Tarrant County 9-1-1 District

**The Business Case
regarding
District Involvement in a
Regional Radio System (RRS)
Supporting Public Safety Operations**

January 23, 2012

**developed by
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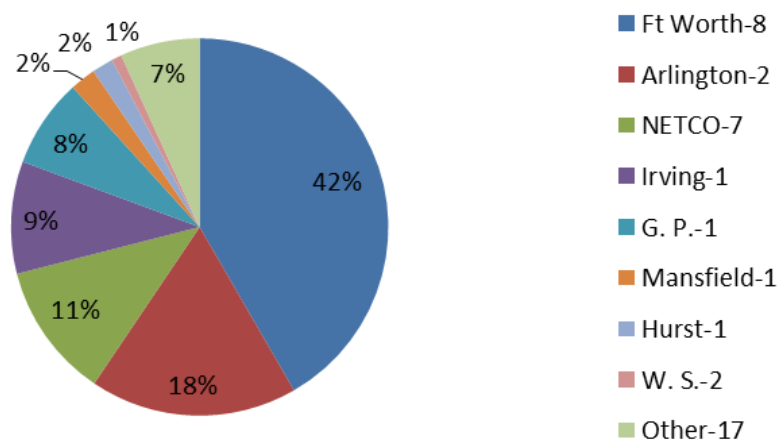
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1. Executive Summary

As a result of a System Study (Jan. 2011, funded by the City of Fort Worth) and a Feasibility Study (August, 2011, funded by the District) for a Regional Radio System managed by the Tarrant County 9-1-1 District (the "District"), Avistas was retained on November 7th, 2011 to develop a Third Party Business Case for a Regional Radio System (RRS) which would, if implemented, provide new, standards-based, digital P25 radio systems, integrated across the District. Avistas is an Irving-based Engineering firm with extensive experience in large-scale deployments of complex Information and Communications Technology (ICT), as well as management, funding and operations for smart cities, states, countries, special districts, public authorities and other municipalities.

While Avistas has extensive background in complex technology and communications, this Business Case focuses on the **Revenue, Cost and Risk** factors that affect decisions by the District. The Business Case provides the financial and operational information to answer two questions, as follows:

- ❖ *Should the District expand its operations into radio systems, beyond support of 9-1-1 and closely related applications in PSAPs?*
- ❖ *If yes, to what degree should the District support radio systems, operations and planning for the 39 cities and unincorporated Tarrant County that are the District's constituency?*

The Tarrant County 9-1-1 District has a constituency consisting of 39 cities and unincorporated Tarrant County, serving a population of over 2.1 million and growing. The larger cites serve a number of surrounding smaller cities with their radio systems, resulting in the chart of population served provided below. The number beside each city is the total number of cities served by their system, except for "Other" which is the number of cities with stand-alone radio systems.

Fort Worth and Irving have purchased and are implementing new, P25, standards-based, multi-site systems; Hurst and White Settlement each have single site P25 systems; Arlington, NETCO (the Northeast Tarrant County Radio Consortium), Grand Prairie and Mansfield are all considering P25 systems upgrades and the remaining 17 cities have a variety of UHF or VHF systems in service.

There is _significant value_ in coordinated management of complex radio technology, particularly with Federal, State and local goals of improving interoperability among disparate radio systems across large geographic areas. In particular, it can provide smaller cities with access to operational, technical and planning resources for radio systems issues in a fashion similar to the current support the District provides for 9-1-1 systems and PSAP operations.
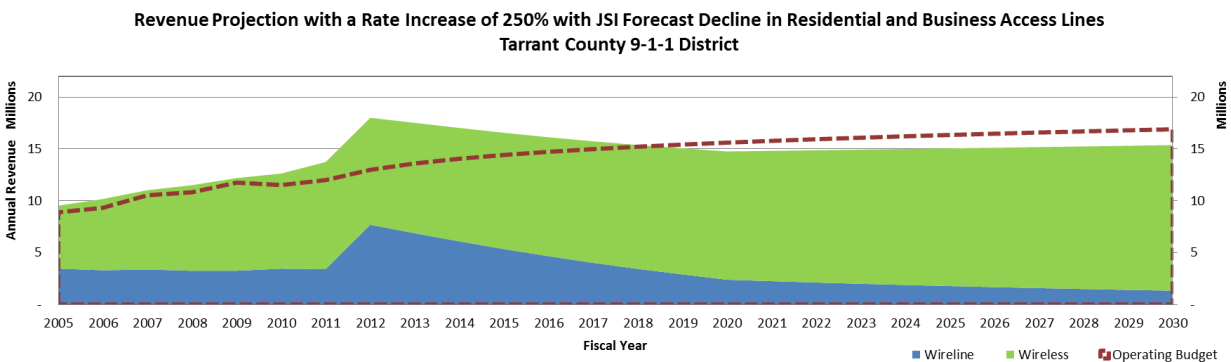
Findings:

The key findings contributing to the results of this Business Case are as follows:

