

Vesta Solutions Service Order Agreement No. 1

1. TERM OF SERVICE ORDER AGREEMENT

This Vesta Solutions Service Order Agreement ("SOA") shall commence on July 24, 2018 (the "SOA Effective Date") and terminate 5 years after the Services Commencement Date (the "Initial Term"), unless earlier terminated in accordance with the provisions of the Master Service Agreement dated of even date herewith, by and between the parties hereto (hereafter the "MSA").

2. DEFINITIONS

Capitalized terms used, but not defined in this SOA are defined elsewhere in the SOA, MSA or Applicable Tariff.

"**Applicable Tariffs**" consist of the standard Vesta Solutions service descriptions, pricing and other provisions filed by Vesta Solutions or any of its Affiliates with the appropriate state regulatory commission having jurisdiction respecting a Service, as revised by Vesta Solutions from time to time. In the event an Applicable Tariff is withdrawn by Vesta Solutions or tariffing is no longer permitted or required by the appropriate state regulatory commission, references to the Applicable Tariff shall be deemed to refer to the corresponding state allowed named document for the services offered herein.

"**Individual Case Basis**" (ICB) means a service arrangement in which the regulations, rates, charges and other terms and conditions are developed based on the specific circumstances of the case. Vesta Solutions may or may not have an equivalent service in the price list for which there is a rate, and the quoted ICB rates may be different than the price list rates. ICB must be provided under contract to a customer and the contract filed (under seal) with the Commission, upon request. All customers have nondiscriminatory access to requesting the service under an ICB rate. Recurring and non-recurring charges for all services provided pursuant to this price list may be individualized for a particular Customer based on the need to respond to a unique service application and/or market condition. All services will be offered on the same basis to any other Customer, which has the same service specifications and market conditions.

3. SERVICES

Vesta Solutions will provide the services to Customer under this SOA as selected below ("Services"), and as further provided in Attachment 2, attached hereto and incorporated herein ("Proposal").

3.1 REGULATED SERVICES

Regulated services may be ordered as provided below ("Regulated Services"). Pricing, service descriptions and other provisions relating to the Services will be set forth in this SOA, the MSA, and the Applicable Tariffs.

VESTA® ROUTER SERVICE - Transitional (Indicate Selection by Checking Box)

- ☒ 9-1-1 Tabular Routing + 9-1-1 ANI
 - ☒ 9-1-1 ALI Database (DB) Services + DB Management
 - ☒ 9-1-1 Network Elements
- VESTA® ROUTER SERVICE – Geospatial**

(Indicate Selection by Checking Box)

- ☐ i3 Geospatial Routing
- ☐ ECRF/LVF Service
- ☐ i3 Logging Service
- ☐ 9-1-1 Network Elements
- ☐ Location Database (LDB)

3.2 OPTIONAL SERVICES

Optional Services are services that are not regulated by a state regulatory commission, and are not included in the Applicable Tariffs ("Optional Services"). Optional Services may be ordered by selecting below and are further described in the Proposal.

- ☐ VESTA® NEXT Data Service
- ☐ VESTA® 9-1-1 as a Service

3.3 SERVICES COMMENCEMENT DATE

Regulated Services that are selected shall commence on a date to be agreed upon between Vesta Solutions and Customer ("Regulated Services Commencement Date"). Optional Services that are selected shall commence on N/A ("Optional Services Commencement Date."). Regulated Services Commencement Date and Optional Services Commencement Date are referred to herein, collectively as "Services Commencement Date." The rates and charges for Services will be effective on the Services Commencement Date. Upon completion of the term of this SOA and any extensions thereof, and until a new SOA has been executed between the parties, the monthly recurring charges and term shown herein shall be as follows:

(a) for Regulated Services, the monthly recurring charges will convert to the Applicable Tariff rate and term therein; (b) for Optional Services, the monthly recurring charges shall be the greater of: (i) the monthly recurring charge provided in the table below; or (ii) the monthly recurring charge as adjusted by the annual rate of the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics, commonly known as the "Consumer Price Index for all Urban Consumers" for the immediately preceding twelve (12) month period, and the term shall automatically extend in one (1) year successive terms.

4. PRICING

The rates and charges provided herein for Services are further described in the Pricing Schedule, attached hereto and incorporated herein as Attachment 1. Regulated Services are priced pursuant to the Applicable Tariff rates and/or pursuant to an Individual Case Basis arrangement. Optional Services are priced pursuant to the Proposal. Vesta Solutions and Customer understand and acknowledge that the Pricing Schedule is priced pursuant to an Individual Case Basis arrangement.

4.1 NON-RECURRING CHARGES (NRC) AND/OR ADVANCE PAYMENTS

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Non-recurring charges and/or advance payments may be required in order to provision the Services. A schedule of non-recurring charges and/or advance payment amounts and events when such charges and/or amounts are due are provided in the Pricing Schedule. Vesta Solutions shall provide an invoice to Customer upon occurrence of each event. Any non-recurring charges set forth in the Pricing Schedule are non-refundable.

4.2 MONTHLY RECURRING CHARGES

Monthly recurring charges for the Services are provided in the Pricing Schedule. Additional charges may be rendered by other local exchange carriers in connection with the provisioning of 9-1-1 Emergency Service to the Customer.

Persons Served is calculated by taking the most recent county population as estimated by the U.S. Census Bureau data (<http://www.census.gov/popest/counties/>). PSAPs that serve an area that crosses county boundaries, or encompasses only a portion of a county, the number of persons served will be determined on a case-by-case basis. The number of persons served is subject to annual review and sizing using the most recent U.S. Census Bureau data.

5. INVOICING AND PAYMENT

Except as otherwise provided in the Proposal, invoicing and payments shall be made as set forth below. For Regulated Services, if no invoicing or payment terms are provided, then the Applicable Tariff applies.

For non-recurring charges and/or advance payments, Vesta Solutions shall invoice the Customer upon completion of each milestone. For monthly recurring charges, Vesta Solutions shall invoice the charges for the Services in advance based upon the Services Commencement Date, and at the beginning of each subsequent month thereafter. In the event that the Services Commencement Date does not coincide with the beginning of a month, such month shall be prorated based on a thirty day calendar month.

Payment is due forty-five (45) calendar days net from the date of invoice. All amounts provided herein are exclusive of any taxes, duties, levies, fees, or similar charges imposed by a third party other than Vesta Solutions.

Unless otherwise specified on the particular invoice, all payments shall be due and payable in U.S. Dollars. A maximum late payment charge of 1% per month on balances not paid within forty-five (45) calendar days in accordance with Part VII, Chapter 218, Florida Statutes (Local Government Prompt Payment Act).

6. GOVERNMENTAL/OTHER CHARGES

As further described in Section 5 of the MSA, regardless of any stabilization of rates or charges that may appear in this SOA, Vesta Solutions reserves the right to increase charges as a result of: (i) expenses incurred by Vesta Solutions reasonably relating to regulatory assessments stemming from an order, rule or regulation of the Federal Communications Commission or other regulatory authority or court having competent jurisdiction (including but not

limited to payphone, PICC and USF related expenses and E9-1-1 and deaf relay charges); or (ii) the price or availability of network elements used in the provision of the Services, amounts other carriers are required to pay to Vesta Solutions or the amount Vesta Solutions is required to pay to other carriers in connection with the provision of the Services to Customer under this SOA.

7. COMMISSION JURISDICTION

If an ICB is subject to the jurisdiction of a regulatory commission, each such ICB will be subject to changes or modifications as the controlling commission may direct from time to time in the exercise of its jurisdiction. Therefore, for this purpose, each such ICB will be deemed to be a separate agreement with respect to the Services offered in a particular jurisdiction.

8. ORDER OF PRECEDENCE

This SOA is made pursuant to and is governed by the MSA. Customer and Vesta Solutions acknowledge and agree that in the event of a conflict between any provisions of this SOA, the MSA and any other ancillary document or agreement related to this SOA, the order of precedence shall be: this SOA, the SOA attachments (if applicable), the MSA, MSA exhibits, and then ancillary documents.

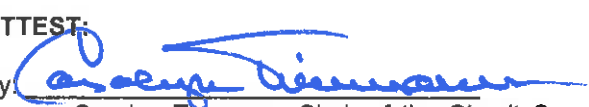
**BOARD OF COUNTY COMMISSIONERS
MARTIN COUNTY, FLORIDA**

By: 
Edward V. Ciampi, Chair

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY

By: 
Sarah W. Woods, County Attorney

ATTEST:

By: 
Carolyn Timmann, Clerk of the Circuit Court and
Comptroller

Date: _____

VESTA SOLUTIONS, INC.

Signed: _____

Print Name: _____

Title: _____ Date: _____

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ATTACHMENT 1 PRICING SCHEDULE

SUMMARY VESTA® ROUTER AND VESTA® NEXT DATA SERVICE

County	2016 U.S. Census Population Estimate	Non-Recurring Charge (NRC) per Person	NRC/Advance Payments Total	Monthly Recurring Charge (MRC) per Person	MRC Total
Martin County, FL	158,701	\$2.40	\$380,882.40	\$0.06	\$571,323.60

NRC AND/OR ADVANCE PAYMENTS SCHEDULE OF PAYMENTS

NON-RECURRING CHARGES/ADVANCE PAYMENTS	
MILESTONES (Options)	Total Amount
1. Contract Execution – 100%	\$380,882.40
2. Contract Execution – 50% Installation Completion – 50%	N/A
3. Other (Agreed to by the Parties)	N/A
SUBTOTAL (NRC/ADVANCE PAYMENTS)	
	\$380,882.40

MONTHLY RECURRING CHARGES (MRC) SCHEDULE OF PAYMENTS

REGULATED SERVICES				
	Monthly Rate Per Person Served	Monthly Rate Total	Number of Months	Total Amount (Initial Term) 5 Years
9-1-1 Emergency Services				
<u>Transitional</u>				
9-1-1 Tabular Routing + 9-1-1 ANI				N/A
9-1-1 ALI Database (DB) Services + DB Management				N/A
9-1-1 Network Elements				N/A
9-1-1 Tabular Routing + 9-1-1 ANI 9-1-1 ALI Database (DB) Services + DB Management 9-1-1 Network Elements	\$0.06	\$9,522.06	60	\$571,323.60
<u>Geospatial</u>				
i3 Geospatial Routing				N/A
ECRF/LVF Service				N/A
i3 Logging Service				N/A
9-1-1 Network Elements				N/A
Location Database (LDB)				N/A
OPTIONAL SERVICES				
VESTA® NEXT Data Delivery Service				N/A
VESTA® 9-1-1 as a Service (see next page)				N/A
SUBTOTAL (MRC)				\$571,323.60

TOTALS – NRC/ADVANCE PAYMENTS AND MRC	
SUBTOTAL – NRC/ADVANCE PAYMENTS	\$380,882.40
SUBTOTAL – MRC	\$571,323.60
TOTAL AMOUNT	\$952,206.00

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OPTIONAL SERVICES VESTA® 9-1-1 AS A SERVICE SCHEDULE OF PAYMENTS

NON-RECURRING CHARGES (NRC)

NON-RECURRING CHARGES	Per PSAP/Per Position	Number of PSAPs/Positions	Total Amount
1. VESTA 9-1-1 Backroom (Per PSAP) - Contract Execution – 100%			N/A
2. VESTA Local Survivability (Per PSAP) - Shipment of Equipment to PSAP – 100%			N/A
3. VESTA 9-1-1 PSAP (Per Position) - Shipment of Equipment to PSAP – 100%			N/A
4. VESTA CommandPOST (Per Position) - Shipment of Equipment to PSAP – 100%			N/A
SUBTOTAL (NRC/ADVANCE PAYMENTS)			N/A

