authorized representative, hereby certifies that no funds under this Contract will be obligated or expended to procure or obtain telecommunication or video surveillance services or equipment or systems that use covered telecommunications equipment or services as a substantial or essential component of any system, or as a critical technology as part of any system prohibited by 2 CFR §200.216 and §200.471, or applicable provisions in Public Law 115-232 Section 889.

☑ **The Contractor or Subrecipient hereby certifies that it does comply with the requirements of 2 CFR §200.216 and §200.471, or applicable regulations in Public Law 115-232 Section 889.**

SIGNATURE OF AUTHORIZED PERSON: Markus Ritsch

NAME OF AUTHORIZED PERSON: Markus Ritsch

NAME OF COMPANY: TriLynx Systems, LLC

DATE: August 23, 2023

-OR-

☐ **The Contractor or Subrecipient hereby certifies that it cannot comply with the requirements of 2 CFR §200.216 and §200.471, or applicable regulations in Public Law 115-232 Section 889.**

SIGNATURE OF AUTHORIZED PERSON: _____

NAME OF AUTHORIZED PERSON: _____

NAME OF COMPANY: _____

DATE: _____

DISCRIMINATION AGAINST FIREARMS ENTITIES OR FIREARMS TRADE ASSOCIATIONS

This contract is subject to the Texas Local Government Code chapter 2274, Subtitle F, Title 10, prohibiting contracts with companies who discriminate against firearm and ammunition industries.

TLGC chapter 2274, Subtitle F, Title 10, identifies that "discrimination against a firearm entity or firearm trade association" includes the following:

A) means, with respect to the entity or association, to:

I. refuse to engage in the trade of any goods or services with the entity or association based solely on its status as a firearm entity or firearm trade association; and

II. refrain from continuing an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; or

III. terminate an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association.

B) An exception to this provision excludes the following:

I. contracts with a sole-source provider; or

II. the government entity does not receive bids from companies who can provide written verification.

The entity identified below, through its authorized representative, hereby certifies that they have no practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and that they will not discriminate during the term of the contract against a firearm entity or firearm trade association as prohibited by Chapter 2274, Subtitle F, Title 10 of the Texas Local Government Code.

☒ **The Contractor or Subrecipient hereby certifies that it does comply with the requirements of Chapter 2274, Subtitle F, Title 10.**

SIGNATURE OF AUTHORIZED PERSON:	Markus Ritsch
NAME OF AUTHORIZED PERSON:	Markus Ritsch
NAME OF COMPANY:	TriLynx Systems, LLC
DATE:	August 23, 2023

-OR-

☐ **The Contractor or Subrecipient hereby certifies that it cannot comply with the requirements of Chapter 2274, Subtitle F, Title 10.**

SIGNATURE OF AUTHORIZED PERSON:	
NAME OF AUTHORIZED PERSON:	
NAME OF COMPANY:	
DATE:	

BOYCOTTING OF CERTAIN ENERGY COMPANIES

This contract is subject to the Texas Local Government Code chapter 809, Subtitle A, Title 8, prohibiting contracts with companies who boycott certain energy companies.

TLGC chapter Code chapter 809, Subtitle A, Title 8, identifies that "boycott energy company" means, without an ordinary business purpose, refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations with a company because the company:

I. engages in the exploration, production, utilization, transportation, sale, or manufacturing of fossil fuel-based energy and does not commit or pledge to meet environmental standards beyond applicable federal and state law; and
II. does business with a company described by paragraph (I).

The entity identified below, through its authorized representative, hereby certifies that they do not boycott energy companies, and that they will not boycott energy companies during the term of the contract as prohibited by Chapter 809, Subtitle A, Title 8 of the Texas Local Government Code.

☒ The Contractor or Subrecipient hereby certifies that it does comply with the requirements of Chapter 809, Subtitle A, Title 8.

SIGNATURE OF AUTHORIZED PERSON: Markus Ritsch

NAME OF AUTHORIZED PERSON: Markus Ritsch

NAME OF COMPANY: TriLynx Systems, LLC

DATE: August 23, 2023

-OR-

☐ The Contractor or Subrecipient hereby certifies that it cannot comply with the requirements of Chapter 809, Subtitle A, Title 8.

SIGNATURE OF AUTHORIZED PERSON: _____

NAME OF AUTHORIZED PERSON: _____

NAME OF COMPANY: _____

DATE: _____

Tab G – Required Exhibit B and Exhibit C

Exhibit B – Pricing Format

EXHIBIT B

Service Questionnaire and Pricing Proposal Instructions

Indicate the services you firm is able to provide:
Respondents are not required to fill out the entirety of the form – e.g., if a Respondent does not offer all of the items listed, they are asked to only fill out those that they do provide.

SERVICE	YES	NO
Software and Software Training Services	X	
Hardware and Hardware Maintenance Services		X
Additional Related Services	X	

Respondents are to provide a rate chart for their proposed solutions in a format to best illustrate proposal. Include any other cost categories that should be considered within the "other" category. Attach extra sheets, as necessary.