- ❖ The District **does have the management and organizational skills** to assume responsibility for a regional radio system at any level described in the Feasibility Study, should the District Board elect to do so.
- ❖ The District **does have the authority to assume this responsibility**, including accepting subscriber fees from participating cities, as presented in Appendix B, Use of Funds Presentation.
- ❖ There is **significant uncertainly** as to the level of future revenue from wireline charges, as detailed in Section 4, Revenue Alternatives and Projections. It is projected that revenue from wireline fees will decline from the current level of 25% of total revenue to between 7% and 14% of total revenue by 2020. Increases in wired access line fees can offset the effect of this decline in revenue over the next decade, but the erosion in wireline revenue continues into the future.
- ❖ The **projected capital costs and ongoing operating costs are higher** than the projections provided in the Feasibility Study, according to cost data provided by Motorola. Including Irving and three new sites in the Western part of the District, the capital costs (without civil costs or subscriber units) is estimated by Motorola to be $76,300,000, rather than $ 56,000,000. Ongoing Motorola support costs are estimated to be $6,780,000 per year.
- ❖ In four scenarios combining 1) probable best case and probable worst case revenue declines and 2) access line fee increases of 250% and 400%, the range of **required subscriber fees** for the years with both equipment lease payments and annual maintenance payments range from **$40 per month to $75 per month.**
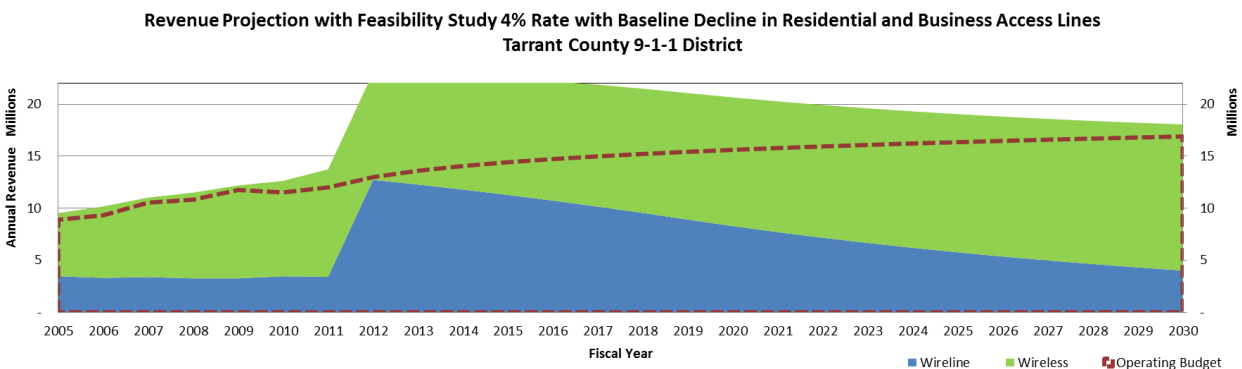
Section 4 has details on District revenue projections as compared to projected operating budget. As a high level summary, the two graphs below depict the range of projections. In each case, the dotted maroon line on the graph is the projected District Operating Budget for current 9-1-1 operations. The wireline fee increases described below and the declines in wireline revenue are detailed in Section 4, Revenue Alternatives and Projections.

The first graph represents a fee increase of 250% for each class of access, with the worst case projection of wireline decline from JSI data. It represents a defensible increase in fees, based on other districts and represents a **probable worst case revenue projection** with a fee increase.

**Revenue Projection with a Rate Increase of 250% with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District**

This second graph represents fee increases to the level in the Feasibility Study of 4% of the current basic line rates for each class of line. It represents an overall increase in fees of about 400%. The decline in wireline revenue is based on projections of actual wireline revenue history for the District. This projection represents a **probable best case revenue projection** with a fee increase.

**Revenue Projection with Feasibility Study 4% Rate with Baseline Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District**

These long term graphs (through 2030) show that, regardless of line fee increases, revenues will continue to erode.

Combining the current revenue projection alternatives detailed in Section 4 with the current systems cost data provided in Section 5, the summary of radio unit subscriber fees from Section 6 is provided below. The highest projected subscriber fees are for the period when both system leasing costs and ongoing maintenance costs are in effect and range from a low of $40 per month to a high of $75 per month. Refer to the following three sections for applicable details.
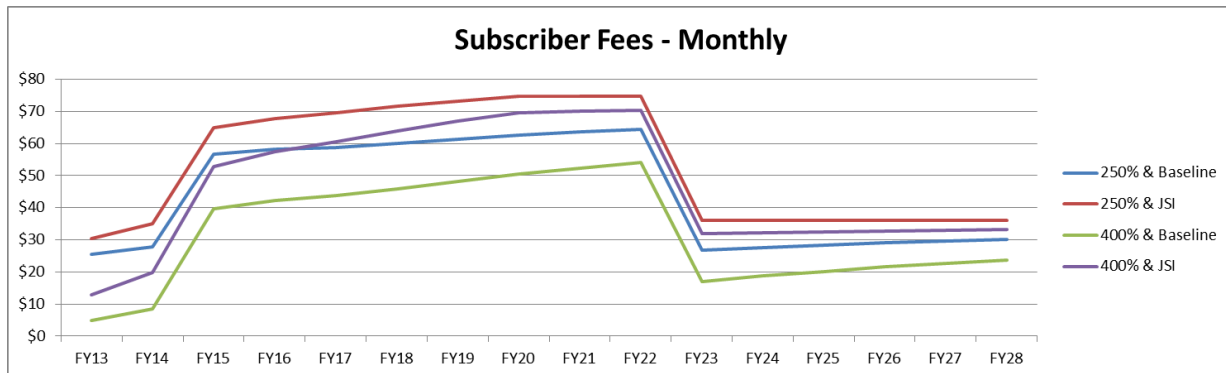
Subscriber Fees - Monthly

	Legend
	250% & Baseline
	250% & JSI
	400% & Baseline
	400% & JSI

Recommendations:

There are two sets of recommendations, the first addressing management of revenue risk, regardless of any decision on Regional Radio Operations, and the second addressing District involvement in Regional Radio Operations.

Revenue Risk Management - The projected decline in wireline revenue requires that the District determine a course of action soon and then manage risk with careful annual revenue and budget reviews.

Short term, the following actions are recommended:

❖ Immediately determine the maximum possible increase in wireline fees and implement the increases.

❖ Examine cost optimization for technology upgrades and services in ongoing District operations.

❖ Do not assume new operational or technical responsibilities unless there is a reasonable expectation of revenue to support them.

❖ Consider non-traditional, but related, revenue sources, such as a fee on each highway toll transaction.

On an annual basis conduct the following review process:
- ❖ Update the US forecasts of wireless lines and wired access lines from one or more sources.
- ❖ Examine actual current and historical revenue and operating costs and develop updated trend lines to detect any difference in the actual revenue trends in the District as compared to projected National trends.
- ❖ Based this analysis, update future budget planning to provide proper support for ongoing operations and reserve funding required to support the responsibilities of the District.

Regional Radio Responsibilities – The identified revenue risks require that the District carefully consider new responsibilities and obligations. With regard to Regional Radio System Operations, the following priorities should guide decisions to assume more responsibilities:
- ❖ Initial Priorities:
  - ➢ Assume an Operations Manager role, in which the District has no ownership in the systems, but provides planning and operations leadership and technical staff to manage day-to-day operations.
  - ➢ Based on operational evaluations and revenue projections, begin developing appropriate operations and support staff.
  - ➢ Integrate that staff into the successful management structure of the District.
  - ➢ Assume Buying Agent role for radio systems purchases in the District.
  - ➢ Provide funding for critical radio systems issues, in the short term, provided revenue, cost and reserve funds conditions permit.
- ❖ Next Priorities:
  - ➢ Establish asset and service management processes.
  - ➢ Establish performance management capabilities.
  - ➢ Begin providing technical and operations assistance as required by the cities in the District.
- ❖ Longer Term Possibilities:
  - ➢ Begin managing and possibly assume ownership of the P25 Switches in Fort Worth and in Irving.
  - ➢ Begin consolidated maintenance support for a "best cost" model.
  - ➢ Develop an interoperability strategy appropriate to the needs of all cities in the District.
  - ➢ Identify the best uses of available funds for long term extension of interoperability.