MONTHLY RECURRING CHARGES (MRC)

OPTIONAL SERVICES (VESTA 9-1-1 as a Service)	Monthly Rate Per Position	Number of Positions	Monthly Rate Total	Number of Months	Total Amount (Initial Term)
REQUIRED ITEMS					
VESTA 9-1-1 CPE					N/A
OPTIONAL ITEMS					
VESTA Local Survivability (per PSAP)					N/A
VESTA Analytics					N/A
VESTA Map Local - Basic					N/A
VESTA Map Local - Premium					N/A
VESTA Activity View					N/A
VESTA Heads-Up Display					N/A
VESTA Phone CommandPOST					N/A
VESTA SIP					N/A
Incentive – Prepayment (Annual)					
SUBTOTAL (MRC)					
A LA CARTE ITEMS			Price/Training	Number of Trainings	Total Amount
VESTA 9-1-1 Admin. Standard training					N/A
VESTA 9-1-1 Admin. Complex training					N/A
VESTA 9-1-1 Agent training					N/A
VESTA 9-1-1 Agent TTT					N/A
VESTA Analytics Admin. training					N/A
VESTA Activity View training					N/A
VESTA 9-1-1 SMS Admin. Delta training					N/A
VESTA 9-1-1 SMS Agent Delta training					N/A
VESTA 9-1-1 SMS TTT Delta training					N/A
VESTA 9-1-1 SIP Phone training					N/A
VESTA Map training					N/A
Cutover Coaching					N/A
SUBTOTAL (A La Carte)					

TOTALS – NRC, MRC and A La Carte Items	
SUBTOTAL – NRC	N/A
SUBTOTAL – MRC	N/A
SUBTOTAL – A La Carte Items	N/A
TOTAL AMOUNT	N/A

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1. INTRODUCTION

Airbus DS Communications, Inc. (Airbus) is pleased to provide this proposal to Martin County, FL. This proposal is for Internet Protocol (IP) selective routing, database, and network services, and is subject to the negotiation of a mutually acceptable Master Service Agreement setting forth applicable terms and conditions.

We are honored to be the VESTA® 9-1-1 call handling provider for Martin County, FL and many other Public Safety Answering Points (PSAPs) in the State of Florida. Today our solutions provide 9-1-1 services to over 925 call handling positions and 32 systems (Counties) in the State of Florida. We have partnered with many Counties, including Martin, to migrate almost 18 systems in Florida representing 530 positions to the new VESTA 9-1-1 platform with many more in the process. Airbus plays an instrumental role in monitoring and managing many of these 9-1-1 solutions.

In addition to being the leading provider of a call handling system, Airbus has also been a key supplier of 9-1-1 selective routers. Today there are approximately one hundred ECS-1000 selective routers still in service and supported by Airbus. As the industry transitions to NG9-1-1, Airbus has made a very natural transition to a 9-1-1 service provider. Airbus is an approved CLEC in the state of Florida and has an approved tariff for our 9-1-1 routing and related services. We value the relationships we have built over the last two decades and look forward to the opportunity of expanding our role as the State's primary 9-1-1 service provider.



2. VESTA® NEXT PORTFOLIO SERVICES OVERVIEW

Airbus DS Communications recommends an interconnected Emergency Services IP Network (ESInet) configuration for the Martin County. Airbus will engineer, furnish, implement, maintain and make operable an IP routing solution. We have selected two data centers, one in Jacksonville and one in Tampa as illustrated in the network diagram below.

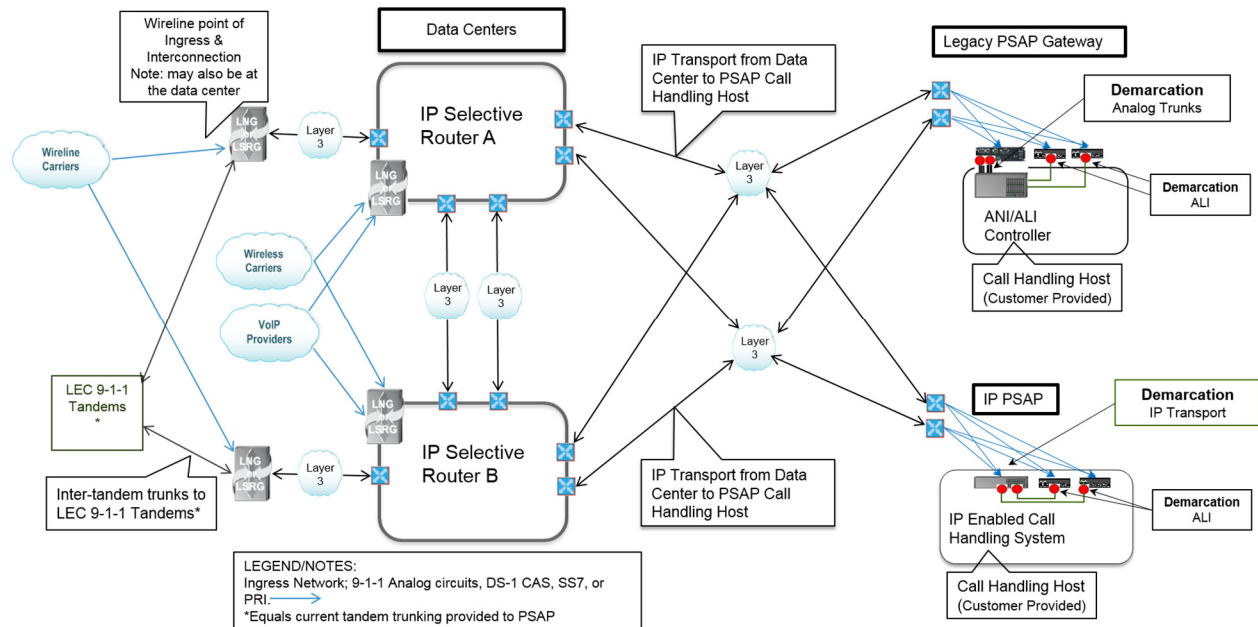


FIGURE 1: NETWORK & ESINET ELEMENTS

SOLUTION GUIDE

The following Solution Guide details the Airbus VESTA® NEXT NG9-1-1 solutions as-a-service overview which includes details on the portfolio offering:

- VESTA® Router Service – NG9-1-1 Call Routing
- The VESTA® Next Portfolio - ESInet
- NG9-1-1 Security Overview
- Service Management
- VESTA® NEXT Location Service
- VESTA® NEXT Data Delivery Service

2.1 VESTA® NEXT Portfolio Services Introduction



Airbus DS Communications, Airbus, launched the VESTA® NEXT portfolio to provide 9-1-1 authorities with a simple, straightforward path to Next Generation 9-1-1 (NG9-1-1) services and functionality. For most 9-1-1 agencies, the transition from legacy E9-1-1 to Next Generation is a substantial change in emergency communications technology, architecture, and infrastructure. Given this level of complexity, it can be difficult for agencies to determine where to start and how to bring all the pieces together. The primary challenges faced include:

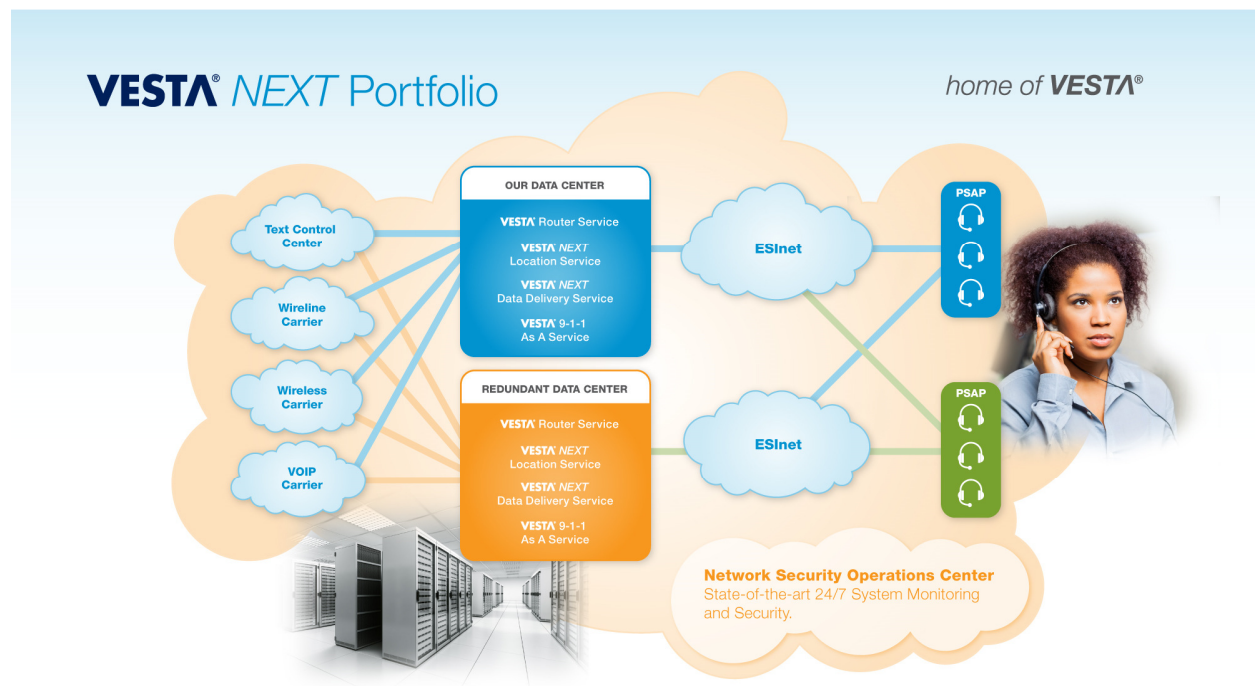
- **Technology.** The change from legacy TDM/analog voice to VOIP touches every aspect of the NG migration. IP based systems offer great advantages in flexibility and availability, but with the change in underlying call routing technologies, there is a significant impact on the rules for emergency communications.
- **Funding.** Funding models have not always adapted to new technologies and new communications modalities.
- **Transition.** The need to support legacy 9-1-1 elements alongside emerging NG9-1-1 technology is a clear requirement. This transition has to occur while continuing the essential service of delivering 9-1-1 calls.
- **Data/Media.** The pace of consumer technology – primarily in the form of smartphones – has dramatically changed the type of information that emergency callers can provide – and that PSAPs will receive.
- **Location Information.** Ongoing advances in location information provide amazingly useful and effective new functionality, but rely on NG9-1-1 deployments to do so.
- **Personnel.** The skills required to purchase, implement, monitor, secure and operate an NG9-1-1 network are very different than legacy implementations.

We recognize there are myriad changes occurring – many of them simultaneously. With this in mind, the VESTA *NEXT* portfolio has been built to allow 9-1-1 authorities to simplify this enormous shift by delivering NG9-1-1 capabilities “as-a-service.” In traditional “**buy, own, operate**” models, agencies are challenged with high up-front capital costs, high support costs, and increases in staffing and training. This traditional model – though it may be what we’re used to – has always come with its own challenges, not the least of which is the high total cost of ownership.