It is acceptable for Respondent to submit a 0% Discount off Catalog Pricing for some or all of their services. A 0% discount must still be denoted on the line item(s) with the number zero. An example of a "list-less" or catalog option pricing proposal is found below, as is an hourly-rate retainer. These are examples of options that are available to propose, but are not required. Respondent may provide pricing that is the most compatible with their business model as long as they maintain consideration for geographic coverage for TXShare participants and evolution of the service throughout the contract lifecycle.

Pricing Format Request Example	**Procurement No.:**	**2023-060**
Respondent Name:		
Notes:	1. This pricing sheet is an EXAMPLE of how pricing should be submitted for RFP 2023-060. 2. For each proposed solution, indicate pricing structure used (tier level pricing, # of licensed users, # of training hours, etc.) 3. Use as many lines as needed. 4. Detail any additional information necessary. 5. Proposers are encouraged to offer optional features and supplemental functions or services to be offered as a catalog option. Please provide any additional options with 'list less' percentages for pricing.	
Early Warning Flood Management Software, Hardware and Related Services - TXShare Cooperative Purchasing Program		
Item	**Description**	**% Discount off Catalog Price**
1	Proposed Solution and Pricing Structure	%
2	Proposed Solution and Pricing Structure	%
3	Proposed Solution and Pricing Structure	%
4	Proposed Solution and Pricing Structure	%
5	Other, Miscellaneous, Etc.	%
6	Other, Miscellaneous, Etc.	%
		%
		%
Contractor shall provide additional related services at catalog price less:		%

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Table 5. Pricing Format Request Example

Pricing Format Request	**Procurement No.:**	**2023-060**
Item	**Description**	**% Discount Off Catalog Price**
NovaStar	NovaStar Initial Software License	0.00 %
NovaStar Annual Support	NovaStar Basic Annual Software Maintenance and Support	0.00 %
Physical Computer Server	NovaStar desktop (or rack mount) base station computer server	0.00 %
Cloud-Hosted Virtual Server	TriLynx uses Amazon AWS cloud services for our cloud-hosted solutions	0.00 %
Software development	Custom programming and software development	0.00 %
On-site labor	On-site visit labor for TriLynx staff	0.00 %
Travel per diem	Travel per diem	0.00 %
Travel airfare and car rental	Travel airfare and car rental	0.00 %
Extended support	Additional annual support block of hours	0.00 %

Exhibit C.a – Texas Service Area Designation

EXHIBIT C

RFP 2023-059	Texas Service Area Designation or Identification		
Proposer Name:	TriLynx Systems, LLC		
Notes:	Indicate in the appropriate box whether you are proposing to service the entire State of Texas		
	Will service the entire State of Texas	Will not service the entire State of Texas	
	Yes, TriLynx will service the entire State of Texas		
	If you are not proposing to service the entire State of Texas, designate on the form below the regions that you are proposing to provide goods and/or services to. By designating a region or regions, you are certifying that you are willing and able to provide the proposed goods and services.		
Item	Region	Metropolitan Statistical Areas	Designated Service Area
1.	North Central Texas	16 counties in the Dallas-Fort Worth Metropolitan area	
2.	High Plains	Amarillo Lubbock	
3.	Northwest	Abilene Wichita Falls	
4.	Upper East	Longview Texarkana, TX-AR Metro Area Tyler	
5.	Southeast	Beaumont-Port Arthur	
6.	Gulf Coast	Houston-The Woodlands-Sugar Land	
7.	Central Texas	College Station-Bryan Killeen-Temple Waco	
8.	Capital Texas	Austin-Round Rock	
9.	Alamo	San Antonio-New Braunfels Victoria	
10.	South Texas	Brownsville-Harlingen Corpus Christi Laredo McAllen-Edinburg-Mission	
11.	West Texas	Midland Odessa San Angelo	
12.	Upper Rio Grande	El Paso	

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Exhibit C.b – Nationwide Service Area Designation

RFP 2023-059	Nationwide Service Area Designation or Identification Form		
Proposer Name:			
Notes:	Indicate in the appropriate box whether you are proposing to provide service to all Fifty (50) States.		
	Will service all Fifty (50) States	Will not service Fifty (50) States	
	Yes, TriLynx will service all Fifty (50) States		
	If you are not proposing to service to all Fifty (50) States, then designate on the form below the States that you will provide service to. By designating a State or States, you are certifying that you are willing and able to provide the proposed goods and services in those States. If you are only proposing to service a specific region, metropolitan statistical area (MSA), or city in a State, then indicate as such in the appropriate column box.		

Item	State	Region/MSA/City	Designated as a Service Area
1.	Alabama		
2.	Alaska		
3.	Arizona		
4.	Arkansas		
5.	California		
6.	Colorado		
7.	Connecticut		
8.	Delaware		
9.	Florida		
10.	Georgia		
11.	Hawaii		
12.	Idaho		
13.	Illinois		
14.	Indiana		
15.	Iowa		
16.	Kansas		
17.	Kentucky		
18.	Louisiana		
19.	Maine		
20.	Maryland		
21.	Massachusetts		