The initial and Next priorities above have significant value for cities in the District, where the smaller cities will likely benefit the most. A District staff focused on radio and interoperability issues can provide objective, vendor-neutral assistance to cities, as required, and provide buying services that can reduce the costs of future radio acquisitions.

As interoperability among systems and with neighboring entities becomes more important, the District would be a logical focal point for these efforts with the advice of the current technical and operations advisory groups in the District.

This "staged approach" is depicted below, where adding each level of responsibility (and ongoing costs) would be a function of the best available long term revenue and operating budget projections.
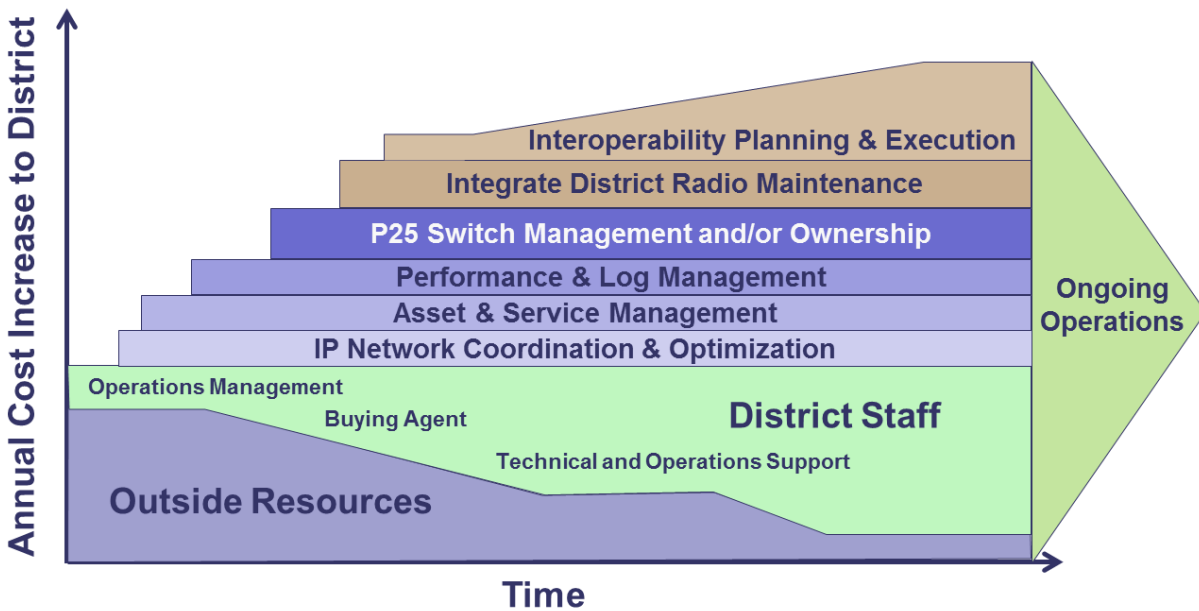
2. Background and Methodology

After review of the Feasibility Study for a Regional Radio System, published in August of 2011, the Tarrant County 9-1-1 District elected to develop an independent Business Case analysis regarding District involvement in various aspects of a Regional Radio System, including financial, operations and technical considerations.

The technical aspects of an RRS have been reviewed as part of the validation of the costs and operational complexity of an RRS, but this Business Case is focused on three areas:

- ❖ **Revenues** from existing District sources and sources related to and enabled by the existence of an RRS.
- ❖ **Costs** for radio and control systems purchase, maintenance, District staff to manage RRS operations and other costs related to an RRS and not part of the current 9-1-1 responsibilities of the District.
- ❖ **Risks** associated with revenue projections and cost projections that could affect the financial viability of a District managed and/or operated RRS.

The goals of the Business Case engagement are as follows:

- ❖ Collect and validate information relative to current and projected District revenues and operations costs in the current 9-1-1 support model.
- ❖ Collect and validate information relative to current and projected systems costs for equipment, end user radios and maintenance support in an environment with the District participating and contributing funds at some level.
- ❖ Develop a long term timeline for revenue and costs to establish what advantages, if any, are gained by District constituents under several support models. Risk evaluation ultimately resulted in a timeline ending in 2030.
- ❖ Complete the Business Case development and report by January 20.
- ❖ The Business Case will include data from at least 80% of the jurisdictions in the defined group of Public Safety organizations, with a goal of more than 90% of the jurisdictions.

The Business Case has been developed from the following:

- ❖ Analysis of the data contained in the two Regional Radio System reports.
- ❖ Interviews with a wide range of District constituent cities.
- ❖ Validation of actual and projected systems costs for a RRS.
- ❖ Investigation of factors affecting projected District revenue over the next two decades.

❖ Investigation of the District's ability to expand staff and assume broader technical and operational responsibilities. In this regard, Avistas also reviewed the Final Report of an Organizational Assessment of the Tarrant County 9-1-1 District, conducted by the Azimuth Group and published November 30, 2011

Additional details on interviews and data sources are provided in Appendix A to this report.

The **Revenue** aspects of the Business Case included the following:

❖ Review of the District's historical revenue streams and the trends that can be projected into the future from that historical data.
❖ Examination of market factors that affect future revenues from both Wireless Subscriber payments from the State and Wired Access Line fees collected from each of the telephone service providers in the District.
❖ Review of projected population growth in the District.
❖ Projections of probable revenue levels from the present through the year 2030.

The **Cost** aspects of the Business Case included the following:

❖ Review of historical operating budget data for the District.
❖ Projections of District operating budget requirements over the next two decades to support the current responsibilities of the District.
❖ Validation of capital costs and projected operating costs for a standards-based, P25 radio system that would cover the land area of the District, as described in the Feasibility Study.
❖ Estimation of the cost to expand the technical and operations staff of the District to provide radio systems management, planning and implementation services equivalent to the quality of services provided for 9-1-1 operations and management.
❖ Estimation of radio subscriber fees that would be required to support a regional radio system, using the model depicted in the Feasibility Study.