In the **as-a-service** model, Airbus assumes the role of the service provider. Rather than interfacing with multiple vendors (Local Exchange Carrier, Call Handling Solution provider, ALI provider, etc.), Airbus presents all these functions as services. This allows us to deliver advanced capabilities for Network, Routing, and ALI to the PSAPs in a tightly integrated and coordinated manner, and allows the client a single path of escalation and problem remediation. Additionally, this offering - rather than having the traditional large upfront costs is typically offered as a tariffed monthly recurring charge. Airbus maintains responsibility and ownership of the NG platforms and network, removing them as matters of concern for 9-1-1 Authorities, and allowing you to focus on your primary roles without the distraction of vendor or technology management. Further, Airbus delivers 24x7 monitoring and management, solution security, service resilience, and customer visibility which is incorporated into the monthly recurring charge. In short, the service model dramatically simplifies the transition to NG9-1-1 for 9-1-1 Authorities while providing 99.999 percent call delivery through all phases of the transition.

Figure 1 provides a high level view of a NG9-1-1 VESTA® *NEXT* portfolio implementation.

FIGURE 1: VESTA® *NEXT* PORTFOLIO OVERVIEW



In summary, the VESTA® *NEXT* portfolio capabilities deliver real value to Emergency Services Agencies by:

- Providing a seamless, logical transition path to NG9-1-1 that is tailored to a PSAPs specific situation
- Simplifying the otherwise complex shift from legacy E9-1-1 to NG9-1-1 with our experienced teams and fully integrated solutions
- Helping overcome funding issues with an innovative “as a service” approach which provides predictable monthly recurring charges rather than large capital outlays
- Enhancing Public Safety with a solution engineered with resiliency, redundancy, security, and fault tolerance to deliver 99.999 percent call delivery through all phases of transition
- Supporting the complete solution 24x7 with our dedicated Network Security Operations Center (NSOC). This center has been designed from the ground up to support the true mission-critical nature of Public Safety.
- CPE(Computer Premise Equipment) agnostic– delivering a solution that allows existing CPE to remain in place i.e. *not limited* to VESTA® 9-1-1 Call Handling Equipment
- Assuring industry leading approaches to security of the NG9-1-1 solution – both cyber and physical – with a defense in depth approach.
- Providing solution transparency and unparalleled visibility to 9-1-1 Authorities with the MyVESTA™ Portal

The VESTA *NEXT* Portfolio addresses PSAPs needs in 6 critical areas. More detail information is provided in the subsequent service description sections:

- VESTA® Router Service
- ESInet
- Security
- Service Management
- Location Database
- Data Delivery Service

3. VESTA® ROUTER SERVICE – NG9-1-1 CALL ROUTING

A foundation in the VESTA NEXT portfolio is the VESTA® Router Service. In order to effectively transition from legacy call routing and call delivery, Public Safety agencies are faced with a myriad set of choices related to the transition to Next Generation capabilities. The VESTA Router Service is specifically designed and engineered to provide a regional or statewide solution that accommodates both legacy and Next Generation call routing. The Airbus depth and breadth of experience and our single-minded focus on Public Safety brings a Next Generation call routing solution that is focused on:

- **Reliable call delivery.** The VESTA Router Service has been designed, engineered, and tested to achieve or exceed 99.999% availability goals. When coupled with our ESInet capabilities, the solution assures an end-to-end ability to deliver crucial emergency calls.
- **Flexible, predictable call routing.** Critical for 9-1-1 authorities, our service offers a rich set of call routing options that are implemented specifically to the PSAPs requirements. (See section 3.2 for detailed routing information)
- **Future proof technology.** In a service environment, Airbus assumes full responsibility for delivering technology and routing advances to meet the evolving needs of our public safety customers. Upgrades to technology in our data centers, ESInet, Cyber-security, and in monitoring are managed completely by Airbus.
- **Security.** Cybersecurity takes on much greater relevance as the transition from legacy telecom solutions to IP based environments continues. The call routing platform implements advanced technologies to secure databases, data transmissions, and interconnections. Defense in depth is our common approach and incorporates security on all aspects of physical, logical and operational elements to protect customer systems and their sensitive data. It puts multiple layers of security throughout the system for redundancy and quick isolation of breeches.
- **24x7 Management and Monitoring.** Continuously monitoring 9-1-1 Authorities operations is an enormous undertaking in a truly mission critical Public Safety environment. Our NSOC assures our customers that the call routing solution is fully operational while maintaining awareness of any situations that may indicate the need for intervention. Advanced system management tools have been deployed across the solution to assure system integrity.

The VESTA Router Service is typically offered via state tariffs – much as 9-1-1 Authorities pay tariffed rates for Tabular Routing and ALI services from legacy providers today. For the most up-to-date listing of our state tariffs, please visit <http://www.airbus-dscomm.com/misc/tariffs.php>.

The VESTA Router Service adheres to the NENA specifications and its continuing evolution to more specific standards. This standards based approach is intended to combine strong functionality with the predictability that comes when following standards.

Our service allows for a graceful transition from legacy call routing to Next Generation. Transitional elements can remain in place to perform legacy functions while your agency migrates to a full i3 environment over time. The Airbus focus is on availability, performance, security, and flexibility to provide the routing capabilities that carry public safety agencies forward.

3.1 The VESTA Router Service Functional Description

The Airbus implementation of call routing brings together a number of technologies and leading providers to implement highly available, secure, high performance call routing for 9-1-1 Authorities.

Our Next Generation routing solution is deployed on enterprise-class servers with virtual machine (VM) technology – all under Airbus active management and monitoring. The hardware and software infrastructure is highly reliable and aligned with industry best practices for a public safety solution. The standard VESTA Router Service deployment is both redundant and geo-diverse with data centers located within the same geographic region.

From a functional perspective, the crucial elements of the solution include:

- **Legacy Network Gateway (LNG).** An NG9-1-1 Functional Element that provides an interface between a non-IP originating network and a Next Generation Core Services (NGCS) enabled network. In a transitional i3 environment, OSP connections – such as SS7, Analog 9-1-1, and DS1 CAS - are converted from their legacy voice delivery to SIP for routing within the NG network.
- **Legacy Selective Router Gateway (LSRG).** The LSRG is another transitional element designed to maintain legacy E9-1-1 requirements. The LSRG provides an interface between a 9-1-1 Selective Router and an ESInet, enabling calls to be routed and/or transferred between Legacy and NG networks. A tool for the transition process from Legacy 9-1-1 to NG9-1-1.
- **Session Border Controller (SBC) and Border Control Function (BCF).** In NG9-1-1 terms, the BCF delivers much of the functionality associated with and SBC. In the Airbus implementation both an SBC and BCF are used at the boundary of the routing function. This provides a secure entry into the ESInet for emergency calls presented to the network. The BCF incorporates firewall, admission control, and may include anchoring of session and media as well as other security mechanisms to prevent deliberate or malicious attacks on PSAPs or other entities connected to the ESInet.
- **Emergency Service Routing Proxy (ESRP).** The ESRP is an i3 functional element which is a SIP proxy server that selects the next hop routing within the ESInet based on location and policy. There is an ESRP on the edge of the ESInet. Additionally, there is usually an ESRP at the entrance to an NG9-1-1 PSAP. There may be one or more intermediate ESRPs between them. Once the call has entered into the network via the SBC or LNG, the ESRP will use a variety of different call routing rule sets. In our architecture, the ESRP utilizes multiple Functional Elements to make the routing decision including the ECRF and PRF.
- **Emergency Call Routing Function (ECRF).** The ECRF is a functional element in an ESInet. It is a Location to Service Translation (LoST) protocol server. Location information, either civic address or geo coordinates, plus a Uniform Resource Name (URN) are inputs to a mapping function that returns a Uniform Resource Identifier (URI). The URI is used to route an emergency call toward the appropriate PSAP for the caller's location or towards a responder agency. This function is invoked via the ESRP sending a query to the ECRF to route to the intended agency.
- **Policy Routing Function (PRF).** The ESRP, in addition to querying the ECRF, utilizes the Policy Routing Function. The PRF function is invoked to determine which PSAP call processing equipment is available to receive a call. PRF functions are customizable for each agency to make the best routing decision for each device that is available to the PSAP. Alternate routes can be configured based on PSAP availability. PRF policies are compliant to the NENA defined policy definitions and format.

- **Egress Border Control Function (EBCF).** Essentially the same functionality as described above for SBC and BCF. In this case, the egress BCF performs this function at the egress point of the call router.
- **Dial Plan Proxy (DPP).** The call routing platform supports a DPP functionality to process digits received from call handling equipment (including star codes) to allow functions such as a call transfers to a SIP URI.
- **Media Server** – Utilized within the routing platform to anchor and support multi-party conferencing.
- **Legacy PSAP Gateway (LPG).** The LPG is among the transitional elements available to support legacy PSAP environments. The LPG supports a SIP interface towards the ESInet on one side, and an Analog 9-1-1 like traditional MF or Enhanced MF interface (comparable to the interface between a traditional Selective Router and a legacy PSAP) on the other.
- **Selective Routing Database (SRDB).** The routing table that contains telephone number to ESN relationships which determines the routing of 9-1-1 calls.

The diagram in Figure 2 illustrates the aforementioned functional elements as well as the Operations, Administration, and Management elements of the solution. Note that the diagram represents an implementation with redundant/diverse call routing chains i.e. both the call routing and service host/management application functions are duplicated.

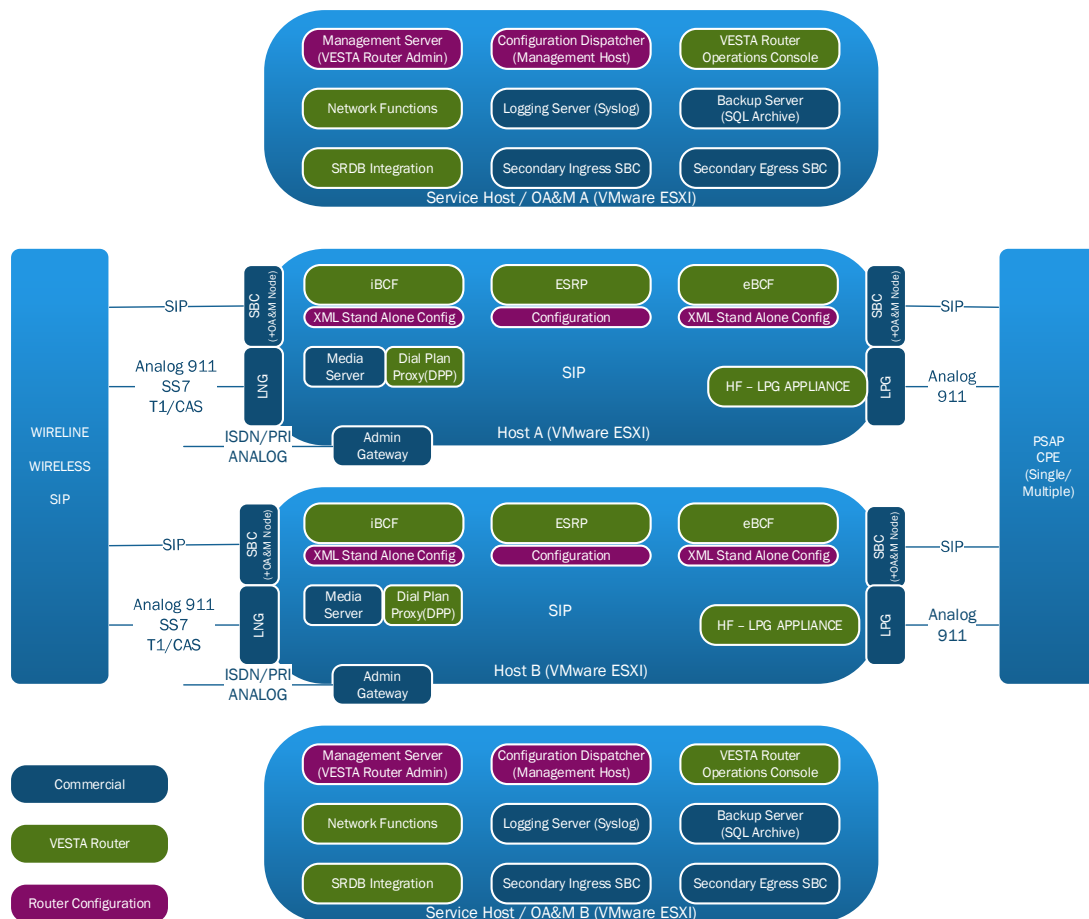


Figure 2: VESTA® Router Service Functional Diagram

3.2 Summary

In most instances, the VESTA Router Service is initially deployed as an IP selective router that will route 9-1-1 calls to the correct PSAP based on ESN. Our routing solution processes an incoming emergency call/request for service, routes the call/request to the correct PSAP based on the ESN and pre-configured routing rules, and sends the call/request to the appropriate call handling system.

Once the call has entered the network via the SBC or LNG, the Emergency Service Routing Proxy (ESRP) will use a variety of call routing rule sets. In our architecture, the ESRP will utilize multiple Functional Elements to make the routing decision.

These include the ESRP sending a query to the ECRF to route to the intended agency. In addition, the PRF function is invoked to determine which PSAP call processing equipment is available to receive a call. PRF functions are customizable for each agency to make the best routing decision for each PSAP or device that is available to the PSAP.

After a routing decision has been made the call is processed and handed off through the BCF, SIP B2BUA, or SBC. This allows SIP messaging to be normalized prior to delivery to the CPE.

We also support i3, SIP-T, LNG/Analog 9-1-1, and RFAI call delivery to all leading equipment manufacturers currently in the market. This allows PSAPs to utilize ESInet resources on legacy equipment.

In preparation for tabular routing, Airbus performs the following activities:

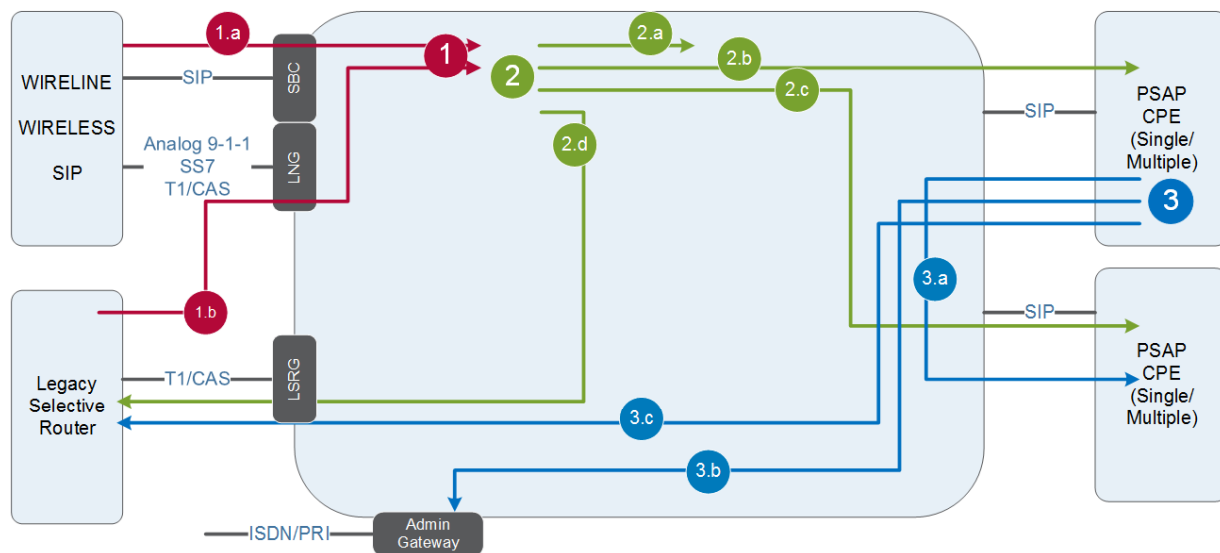
- Load Master Street Address Guide (MSAG) data (Selective Routing Database - SRDB based on ESN) provided by customer
- Upload SRDB updates including Service Order Input (SOI) record updates
- In consultation with the customer, develop and implement custom policy rules for:
 - Tabular Routing
 - Trunk Group Routing
 - Primary Route
 - Overflow Route
 - Busy Route
 - Dial Plan Proxy including star codes
 - Network Transfers
 - Network Conferencing
 - Abandon PSAP
 - Default Route
 - Configurable Timer for Ring No Answer
- Manage changes to routing policy as required
- Configure Automatic Location Information (ALI) steering for wireless calls

Routing rules will be configured for all inbound emergency calls. Routing rules can be based on the call type (wireline, wireless, VoIP, etc.), location information of the calling party, the originating service provider (OSP) of the trunk, or trunk group, as an example. Airbus will manage the routing of calls, including the ability to re-route in the event of an outage or availability of a PSAP. In addition, a PSAP may opt for a physical abandon PSAP switch which – when activated – initiates a reroute of all incoming calls to an alternate PSAP.

Airbus recommends 9-1-1 Authorities move toward geospatial routing in a phased approach, starting with IP routing and then migrating to geospatial routing, consistent with the FCC's TFOPA Working Group 2 report, from December 1st, 2016. This allows the GIS data and processes to be perfected in order to meet the 98% accuracy goals set forth by NENA. While VESTA Router will support the migration to an i3 geospatial routing service in the future, incremental licensing will be required in the “as a service” model.

3.1 NG9-1-1 Call Routing – Common Scenarios and Supported Options

The diagram below illustrates common call routing scenarios from source to destination. Primary route, alternate route, and abandoned calls are included – as well as typical conferencing scenarios.



- 1 Incoming Calls** (a: Phone provider; b: LSRG)
- 2 Call Routing** (a: abandoned, rejected, fail; b: Primary Route; c: Alternate Strategy; d: LSRG)
- 3 Call Transfer/Conferenced (Optional Step)** (a: Other PSAP; b: PSTN; c: LSRG)

FIGURE 3: VESTA® ROUTER: ROUTING SCENARIOS

VESTA Router Service - Call Routing Options

Typical call routing is accomplished through IP Selective Routing, Trunk Group Routing, Default Routing, and Abandon PSAP Routing.

IP Selective Routing is the routing of a 9-1-1 call to the proper PSAP based on the location of the caller. Selective Routing is typically accomplished by mapping the ANI to an ESN that has been derived based on the caller's location. The ESN maps to a specific routing rule that identifies the PSAP and possible alternative destinations.

Trunk Group Routing can be implemented as required by agencies. Inbound trunks, typically from a given telecommunications carrier, can be designated to route all calls to a given destination, usually a specific PSAP. If Trunk Group Routing is not specified the system is normally provisioned to provide IP Selective Routing.

Default Routing assures call delivery when standard routing rules cannot be applied. When an incoming 9-1-1 call cannot be selectively routed due to the reception of an ANI number that is either not stored in the selective router data base, unintelligible ANI or when no ANI number is passed, a predetermined call route – as determined by the agency – will direct the call to the default PSAP. This routing is commonly based upon the incoming trunk facility of the call.

PSAP Abandonment Routing allows an agency to pre-determine alternate routing in the event of PSAP closure. If a situation arises where a PSAP must be closed or evacuated, PSAP management personnel have several “abandon” options include the VESTA-Abandon PSAP Switch which communicates with the routing platform to activate alternate routing. Alternatively, authorized PSAP personnel can notify the Airbus NSOC to activate alternate routing.

In addition to standard call routing options, a number of network transfer and conferencing capabilities are also available on the VESTA Router Service. These are in addition to “local” conferencing capabilities available on the VESTA® 9-1-1 call handling solution.

Fixed transfer is a feature that enables a Calltaker to transfer a 9-1-1 call to a secondary destination (possibly another PSAP) by dialing a pre-assigned speed dial code or by use of a single button on an approved Customer telephone system that dials the appropriate code.

Selective Call Transfer. A feature enabling a PSAP call taker to transfer an incoming 9-1-1 call to another agency by dialing a pre-assigned speed dial code associated with police, fire or medical agencies or by use of a single button on an approved Customer telephone system that dials the appropriate code. The specific transfer destination is determined by the caller’s originating location as specified by the ESN.

Manual Transfer. A PSAP call taker may transfer an incoming call manually by depressing the hook switch of the associated telephone or the “add” button on the Customer telephone system, and dialing either a seven or 10-digit telephone number.

Alternate Route Transfer. The overflow call disposition transfer feature enables the ability for callers to be terminated either to a previously designated alternate call center or to a busy tone when all PSAP trunks are busy.

Call logging is also a standard feature of the VESTA Router Service. The call event logging feature delivers reporting information containing:

- The ANI received from a 9-1-1 call
- The identity of the incoming trunk the Selective Router received the call over
- The identity of the outgoing PSAP trunk the call is terminated to
- The date and time the call was delivered to its target destination, transferred and/or disconnected.

4. THE VESTA® NEXTPORTFOLIO - ESINET

The VESTA NEXT portfolio consists of four ESInet network segments in an NGCS solution:

1. **IP Wide-Area-Network (IP-WAN).** Connects the IP Selective Router to PSAPs via diverse and redundant IP routes.
2. **Originating Service Provider (OSP) Ingress Network.** Connects wireline, wireless and VoIP providers that deliver 9-1-1 calls.
3. **Legacy Network Connectivity.** Connects to legacy 9-1-1 selective routers supporting traffic to new IP selective routers, for transfer of 9-1-1 calls (to and from) with neighboring PSAPs not on same IP selective router and for interflow of split rate center traffic.
4. **Inter-Data Center Network.** For inter-data center synchronization.

At Airbus, we offer an end-to-end solution to build, secure, monitor, and maintain the network. This begins with a regional network assessment to design primary, redundant and even secondary networks and continues with the migration of the customer's existing OSP networks. Further, the network is built in anticipation of growth driven by increased multi-media payloads.

Our ESInet services are typically provided under State Tariffs as Airbus continues to expand our Competitive Local Exchange Carrier (CLEC) footprint. These tariffs illustrate our single-minded focus on providing industry leading solutions for Public Safety. As of this writing CLEC certification has been achieved in 10 states including Florida. For the most current CLEC coverage please refer to <http://www.airbus-dscomm.com/misc/tariffs.php>.

In the subsequent section on the ESInet, we focus on key areas of the Airbus provided solution including:

- **Reliability, Availability, Survivability.** Achieved through careful design, engineering, and deployment of high availability elements throughout the system.
- **Awareness, monitoring, and maintenance** via the Airbus NSOC. Purpose built and staffed specifically for public safety's mission critical mandate, the NSOC incorporates industry leading tools to stay ahead of issues, and to respond rapidly when the situation demands.
- **Performance** assured by detailed analysis of required and anticipated capacity, selection of carrier grade componentry, thorough interoperability testing, implementation of end-to-end QoS, and intense 24x7 scrutiny by the Airbus NSOC.
- **Scalability** achieved by sizing components for growth, careful monitoring of utilization across all components, and initiating upgrades well in advance of system degradation.
- **Security** issues mitigated through the use of defense in depth strategy. Careful analysis of threat vectors combined with leading edge security tools allow issues to be identified early. Detailed security processes and procedures assure rapid and effective response.
- **Adherence to standards** by continued commitment to NENA specifications.
- **Flexibility** to meet customer requirements, e.g. choice of transport options, optimized data center locations, agency specific or mandated security options

4.1 ESInet and Routing Data Center Infrastructure

A critical element in the VESTA *NEXT* portfolio is the Airbus Data Centers. Our data centers, located in Jacksonville and Tampa, are designed, engineered, and deployed specifically to meet the critical demands of Public Safety. The underlying Tier 3 and/or Tier 4 data center costs, regardless of location chosen, is included as part of the service and integral to maintaining 99.999% call delivery to PSAPs.