The **Risk** aspects of the Business Case included the following:

❖ The probability that the District's projected revenues will be adequate to support both 9-1-1 operations and the level of radio systems support ultimately chosen by the District for its constituents.
❖ The probability that the level of grant income projected in the Feasibility Study can be attained.
❖ The probability that Interoperability Partner income projected in the Feasibility Study can be realized.
❖ The probability that a significant percentage increase in wireline rates will be accepted by the citizens in the District.

3. Radio Systems Environment

The Regional Radio System structure as presented in the Feasibility Study envisioned integration, over time, of all radio operations for the cities in the District into a standards-based, digital P25 radio system with interoperability across the District and interoperability with neighboring jurisdictions operating P25 compliant radio systems.

The Tarrant County 9-1-1 District has a constituency consisting of 39 cities and unincorporated Tarrant County, serving a population of over 2.1 million and growing. The larger cites serve a number of surrounding smaller cities with their radio systems, resulting in the chart of population served provided below. The number beside each city is the total number of cities served by their system.
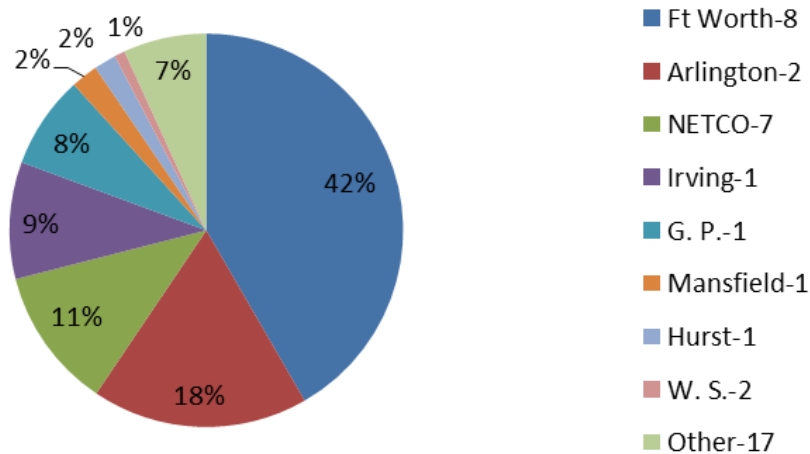
The current systems environments for the cities depicted above are as follows:

❖ The City of Fort Worth has begun an upgrade of their current Motorola Trunked Radio System to a Motorola digital P25 standard compliant system.

❖ The City of Irving has signed a contract with Motorola to replace their current Harris trunked radio system with a Motorola digital P25 standard compliant system.

❖ The cities of Hurst and White Settlement each have single site P25 compliant systems installed.

❖ NETCO and the cities of Arlington, Grand Prairie and Mansfield are considering options for systems upgrades.

❖ The remaining 17 cites have a variety of analog UHF and VHF systems in operation.

The geographic distribution of the radio systems in the district is depicted below. The designations are as follows:

❖ P25 – a system that is P25 compliant or is in the process of upgrading to P25, using the 700MHz-800MHz frequency band..

❖ SN – Motorola SmartNet trunked system, using the 800MHz frequency band.

❖ SZ – Motorola SmartZone systems, which is a network of SmartNet systems, using the 800MHz frequency band.

❖ The connecting lines from these systems to other cites indicate that radio services are being provided to them by the larger city.

❖ VHF – an analog conventional radio system with one or more talk frequencies in the system, using the 152 - 162 MHz frequency band.

❖ UHF - an analog conventional radio system with one or more talk frequencies in the system, using the 406-512 MHz frequency band. Burleson has a UHF analog trunked system
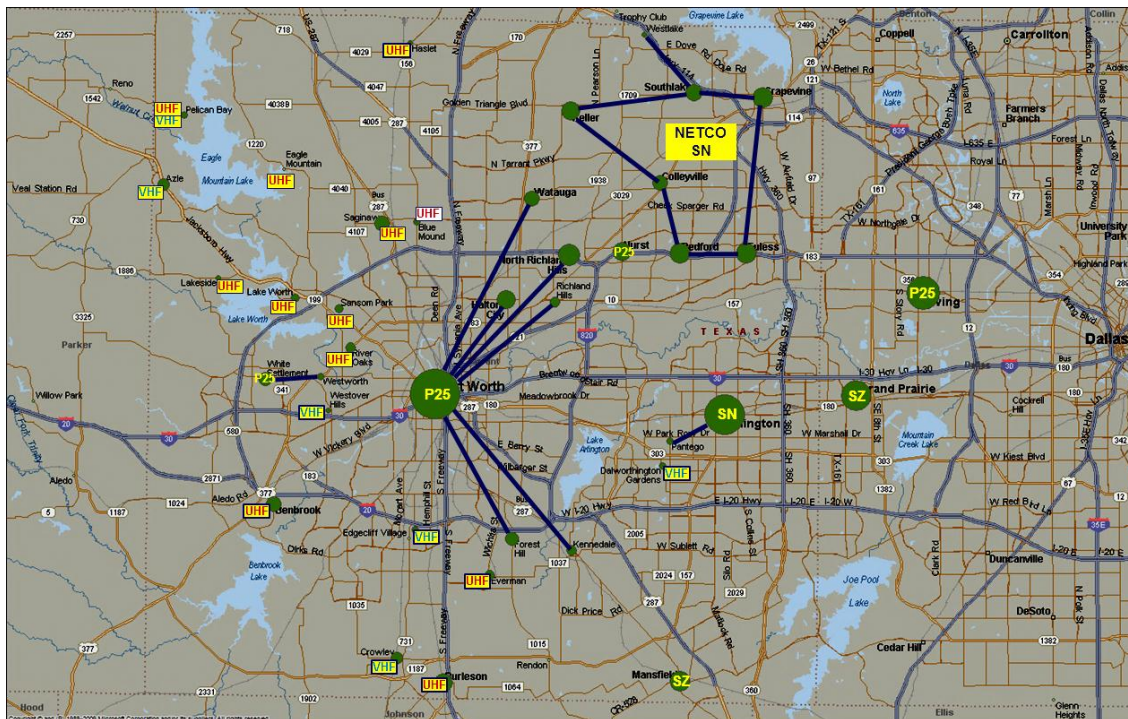
Note that the western part of the District has most of the smaller VHF and UHF systems. The description of the Regional System from the Feasibility Study includes proposed RRS coverage for this area as show on the next pages.

Regional Radio Concept

The Regional Radio Communications Master Plan depicted the current trunked radio system coverage in the District as follows:
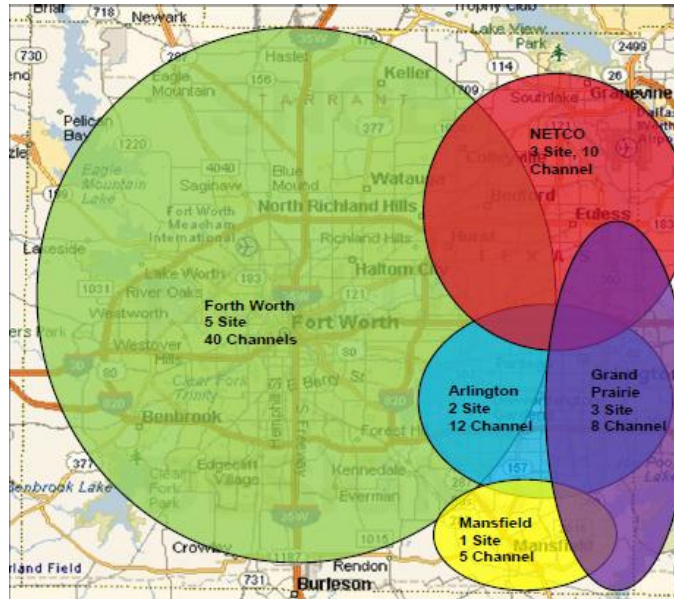
Upgrading to P25 systems, interconnecting them and adding sites in the Western part of the District, as described in the Feasibility Study, resulted in the following coverage for the entire District, where Irving would also be added to the P25 network.
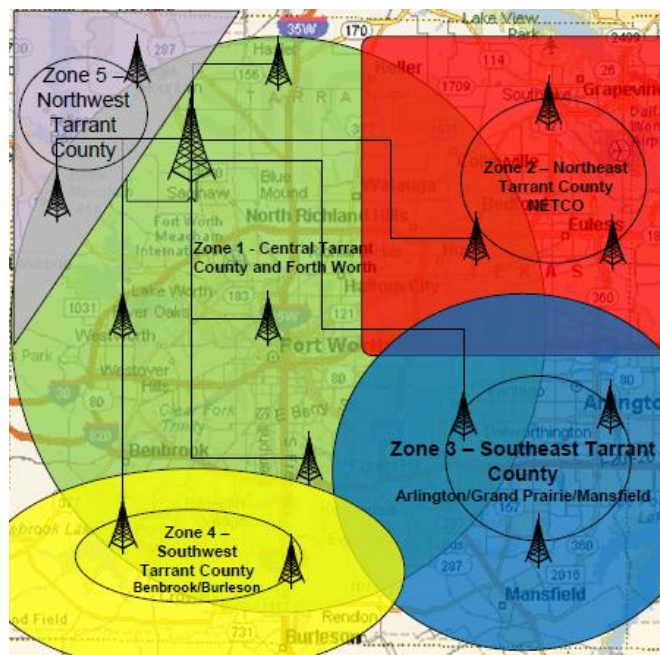
In addition to a District-wide system, interoperability is required with neighboring counties and cities, volunteer fire departments, private EMS companies and with State-wide agencies including Parks & Wildlife and Public Safety.

Texas has been at the forefront of radio interoperability, as documented in the *Texas Statewide Communications Interoperability Plan*, dated August, 2010 Their Vision Statement is as follows:

"*By the end of 2015, provide all public safety and critical infrastructure responders at all levels of government – including local, county, special districts, tribal, state and Federal – with the highest level of real-time direct interoperable voice and data radio communications utilizing Standards-Based Systems.*"

Additionally, the plan states that:

"*Texas has adopted the 'Project 25 Suite of Standards' as the technology solution and long-term interoperability goal for voice public safety agency communications*."

The achievement of this interoperability goal for 2015 is obviously a function of local, regional and State budgetary constraints as well as the capability of each jurisdiction to allocate resources to plan, design, procure and implement new, standards-based radio systems.

Additionally, smaller cities have technical and operational issues that could be effectively addressed by a Regional Radio staff that "belongs" to them via a vehicle such as the District. These include the following:

❖ Narrow-banding – the FCC requires that, by January 1, 2013, all radio systems operating in the 150MHz to 512MHz frequencies reduce the bandwidth for a voice channel from 25KHz to 12.5KHz or less to allow for expansion of the number of users in each band. Some cities have cost or technical issues that make this process difficult.

❖ Interoperability among disparate radio systems – a number of cities have a few radios that will operate in neighboring jurisdictions and some have electronic interconnecting devices to allow disparate radios to communicate through a common switching arrangement mounted in a vehicle.

❖ Access to high quality technical expertise – most cities depend on a local radio systems vendor for technical advice and typically cannot afford independent technical advice.

❖ Difficulty of multi-city planning/coordination, where multiple meetings among various city groups require time and effort, with limited access to technical resources.

4. Revenue Alternatives and Projections

There are two major risks to District revenue over time, as follows:

❖ Wired access line fee revenue is projected to decline significantly over the next 10 years and beyond, as detailed in this section.
❖ As broadband connections for homes, businesses and wireless devices continue to expand, there is a possibility that revenue will be lost due to migration of conventional wireless telephone numbers to alternate voice communications channels. This risk is not quantifiable at this time.