The VESTA *NEXT* portfolio architecture is implemented with redundant data centers which include:

- Core IP emergency call routing
- Network routing and switching
- Management and system administration elements
- Legacy Network Gateway/Legacy Selective Routing Gateway (LNG/LSRG)
- Provide points of interconnection (POI) for the Originating Service Provider (OSP) carriers' ingress/egress to the Public Switched Telephone Network (PSTN).

The data center locations are strategically chosen based in part on Local Access and Transport Area (LATA)/regulatory need, as well as existing PSTN/carrier co-location efficiency. As an example, data centers are chosen such that inter-LATA costs are mitigated and are located in separate LATAs, but within LATAs that contain existing tandem pairs.

Geographic diversity is an important consideration in planning for data center locations in order to mitigate and impact of an emergency event. In addition, Airbus selects Hardened Data Centers (N+2) that meet TIA-942 requirements. The Figures below outline the TIA-942 Tier 3 and Tier 4 requirements/recommendations to reference. TIA-942 generally defines the difference between Tier 3 and Tier 4 data centers as follows:

Rated-3/Tier-3: Concurrently Maintainable Site Infrastructure

A data center which has redundant capacity components and multiple independent distribution paths serving the computer equipment. Typically, only one distribution path serves the computer equipment at any time. The site is concurrently maintainable which means that each and every capacity component including elements which are part of the distribution path, can be removed/replaced/serviced on a planned basis without disrupting the ICT capabilities to the End-User. It has protection against most physical events.

Rated-4/Tier-4: Fault Tolerant Site Infrastructure

A data center which has redundant capacity components and multiple independent distribution paths serving the computer equipment which all are active. The data center allows concurrent maintainability and one (1) fault anywhere in the installation without causing downtime. It has protection against almost all physical events.

In addition to meeting the Tier3/4 requirements the following is also considered:

- Full review of data center's history of full availability
- Alternate entrance facilities with full redundancy
- Audit of data center's ability to provide fuel for back-up generator
- Roof access for RF-based master time clock antenna.
- ILEC colocation
- Diverse IP carrier capability between data centers and for egress between data centers and PSAPs

In summary, Airbus Data Centers in Jacksonville and Tampa, are specifically suited to serve Public Safety. All aspects of security, connectivity, and availability have been considered in establishing these mission critical facilities.

4.2 IP Wide-Area-Network (IP-WAN) Transport Technology

Airbus understands the absolute critical nature of all elements of the NG 9-1-1 solution. This is at the forefront of the design and engineering principles used in all network solution deployments.

As contrasted to carrier based solutions, Airbus is "carrier agnostic" which allows us **flexibility** in choosing the absolute best in class solution to build the IP-WAN for the specific customer implementation. Airbus specifications provide reliable, resilient and redundant IP-WAN connectivity which can be met by several available IP transport technologies. We apply stringent guidelines to our IP-WAN providers used as part of the solution.

The advantages of an Airbus provided IP-WAN are well documented, and include:

- **Inherent Security.** Network traffic is not deployed on a shared IP network. It does not use the Internet for transport, nor does it have connections to the internet. (Additional security aspects of the ESInet solution are discussed further in section 4.
- **Scalability.** With port speeds commonly ranging from 1.5Mbps up to 10Gbps, Airbus deployed IP-WAN networks are able to scale to carry extremely large volumes of traffic. This becomes crucial as multi-media payloads become more prevalent in emergency communications.
- **Quality of Service.** QOS is crucial in an environment where voice traffic is being carried across the network. Real-time QOS marking insure that voice traffic receives the highest priority transport treatment relative to lower priority tasks such as database replication.
- **Availability/Resilience.** Airbus deployed IP-WAN networks sense network congestion and network outages and reroute traffic within milliseconds. Airbus engineers the ESInet to achieve 99.999 percent availability assuring crucial emergency call delivery.

Alternatively, a wide range of reliable point-to-point private line products can be engineered and provisioned to produce a high availability solution for WAN connections. This may involve the use of alternate carriers, alternate entrance facilities, and 4G LTE backup options. This would also include FirstNet when available and after verification that it meets Airbus specifications.

Airbus continually evaluates transport options to assure that the ESInet service keeps pace with advances in technology.

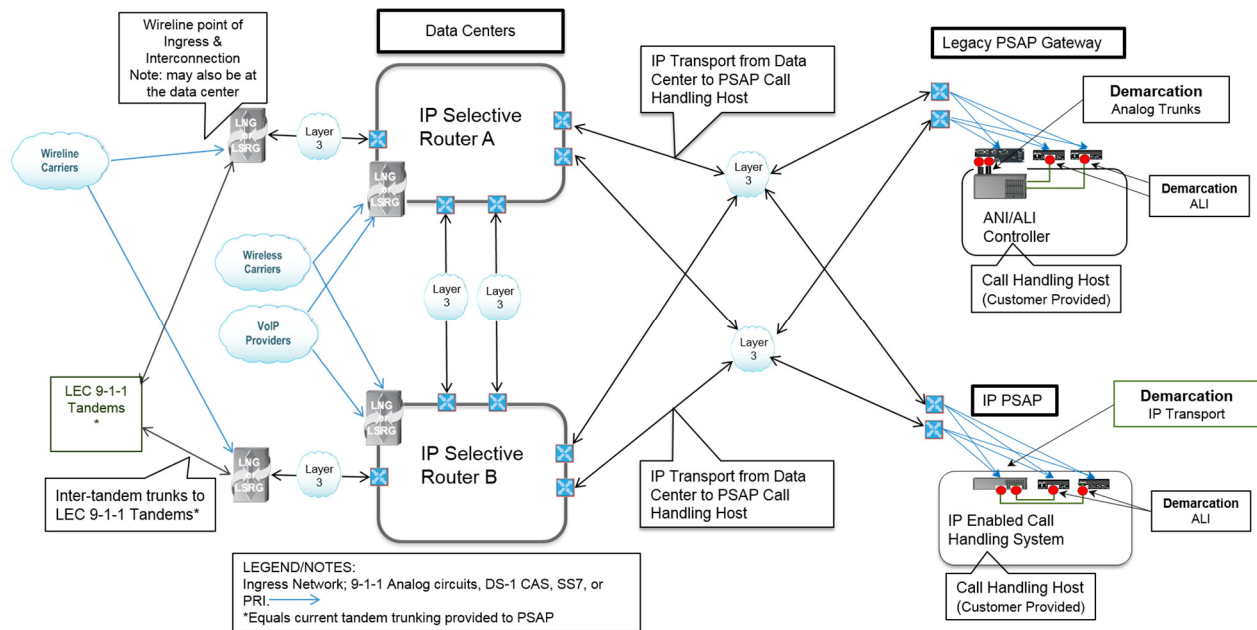


FIGURE 4: NETWORK & ESINET ELEMENTS

4.3 Originating Service Provider (OSP) Ingress Network

As a registered CLEC, Airbus manages diverse Points of Interconnect (POI) with Originating Service Providers (OSPs). The supported Points of Interconnect provide connectivity to all sources of emergency call origination for 9-1-1 Authorities including traditional telco circuits, SIP connections, and connections to Legacy Selective Routers. These interconnects are provisioned in-state or in-region to provide greater levels of control, performance, security, and reliability.

The Point of Ingress and Interconnection for the OSPs is the Legacy Network Gateway (LNG). The Point of Ingress and interconnection for a Legacy 9-1-1 Service Provider is the Legacy Selective Router Gateway (LSRG). Airbus designs, engineers, and provides the points of ingress where the OSP trunks and/or SIP circuits of other providers will terminate.

Our typical design includes diverse circuit termination - dual-homed and/or load-balanced - from the OSPs across geographically diverse paired data center sites and across multiple gateways to minimize loss of call routing capacity and services.

Airbus has the ability to terminate the complete range of OSP ingress connections. This is particularly crucial during an extended transitional phase as OSPs move to more IP based communication. The connection types supported include:

- Analog 9-1-1
- SIP
- SS7
- T1/CAS

The wireless and VoIP OSPs are required to terminate 9-1-1 traffic at a location designated by the PSAP(s). In most cases, the ingress traffic transport consists of SS7 and T1 based trunking, terminated on Legacy Network Gateways (LNGs) at our data centers. Airbus coordinates the transition and manages the ingress demarcation with a preferred termination point being the Airbus Data Centers.

Additionally, SIP based traffic is increasingly common and is provisioned on our data center Session Border Controllers (SBC). SBCs provide a crucial layer of security along with other capabilities such as interoperability and topology hiding. Movement to IP based voice traffic is an inevitable trend as OSPs continue to replace legacy PSTN voice networks with Voice Over IP (VOIP) services.

In summary, Airbus provides:

- Points of Interconnection
- End Office to Tandem trunks matching the existing tandem trunking services
- Inter-tandem trunks to LEC 9-1-1 Tandems matching the current inter-tandem trunking services
- Legacy Selective Router Gateways (LSRG's) to terminate trunking back to the existing E9-1-1 LEC tandem during the transition phase. These trunks will allow call transfers between the LEC E9-1-1 tandem and the VESTA Router.

4.4 Legacy 9-1-1 Network

Legacy Network Connectivity is delivered through gateway functionality including the LSRG and LPG. LSRG connectivity provides:

- Preliminary migration option to route all 9-1-1 calls from legacy SR to new IP SR at one time
- Transfer connectivity for calls to and from neighboring PSAPs not on the same IPSR.
- Selective router trunks to route split rate center traffic as necessary

From a program perspective, once the Airbus call routing platform installation is complete and in-service, Airbus will provide the LSRG and inter-tandem trunks - matching the current trunking services - necessary for the handling of E9-1-1 call transfer between the Airbus call routing platform and those PSAPs still connected to the legacy E9-1-1 LEC tandems.

Lastly, egress must also include connectivity to neighboring jurisdictions still served by legacy selective routers – typically provided by the telcos. Legacy Selective Router Gateways (LSRG's) will be provided to terminate trunking back to the existing E9-1-1 LEC tandem during the transition phase. These trunks will allow call transfers between the LEC E9-1-1 tandem and the Airbus provided IP selective routers.

Obviously, the primary egress point for emergency calls is via the ESInet to agency PSAPs. In many cases, call handling equipment is already ESInet “capable” and can accept IP based calls and associated data. For example, current versions of VESTA 9-1-1 is ESInet capable when implemented with the ESInet Interface Module (EIM).

Alternatively, when PSAPs are still utilizing legacy analog call handling equipment, egress traffic must be converted from IP based communication back to legacy formats such as T1/Analog 9-1-1. This conversion is accomplished through the Airbus provided Legacy PSAP Gateway (LPG) during this transitional period.

4.5 Inter-Data Center Links

Inter-Data Center links deliver a number of crucial capabilities in delivery of the ESInet including:

- Database replication
- Alternate routing and call paths
- Load balancing
- Resiliency/Redundancy of Data Center call processing.