Wired Access Fee Revenue Risk

The proportions of revenue between wireless and wireline income for the Tarrant County 9-1-1 District have changed significantly over the past 15 years and are forecast to continue to change over this coming decade, with 1) continued growth in wireless revenue, but at a slower rate, and 2) a significant decline in wireline revenue. This trend is noticeable in a simple projection of wireless and wireline revenue, using actual monthly data for the period October, 1996 through October, 2011 as shown below:

Historical and Projected Wireline and Wireless Monthly Revenue
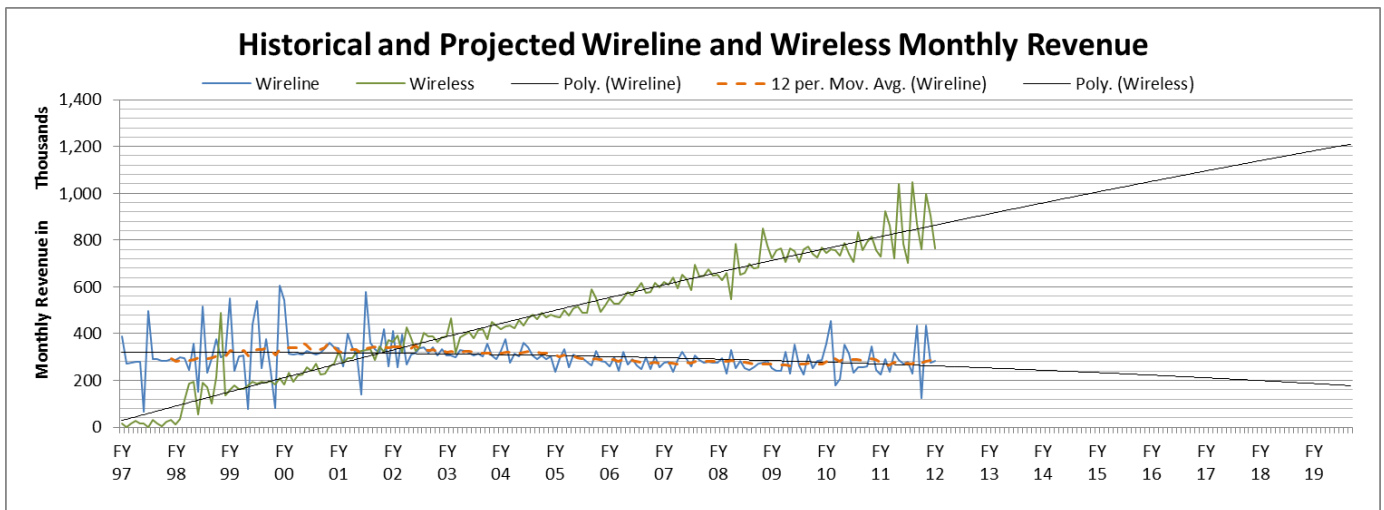
The historical monthly revenue data for the District shows the following:

❖ There is continued growth in wireless revenue
❖ The wireless rate of growth is slowing in the District, as it is for the US.
❖ There has been a decline in wireline revenue since the year 2000, averaging about 1.7% per year.
❖ The projected trend line for wireline revenue for the next 10 years indicates a decline of 2.7% per year in 2011 accelerating to a decline of 7% per year in 2020.

The Texas Commission on State Emergency Communications provided data that wireline revenue statewide accounted for 41% of the total revenue in 2006 and 31% in 2010. The District's corresponding percentages are 32% and 27%.

Wireless subscriptions in the US have grown significantly in the past decade, with an estimated 303 million to 323 million subscribers at the end of 2010. With a US population of 310 million, these estimates represent a saturation of about 100% of the population. Technology Futures, Inc. projects wireless penetration of as much as 115% by 2020. The current wireless penetration in the District is 76% of population and is projected to grow to 90% penetration by 2020, based on 2005-2011 actual data from the District.

Revenue for wired access lines is forecast to decline more significantly than indicated by the projections above, which are based on past revenue. A 2008 forecast by Technology Futures, Inc. predicted that wired subscribers would decline by 66% from 2010 to 2020. A 2011 forecast by JSI Capital Advisors predicts a decline of 79% over the same period

The factors contributing to accelerated declines in both residential and business wired access lines are as follows:

❖ Residential lines are being replaced by wireless subscriptions at an accelerating rate. Many residents move into a home or apartment and never order local phone service.
❖ Registered, nomadic IP telephone revenue will likely decline for the same reasons.
❖ Small businesses are using services that reduce the need for wireline connections:
  ➢ E-mail is used for more and more communications.
  ➢ E-commerce and web portals shift customer interaction away from telephones.
  ➢ Services are available that provide "virtual" voice lines and facsimile lines that eliminate the need for any wireline services and still provide local voice and facsimile telephone numbers.
❖ Larger businesses require fewer voice trunks per employee, as more and more business is conducted via e-mail, desktop voice & video conferencing, web conferences, customer web sites and employer provided or personal cell phones.

The most significant forecast, from JSI Capital Advisors, indicates that:

❖ Residential lines in 2020 could be as little as 14% of the lines in 2011.
❖ Business lines & trunks in 2020 could be as little as 35% of 2011.

Comparison of the various growth/decline rates is provided in the "normalized" graph below. Each set of data is compared to its 2005 value so all data in the graph starts at the value 1 in 2005. The data shown are:

- ❖ District population growth projection
- ❖ Wireless revenue growth projection
- ❖ Wireline revenue projection, based on actual 1996-2011 monthly revenue data
- ❖ Wireline revenue projection, based on data from the JSI Capital Advisors forecast.

Normalized Trends Comparison for Tarrant County 9-1-1 District
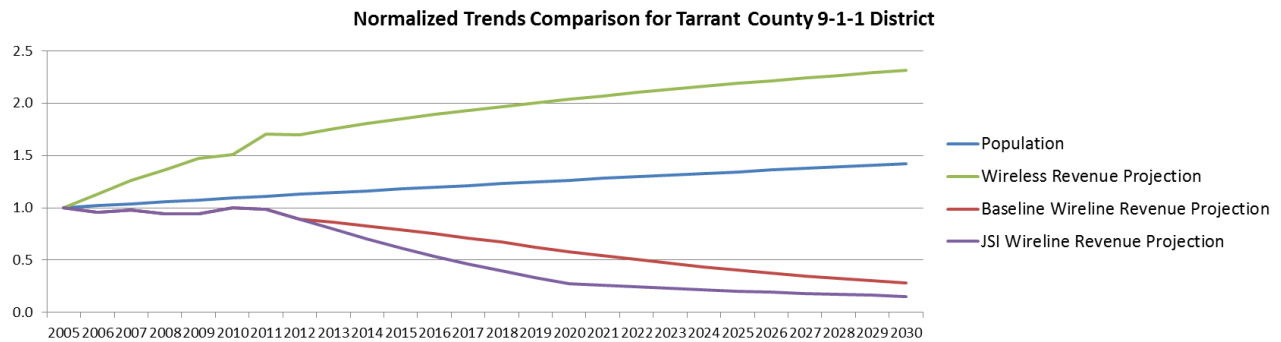
Application of this data results in revenue forecasts to FY2030 for the District as shown below. The dashed maroon line in each graph represents a projection of the District's 9-1-1 operating budget (exclusive of monies into or out of reserve funds) based on actual 2005 to 2011 data and 2012-2016 projected data from the 2011-2012 Annual Budget published July 18, 2011.