Airbus selects best-in-class network elements from available regional options to assure highly available connections between centers. A full range of options are considered ranging from dark fiber, optical private lines, Virtual Private Line (VPL), SONET. Inter-data center connections are designed with alternate carrier paths, alternate entrance facilities, and other diversity options to insure reliable communications.

4.6 ESInet Security

Note: Cybersecurity is covered in depth in Section 5.

As 9-1-1 Authorities move from legacy network environments to a more open Internet Protocol (IP) based solution, the risk profile changes. Security of the ESInet is a top priority at every level. Our security program adheres to industry standards and guidelines and utilizes the defense in depth strategy.

Defense in depth covers all aspects of physical, logical and operational security to protect your systems and their sensitive data. It puts multiple layers of security throughout the system for redundancy and quick isolation of breeches.

Airbus utilizes Session Border Controllers at the edge of the ESInet to provide firewall-like security for ingress/egress call flows. In addition, an application firewall (hardware/software) is also added to BCF instances to provide added safeguards for data that is not associated with the voice call process. This firewall will protect against all IP traffic and allow separation of networks.

Intrusion Detection Sensor/Intrusion Prevention Sensor (IPS/IDS) systems are also employed with subscription based services for signature based monitoring. The VESTA *NEXT* portfolio service maintains up-to-date subscriptions for all deep level packet inspection that occurs at all edge points touching the commodity internet. Physical and application layer based firewalls are also deployed at the points of interface to foreign networks.

5. SECURITY

As 9-1-1 Authorities moves from a legacy, TDM landline network environment to a more open Internet Protocol (IP) based solution, the risk profile changes substantially. Security becomes one of the most critical aspects during and after the transition to IP based systems for voice, data, applications, and databases. The VESTA *NEXT* portfolio of services makes security a top priority at every level. Our security program adheres to industry standards and guidelines and utilizes the defense in depth strategy.

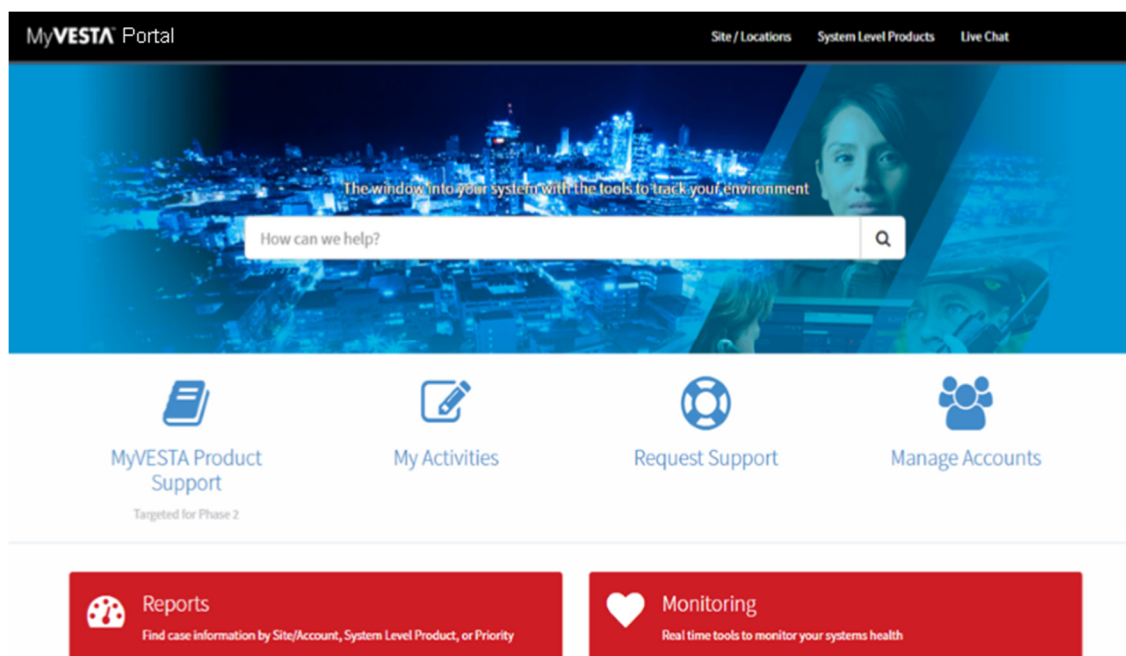
5.1 NG9-1-1 Security Overview

For agencies responsible for emergency call delivery, keeping up with rapidly evolving threat vectors has never been more challenging as recent headlines can attest. Ransomware, Denial of Service (DOS) attacks, Telephone Denial of Service (TDOS) attacks, are just a few of the threats facing PSAPs today.

Airbus has extensive expertise in the form of trained personnel, industry best practice security processes, and advanced security tools to mitigate the myriad threats to the mission critical NG9-1-1 operations. This expertise in Security is an inherent component of the VESTA *NEXT* portfolio including the VESTA Router service, ESInet, and Location Services. These security capabilities are delivered by Airbus as a fully monitored and managed service to provide seamless operation.

Once an NG9-1-1 system is fully deployed, one of the most critical operational activities is the proactive monitoring and response for all components within the core services offering; security is a critical part of this proactive monitoring. This allows Airbus to perform pre-emptive intervention to mitigate potential issues as well for proper investigation and trending of issues. When actionable issues are identified, they are addressed based on the order of critical priority. All activity is fully available to the 9-1-1 Agency staff via the MyVESTA® portal.

Figure 5: MyVESTA portal



5.2 Airbus Approach to Logical Security

The Airbus approach to logical NG9-1-1 network security includes a comprehensive strategy, policy set, and management to ensure that the Airbus provided NG9-1-1 network is as secure as possible. Airbus uses Firewalls, IDS / IPS systems, Anti-Virus scanning and malware scanning at all interworking points. Interworking points are defined as any connections between trusted and untrusted zones as well as internal points of connection between different designated security zones. All traffic is directed by access controls lists to the designated destinations, largely using encryption and precise link quality monitoring.

Assessing Risk. Airbus maintains a comprehensive security plan built on widely accepted risk management framework. The security plan in turn identifies a thorough Risk Assessment. All deployments or major subsets of deployments require a Risk Assessment to be executed against them prior to a transition to production status, with a validating vulnerability scan to confirm the solution as deployed into production is the same as the solution as designed. The Airbus Risk Assessment process outputs a confidential report which is shared with designated PSAP personnel. Risk Assessments are refreshed following any major changes or at a minimum annually on all deployments or major subsystems of deployments. Airbus will support external or coordinated internal third party Cyber Risk Reviews to validate the overall solution, the interfaces and attack surfaces to ensure that integration is functioning properly.

Establishing Security Policies Based on Assessed Risk. From this Risk Assessment, policies and procedures are constructed to avoid / accept / reduce / transfer the risks. The objective of the overall security program is to require monitoring of every production device, with change management engaged for any alteration to production devices, and an incident response plan to be implemented as needed for impacts to production devices. Monitoring is provided through a suite of IBM sourced enterprise grade networking monitoring and endpoint monitoring and security tools in addition to custom scripts which interrogate specific subsystems as a failsafe.

Data Security. All NG9-1-1 platform data is categorized and protected under an umbrella of confidentiality labels, with sub-labels and specific controls depending on increasing levels of sensitivity. Specifically - CPNI, PHI, PII, Infrastructural, and Security will all be called out in addition to other categories when specifically required by PSAPs being served. Storage of all data within the datacenters and Airbus HQ in Temecula will be encrypted “at rest”, with all dataflow between all sites encrypted “in motion” via VPN tunnel.

Personnel Security Measures. Security, Monitoring, and Incident Response are all areas significant emphasis for Airbus, with certified and experienced personnel engaged, and holding the following certifications: CISSP, CISM, CISA, CRISC, and CGEIT. All Airbus personnel are subject to credit and criminal background checks on a pre-employment and annual basis as well as pre-employment drug testing. Airbus staff access authority levels is dependent on successful completion of those checks coupled with a business need to know of specific details. The support personnel are broken into functional elements supporting customer business, operations, technical, and security needs, with access to Customer Confidential Data being regulated along those lines.

5.3 Security Elements

Session Border Controllers. Airbus utilizes Session Border Controllers at the edge of the ESInet to provide firewall-like security for ingress/egress call flows. The SBC is responsible for managing security of the SIP traffic by providing:

- Call Admission Control
- Topology hiding
- Transcoding where needed
- Signaling protocol normalization and interworking
- Network Address Translation (NAT)
- Codec negotiation
- Support for QoS and priority markings
- Media proxy

Application Firewalls. An application firewall (hardware/software) is also added to BCF instances to provide added safeguards for data that is not associated with the voice call process. This firewall protects against all malicious IP traffic and allows separation of networks. Application Firewalls deliver a range of critical security functions including:

- Border firewall
- Virtual Private Network functions
- IDS/IPS
- SBC
- Opening and closing of pinholes
- Limiting access to critical components using VLANs

Within the application firewall, IPS/IDS systems are employed with subscription based services for signature based monitoring. The VESTA *NEXT* portfolio service maintains up-to-date subscriptions for all deep level packet inspection that occurs at all edge points touching the commodity internet. Physical and application layer based firewalls are also deployed at the POI to foreign networks.

5.4 Airbus Approach to Physical Security

The Airbus approach to physical NG9-1-1 network security includes a comprehensive engineered strategy, policies, and associated management elements to ensure that the NG9-1-1 network is as secure as possible. The approach includes: selection of hardened facilities, ingress/egress authentication controls, physical security personnel, enterprise-wide dynamic credential control, real-time monitoring, and historical reporting. The physical security strategy can be segmented into three primary areas, PSAP facility, NSOC facility, and IP Transport facility.

PSAP Facility Access. All relevant facilities will have access controls with authorized personnel lists administered through the Airbus NSOC working in concert with 9-1-1 Authorities and with the source vendor suppliers. Typically PSAP physical security is assumed to be provided by Government Agency personnel and staff. Security / Access requirements, access list updates, and other interactions will be coordinated through the Airbus NSOC. Access will be limited by policy to engineering personnel required to access the equipment for maintenance purposes. All materials will be kept in a locking cabinet with remote monitoring of access events.

NSOC Facility Access. Physical access to the NSOC requires biometric access as well as possession of a keycard. Logs of events are maintained indefinitely and are reviewed weekly and monthly. The technology space servicing the NSOC as well as systems on site which operate in support of the NSOC (servers, switches, routers, firewalls, UPS systems) is contained within a small data floor accessed by passing through the NSOC, then authenticating to enter that specific data floor.

IP Transport Facilities. Physical networking between the sites will be secured with locking and monitored fiber vaults which are geographically diverse and supporting diverse fiber paths between the relevant facilities. Fiber paths between facilities that may potentially be vulnerable to tapping or disruption. To mitigate this issue, Airbus – in concert with selected network providers - engineers diverse path / diverse provider connections.

6. SERVICE MANAGEMENT

Routine system monitoring, network connectivity issues and ongoing cyber threats can consume valuable time and resources. Airbus removes these burdens from the 9-1-1 Authority and mitigates associated risks with vital network operations services that include technical support, system monitoring and security – 24/7 – from our state-of-the-art Network Security Operations Center (NSOC).

Of critical importance to 9-1-1 Authorities – and key among our strengths - is the ability to quickly and accurately manage service impacting issues. Additionally, since no system remains static, the Service Management capabilities must be designed to effectively manage system changes while continuing to deliver emergency calls.