The next graph is based on projections of FY1996-FY2011 historical revenue data for the District, where the annual decline is assumed to be 7% per year after 2020. This is the "Baseline" revenue projection, based on actual historical data from the District.
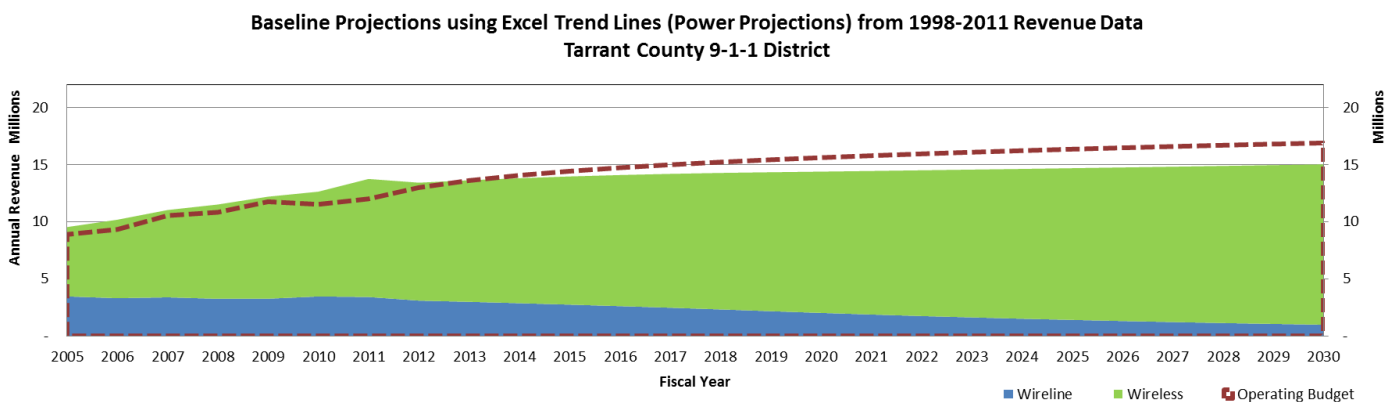
Baseline Projections using Excel Trend Lines (Power Projections) from 1998-2011 Revenue Data
Tarrant County 9-1-1 District

This Baseline revenue projection represents a **probable best case** revenue scenario, where the characteristics of residential and business lines in the District could result in a faster decline in line revenues.

The next graph is based on the JSI forecast, where the residential and business lines are assumed to continue to decline after 2020 at 10% per year and 5% per year, respectively.

**Revenue Projection with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District**
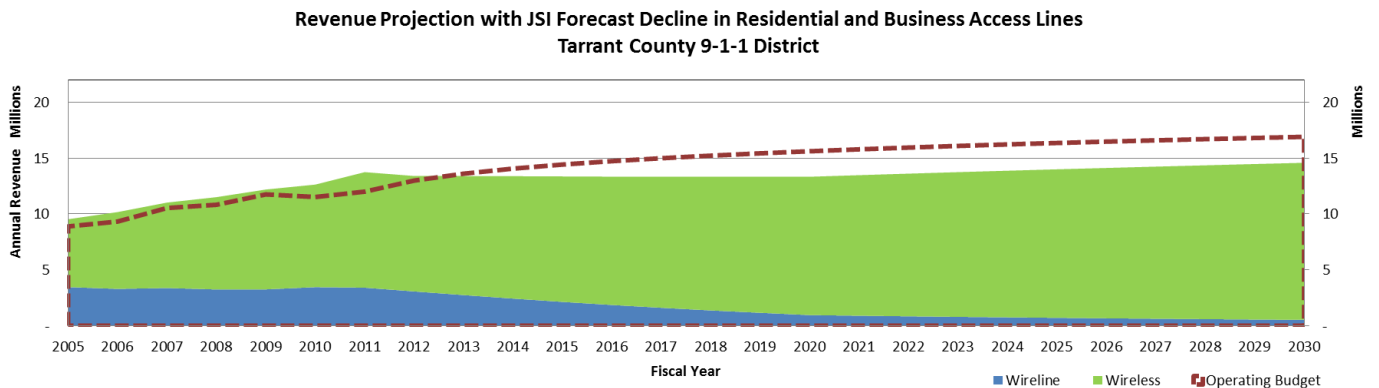
The JSI scenario represents a **probable worst case** revenue scenario, where wireline revenue in the District may not decline as rapidly as projected by JSI.

Either of these projections quickly results in a deficit of projected revenue to the District as compared to the projected operating budget.

Annual Revenue Forecast Review

The possibility of such reductions in wireline revenue requires that an annual review of available wireless and wireline subscriber forecasts be conducted by the District. The objectives of each annual review are as follows:

❖ Update the US forecasts of wireless lines and wired access lines from one or more sources.

❖ Examine actual current and historical revenue and operating costs and develop updated trend lines to detect any difference in the actual revenue trends in the District as compared to projected National trends.

❖ Based this analysis, update future budget planning to provide proper support for ongoing operations and reserve funding required to support the responsibilities of the District.

Effects of Wireline Fee Increases

The Feasibility Study calculated two possible increases in the current line fees, as follows:

❖ Adjusting the current fees (which have never been changed) to fees equal to 2% of the current base rates for each class of line. The existing fees are about 1% of the current base rates. This change would produce an overall fee increase of about 200%.

❖ Adjusting the current fees to 4% of the current base rates for each class of line would produce an overall fee increase of about 400%.

These fee changes are shown in the table below.