The VESTA Router Service includes Service Management capabilities to provide an unparalleled level of transparency to 9-1-1 Authorities in the categories of:

- Case Management
- Configuration Management
- Problem Management
- Change Management
- Service Level Management

SERVICE MANAGEMENT SYSTEM – INCORPORATES

Process	Description
Case Management	The primary goal of the case management process is to restore normal service operation as quickly as possible and minimize the adverse impact of incidents on emergency management business operations, thus ensuring that the best possible levels of service quality and availability are maintained. <i>Normal service operation</i> is defined here as an operational state where services and Configuration Items e.g. servers, routers, databases - are performing within agreed service and operational levels.
Configuration Management	<p>The configuration management system underpins all case management activities. It not only hosts the case and other service management records, but contains details of the infrastructure vital to efficient overall system functionality.</p> <p>When Customer Information records are identified as inaccurate, case records are created and assigned to configuration management for correction.</p>
Problem Management	<p>Problems can be initiated from a case when determining if the root cause of the incident needs further investigation.</p> <p>Incident information is proactively analyzed to detect trends in service behavior that may be indicative of an underlying problem.</p> <p>Information about known errors and their workarounds is used to diagnose and resolve recurring cases faster.</p>
Change Management	A request for change (RFC) can be submitted in order to implement a workaround or a resolution. An RFC can detect and resolve cases that arise from changes to the system.

Process	Description
	Change management is responsible for keeping the NSOC informed of all scheduled changes.
Service Level Management (SLM)	<p>Defines measurable responses to service disruptions.</p> <p>Provides historical data that enables SLM to review performance objectively and regularly.</p> <p>Assists SLM in defining where services are at their weakest so that SLM can define actions as part of the service improvement plan.</p>
	<p>SLM defines the acceptable levels of service within which case management works, including:</p> <ul style="list-style-type: none"> Case response times Impact definitions Target fix times Service definitions Rules for requesting services

Airbus utilizes advanced systems to facilitate true Emergency Services grade monitoring and management services. Full management and oversight of the system is maintained within the NSOC including:

- Real-time Network/ESInet monitoring
- Real-time monitoring of all systems and applications
- Advanced Metadata driven rules for incident correlation to simplify alarms and accelerate mediation
- Automated network configuration and network change management
- Lifecycle functionality including asset discovery and inventory, software distribution, automated patching, operating system deployment, power management, remote desktop control.

In summary, our Service Management capabilities have been designed strictly from a Public Safety perspective. This includes our people, processes, and tools that we bring to bear to support your critical mission – making communities safe.

7. VESTA® NEXT LOCATION SERVICE

The VESTA NEXT Location Service – provided by Airbus in partnership with 911 Datamaster – provides crucial functionality for both Next Generation and traditional ALI. As an integral part of tabular call routing, Airbus provides a logical transition point for most 9-1-1 Authorities. In virtually every case, we recommend the VESTA NEXT Location Service as part of our VESTA Router and ESnet Services. In addition, this service also provides traditional ALI response to ALI requests from the PSAP.

The combined capabilities of Airbus and 911 Datamaster are also key in assisting 9-1-1 Authorities in migrating their ALI MSAG to Next Generation. It can be a first step in helping 9-1-1 Authorities migrate their ALI MSAG and get them ready for IP routing through support of both legacy ALI and HeLD protocols. As with other elements of the VESTA NEXT portfolio, agencies pay for the Location Service capability and not the hardware, software, and maintenance. We have bundled the Location Service in our tariff offerings in states where we have CLEC status. We will also sell Location Service un-bundled from the tariff offering, i.e., not part of our VESTA Router service.

7.1 VESTA NEXT Location Service Summary

The VESTA NEXT Location Service provides a full suite of capabilities associated with both traditional ALI as well as Next Generation. These include:

- **Master Street Address Guide (MSAG) Management.** Our solution provides a data management and administration tool that automates the viewing and communication of updates, insertions, and deletions to the MSAG database.
- **Database Standards Compliance.** 911 Datamaster acts as the facilitator with the addressing authority in the maintenance of the MSAG utilizing recognized NENA recommended standards.
- **Subscriber Records Management.** Provides for the collection of service order records from TSP's, validation of those records against the MSAG, and storage of the records for the generation of the ALI database.
- **ALI Database Updates.** After processing and validating subscriber record updates, Airbus processes ALI records for call routing and for retrieval and display by the PSAP during 9-1-1 calls.
- **ANI/ALI Discrepancy Resolution.** An ANI/ALI discrepancy occurs when an ALI record delivered to a PSAP does not match the information of the caller. 911 Datamaster will investigate ANI/ALI discrepancy reports and refer each discrepancy to the respective TSP for resolution.
- **Misroute Resolution.** An ANI/ALI misroute occurs when a 9-1-1 call is delivered to the incorrect PSAP. Datamaster investigates ANI/ALI misroute reports and refers each misroute report to the TSP for resolution.
- **No Record Found (NRF) Resolution.** An NRF occurs when the ANI provided does not exist in the ALI database and/or when NRF is displayed at the PSAP. 911 Datamaster will resolve or refer each NRF to the respective TSP for resolution.
- **ALI Delivery.** ALI Delivery provides location information via the ALI Data Access Connections to a PSAP during a 9-1-1 call.
- **Data Support of Wireless and VoIP 9-1-1.** The 911 Datamaster database management systems support both Phase I and Phase II wireless and VoIP 9-1-1 call processing. This includes the E2 interface used by wireless service providers to communicate 9-1-1 caller location information to the ALI database.

7.2 Location Database (LDB) & Traditional ALI

For database technology, the Airbus Location Service utilizes 911 Datamaster. Datamaster provides an evolution of 9-1-1 ALI. It can serve as a 'Location Database' (LDB), which is defined by NENA as a data structure that can serve as both an ALI and a LIS operating within a 9-1-1 authority's jurisdiction. Since it integrates with both existing and NG9-1-1 infrastructure, it allows for the migration to NG9-1-1 technology on the agencies' timetable and with minimal expense. This innovative software facilitates a migration mechanism of both data and business processes, making the transition a flexible, yet controlled, evolution. It supports current and future versions of location validation, emergency call routing and location-based call routing. These capabilities are fully integrated into the VESTA Router Service. Rates for LDB & ALI are included in the Airbus Tariff.

The Datamaster elements consist of database and database management software. It provides request / response and is compatible with all leading ANI / ALI controllers as well as NG9-1-1 components such as Legacy Network Gateways (LNGs) and Emergency Service Routing Proxies (ESRPs).

Some of the key features include:

- Interfaces with 9-1-1 DBMS software for ALI / LDB updates to the call routing platform
- Supports onboard and off board selective routing updates to the VESTA Router Service
- Automatic synchronization of records on two geographically diverse Airbus data center servers for full redundancy and reliability
- Encompasses all of the specifications for 9-1-1 ALI and LIS
- Supports HTTP Enabled Location Determination (HELD)
- Supports replication with remote LIS implementations
- Scales from less than one thousand to more than 50 million records
- Supported by 911 Datamaster's comprehensive, 24/7/365 software support

7.2.1 Traditional ALI

The VESTA *NEXT* Location Database Service also provides traditional ALI capabilities to the PSAP:

- Provides ALI response to multiple PSAP controllers
- ALI steering to other ALI providers and to MPCs and VPCs via pANIs
- Provides five call history-input and stores details about a particular phone number
- Maintains logs of call activity and imports and selective router updates
- Supported by 911 Datamaster's comprehensive, 24/7/365 software support

Adherence to standards insures compatibility with traditional ALI interfaces and provisioning as described in:

- NENA 02-010: "Standard Legacy Data Formats for 9-1-1 Data Exchange GIS Mapping Data Structures"
- NENA 02-501: "Wireless (Pre-XML) Static and Dynamic ALI Data Content Information Document"
- NENA 04-005: "ALI Query Service Standard"
- NENA 02-011: "Data Standards for Local Exchange Carriers, ALI Service Providers & 9-1-1 Jurisdictions"

- NENA 02-015: “Standard for Reporting and Resolving ANI/ALI Discrepancies and No Records Found for Wireline, Wireless and VoIP Technologies”

7.3 ALI Data Migration to LDB

Our team has extensive experience in migrating ALI data into its Location Database. We have performed over 200 such migrations.

The migration involves extracting the ALI records from the existing system, preferably in a NENA 2.1 format (but any format will work) and existing MSAG records if any. Using this data, we can properly format the existing data and perform a trial import into the new LDB. Any records that fall out of the import process are examined and modified as needed.

After extensive testing and end user verification, the same process can be performed into the live LDB environment.

7.4 ALI Operational Changes and Discrepancies

As reference data or customer data incur operational changes, including error conditions, DataBond offers a number of features that facilitate the efficient receipt, reporting, error resolution and authorizing of any such changes.

For example, the daily SOI data exchange submitted by OSPs can be fully automated, any resulting error conditions can immediately be made available to the OSP via WebDBMS as well as the ability to correct any such errors directly online. Any discrepancy reports, such as No Record Found (NRF) conditions, can be recorded, referred and resolved within WebDBMS for a complete audit trail.

Any reference data or customer data having incurred a change within the database will automatically be replicated by DataBond to all downstream ALI databases, of which there usually are two (2) and optionally additional ALI databases, to ensure all maintained data is always in sync.

8. VESTA® NEXT DATA DELIVERY SERVICE

The VESTA® NEXT Data Delivery Service is a networking service that aggregates communications from multiple Text Control Centers to route emergency Text-to-9-1-1 messages to the VESTA 9-1-1 system. The result is integrated Call Handling or a robust browser based application with ATIS/TIA J-STD-110-compliant Text-to-9-1-1. Specifically, the service:

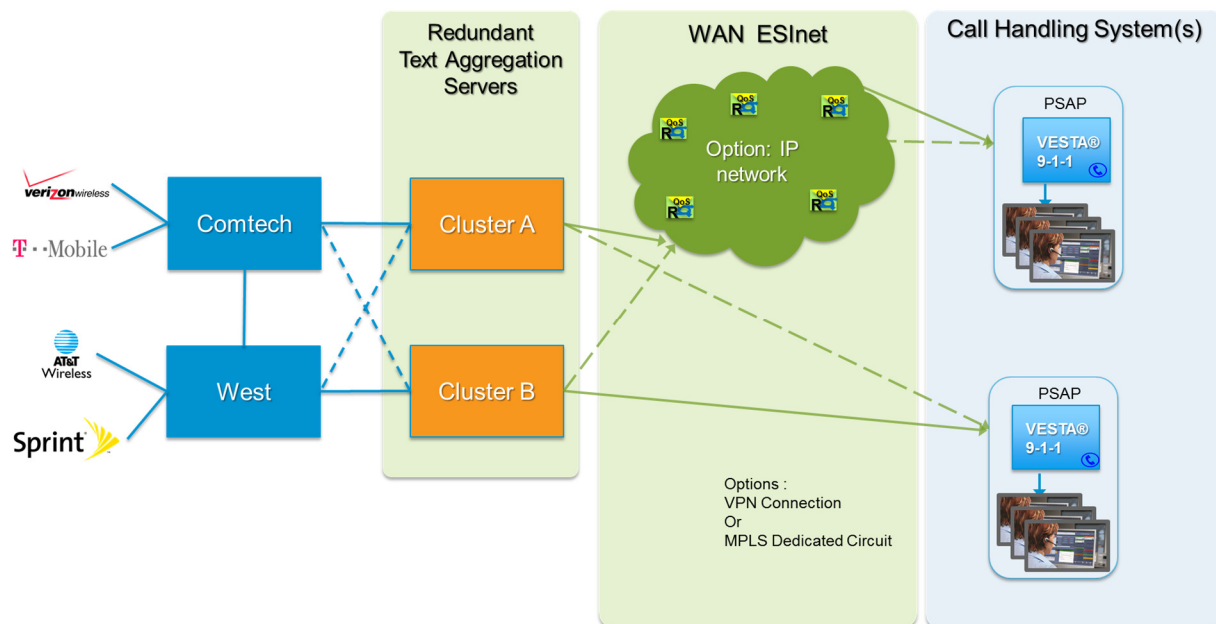
- Delivers an integrated Text-to-911 call flow and work flow within the VESTA 9-1-1 solution when customer have installed VESTA SMS;;
- Provides an over-the-top Text-to-9-1-1 call flow for non-MSRP compliant Call Handling systems;
- Reduces complexity associated with Text-to-911 by providing an Airbus managed fully integrated solution
- Simplified “Solution as a Service” pricing with a monthly recurring charge based on the population of the area served. A nominal non-recurring charge supports service implementation.

8.1 VESTA NEXT Data Delivery Service Overview

Text to 9-1-1 is the ability to send text messages from mobile devices to 9-1-1 emergency call takers. A text to 9-1-1 application has two components: (1) the text message delivery service; and (2) the workstation client to view and manage the communication process.

Airbus provides a complete solution for text to 9-1-1: (1) VESTA NEXT Data Delivery Service which delivers the text messages to the PSAP; and (2) VESTA® SMS implemented on the VESTA 9-1-1 call handling equipment. The Data Delivery Service connects with the TCCs and the PSAP utilizing the Message Session Relay Protocol (MSRP) per the ATIS-STD-J-110 for communication of messaging and signaling content to and from the PSAP.

FIGURE 6 VESTA® NEXT DATA DELIVERY SERVICE



8.2 Text Message Ingress

As illustrated in Figure 5 above, the VESTA® NEXT Data Delivery Service utilizes the existing Comtech and West connectivity to the mobile carriers. 9-1-1 text messages are delivered from the wireless carriers to the primary TCCs. The primary TCCs will forward each 9-1-1 text message to both of the Airbus redundant Cluster Controllers. In the event one of the Clusters are off-line, the other Cluster will process the text message. (Figure 1).

As part of the VESTA NEXT Data Delivery Service, Airbus coordinates the text ingress delivery process, including directing the wireless carriers which text messages are to be routed to the applicable PSAP based on caller location. Please Note: Airbus requires that the PSAP provide a Letter of Authorization (LOA) to Airbus so that we can coordinate the routing of the text messages and the schedule for cutover.

8.1 Delivery Network

Airbus interconnects with Comtech and West to our redundant Text Aggregation Cluster Controllers in Airbus data centers. From our Cluster Controller aggregation points to the PSAP, a number options are available:

- Customer with an Airbus provided ESInet can utilize the existing infrastructure to transport Text-to-911 calls.
- 9-1-1 Authorities without an ESInet in place can be connected directly to the Airbus Text Aggregation points, typically with redundant low bandwidth IP connections. Airbus can utilize a customer provided Internet Protocol (IP) network, through a Virtual Private Network (VPN) tunnel implemented and managed by Airbus.
- As an option, Airbus can offer the customer a dedicated network link.

8.2 PSAP Call Handling Equipment - Text Client

Currently, PSAPs with the VESTA® 9-1-1 solution must be at release 6.1 or later - which includes VESTA® SMS - to support integrated text messaging. Integrated text messaging allows the VESTA® SMS solution to efficiently manage the text message within the Calltaker console and report on the text message in the VESTA® Analytics solution. If VESTA 9-1-1 is not at release 6.1 or later, it should be upgraded as a part of this process. The Data Delivery Service does not include the VESTA SMS text implementation fees. These should be provided by the VESTA 9-1-1 support provider.

Airbus supports web-enabled (over the top) Data Delivery Service for non-VESTA PSAPs who are utilizing VESTA NEXT Router Service or are who migrating to VESTA 9-1-1. The web-enabled service requires text messages be received in a web-browser.

8.3 Additional Considerations

Airbus text messages can be transferred from one PSAP to another in a shared VESTA 9-1-1 deployment. Although the specifications for text transfers are not completed, Airbus is exploring the capability to transfer to PSAPs that utilize another TCC provider.

Outbound or PSAP initiated text sessions are not supported within the VESTA 9-1-1 application, however, Airbus is exploring the capability to support outbound text messages in the future.

9. VESTA® NEXT- SUMMARY

The VESTA NEXT portfolio delivers the set of critical elements 9-1-1 Authorities need for NG9-1-1 as services under tariffed, monthly-recurring charges. Airbus is the Telecommunications Service Provider and maintains responsibility and ownership of the Next Generation platforms and networks. As a result, 9-1-1 Authorities:

- Gain the ability to budget for NG9-1-1 with greater certainty. Unknown or unforeseen costs are replaced with tariffed monthly recurring charges.
- Leave the complexity and responsibility of NG9-1-1 migration to Airbus, the technology partner committed to their success.

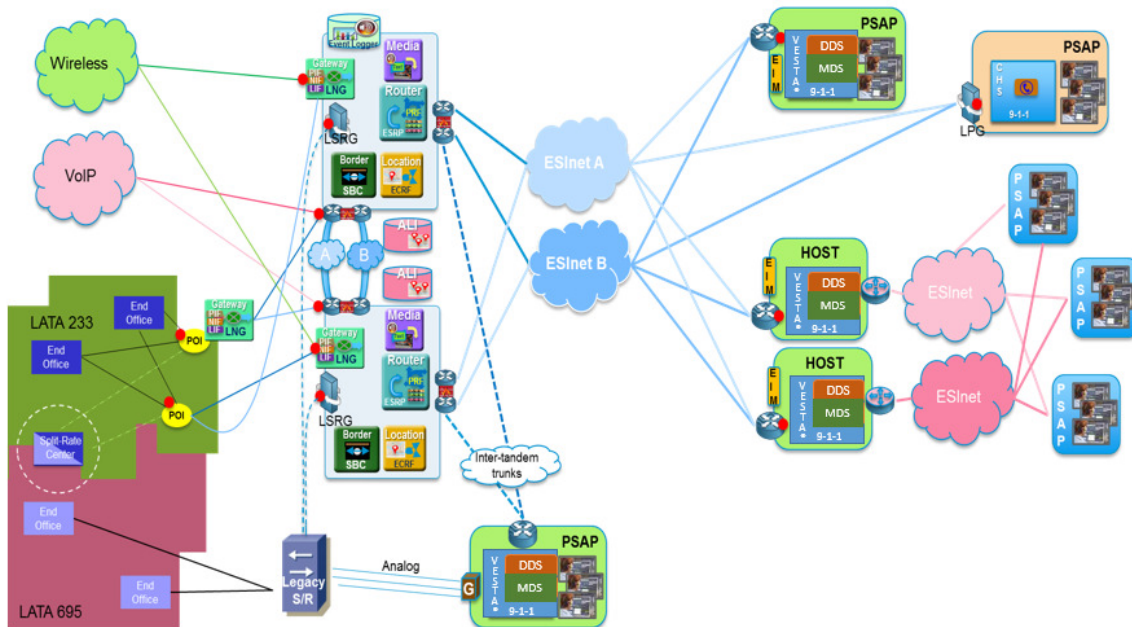
VESTA NEXT PORTFOLIO DEPLOYMENT SUMMARY

The VESTA NEXT portfolio implementations consist of two points of interconnect (POI) for ingress traffic from the originating service providers (OSPs). If required, the POIs will be in LATA, eliminating additional charges to the PSAP for 9-1-1 call delivery. Emergency calls will be delivered directly from the POI to the Airbus Tier 3 or 4 data center/colocation facility. Gateways that convert legacy 9-1-1 calls to IP may be located in the data center, at the POI, or the OSP may deliver calls via IP.

The VESTA Router Service with the associated NG9-1-1 functional elements (SBC, ECRF, etc.) is located in geo-diverse, redundant data centers. The VESTA Router Service is deployed as a carrier grade solution with an active-active vertical and horizontal redundancy as well as support for upgrades while active. As regions expand or for statewide implementations, multiple data centers may be implemented. The solution is designed to support 100% of the traffic in a region from a single data center. If a failure occurs in the service, the 9-1-1 call will be routed by the alternate router, without dropping the call or requiring the caller to dial 9-1-1 again.

Typical call routing is based on traditional ESN. Calls will be delivered to the PSAP via redundant, diverse wide-area networks. Where possible, redundant, path diverse last mile IP networks are used to provide connectivity to the PSAPs.

Airbus solution includes interim trunks to accomplish transfers until the entire region and adjacent counties have transitioned to NG9-1-1. For non-NG9-1-1 PSAPs, legacy PSAP gateways (LPGs) are provided to convert IP calls back to analog. Airbus also includes legacy selective routing gateways (LSRGs) if required to transfer a call to a legacy selective router.



To summarize the key factors of the VESTA *NEXT* portfolio:

- **In-region / in-state data centers** (not just aggregation points). Traffic / signaling is not routed to out of state data centers, reducing the number of network interconnections and avoiding unnecessary risk.
- **Geo-diverse, redundant routing infrastructure.** High availability (99.999%), no single point of failure for NGCS functional elements and network connectivity.
- **Redundant points of interconnect (POI) for ingress traffic.** In LATA POIs for ingress traffic to facilitate OSP migration and reduce duplicate billing costs.
- **ESInet.** Secure IP Wide Area Network (WAN) connections (often MPLS) to PSAPs, physically diverse and redundant where possible. Automatic re-route in the event of a failure.
- **i3 compliant solution.** Inter-networking with adjacent networks
- **Geospatial routing solution with transitional routing support.** PSAPs can choose full geospatial routing support with a fallback to transitional ESN-based routing if geospatial location information is not available
- **Location-based and GIS data services.** Graceful migration from ALI to NG GIS data
- **Comprehensive security.** Intrusion detection, virus protection, patch management and physical security aligned with NG-SEC
- **Service program.** Single point of contact for all service related issues including monitoring, performance management, change management, and SLAs.

CREATING YOUR NEXT GENERATION PLAN

The changes in Public Safety communications may seem overwhelming, but they don't have to be.

Together, let us help you create and execute a plan to accomplish the critical tasks necessary to migrate to NG9-1-1.

10. PRICING

Our individual case basis pricing is pursuant to Airbus' filed Florida Price List No.1. The individual case basis pricing contained in this proposal is valid for 120 days. The Airbus price list is available on the web at <http://tariffs.net/airbus/>.

PRICING

County	2016 US Census Population Estimate	NRC per Person	MRC per Person	NRC	MRC
Martin	158,701	\$2.40	\$0.06/mo.	\$380,882.40	\$571,323.60

CONDITIONS/ASSUMPTIONS

1. Pricing is based on 60 month term agreement.
2. Termination charges will apply for early termination.
3. NRC (service establishment charge) means Non Recurring Charge.
4. The NRC payment(s) is non-refundable
5. MRC means Monthly Recurring Charge.
6. MRC is based on the population served
7. Airbus may adjust MRC annually based on the customer contract date and population
8. Upgrade to i3 geospatial routing will be available in the future as a service enhancement at an additional cost.
9. *Airbus VESTA® Data Delivery Service services are not included in the pricing.*
10. All prices are exclusive of applicable taxes, fees, and surcharges.

Thank you for the opportunity to submit this proposal for a Next Generation routing solution, We are committed and stand ready to provide you the best solution and best service in the industry. We look forward to the opportunity to discuss our proposal in more detail.

Sincerely,

Chris Faircloth
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