	Base Rate	Current Fees	Current %	Feasibility Study Fees					
				2%	Increase	4%	Increase	6%	Increase
Residential	$ 21.00	$ 0.20	0.95%	$ 0.42	210%	$ 0.84	420%	$ 1.26	630%
Business	49.50	0.46	0.93%	0.99	215%	1.98	430%	2.97	646%
Trunk	53.00	0.74	1.40%	1.06	143%	2.12	286%	3.18	430%

If a wireline increase of 250% is applied to the current District fees for residential lines, business lines and trunks, it would increase the residential fee from $0.20 to $0.50, which is the current statewide COG fee. The other two line fees would also be increased by the same percentage. The resultant fee schedule would be slightly more than the 2% fee scenario in the Feasibility Study.

The following table provides a sample of fees from other ECDs in Texas. The cells with red text have line fees higher than the increased District fees under the heading "***TC x 250%***". An average of fees for this group of ECDs (not including TC9-1-1) is provided in the shaded box at the far right.

	TC9-1-1	TC x 250%	Bexar	Harr. Co.	Galv. Co.	Denco	Pot/R Co.	Ector Co.	Average
Res. Lines	0.20	*0.50*	0.22	0.50	0.62	0.27	0.93	0.51	0.51
Bus Lines	0.46	*1.15*	0.51	0.80	1.44	0.71	1.63	1.06	1.03
Trunks	0.74	*1.85*	0.77	0.87	2.10	1.13	2.22	1.56	1.44

A 250% increase represents a defensible increase in line fees, since it is based on a residential fee equal to the current statewide COG fee and the increased business line and trunk fees are not the highest among larger ECDs.

An increase to the 4% level in the Feasibility Study results in line fees that are higher than any ECD except Potter/Randal County ECD in the comparison chart above.

Beginning with a 250% increase in line fees and using the Baseline projection for declines in wired access lines, we have a graph of the revenue projection below. Note that the decline in wired access lines rapidly erodes the revenue contributed by the fee increase.

**Revenue Projection with a Rate Increase of 250% with Baseline Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District**
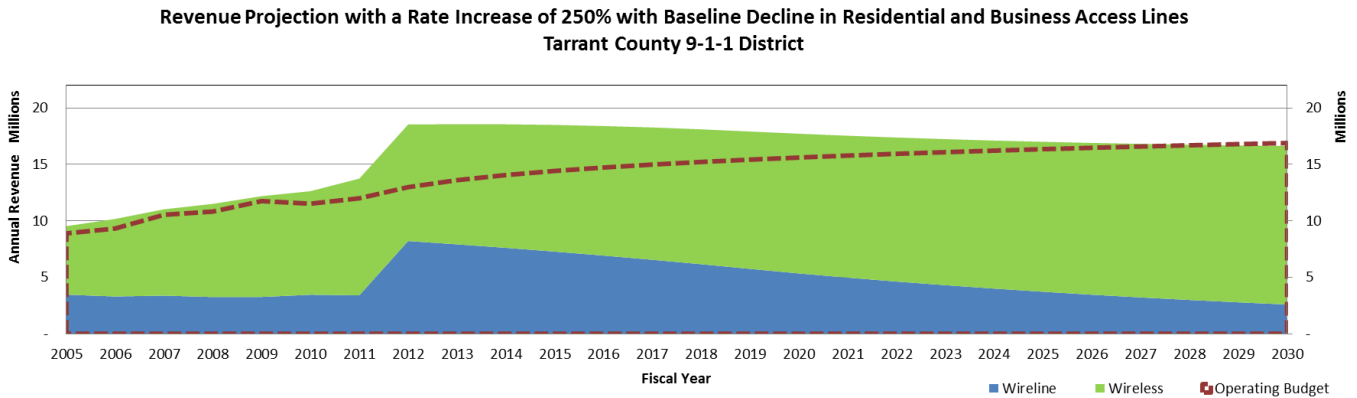
The additional revenue produced over time is provided in the chart below. The information in this chart is as follows:

❖ Line Fees – the new fee structure for the increased revenue
❖ Revenue in Excess of Operating Budget:
  o Excess available revenue as compared to the current budget over the Feasibility Study time frame of 2012-2022 (10 years)
  o Average annual excess revenue for that period
  o Excess available revenue as compared to the current budget for the remaining 8 years to 2030
  o Average annual excess revenue for that period
❖ Year 2030:
  o Estimated annual Revenue
  o Estimated annual Operating Budget
  o Estimated surplus (deficit) in 2030
  o

Line Fees

Residential lines	0.50	per month
Business lines	1.15	per month
Business trunks	1.88	per month

Revenue Projection with a Rate Increase of 250% with Baseline Decline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	16,638,095	2030 Estimated Annual Revenue
Total	31,209,039	3,052,647	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	3,120,904	381,581	(261,993)	Annual Surplus (Deficit)

A table of the same format is provided with each of the scenario grpahs on the following pages.

The next graph depicts the application of the same 250% fee increase, where the projection uses the JSI forecast for wired access lines.

Revenue Projection with a Rate Increase of 250% with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District
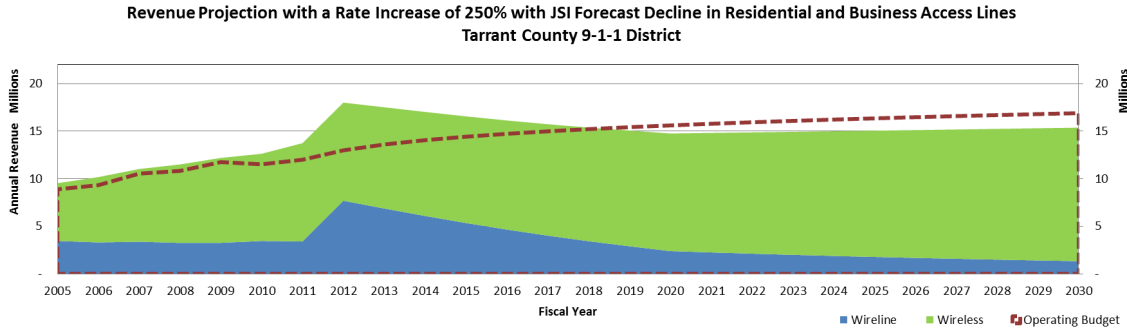
The related financial summary for this graph is as follows:

Line Fees

Residential lines	0.50	per month
Business lines	1.15	per month
Business trunks	1.88	per month

Revenue Projection with a Rate Increase of 250% with JSI Forecast Decline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	15,376,796	2030 Estimated Annual Revenue
Total	8,121,067	(10,891,158)	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	812,107	(1,361,395)	(1,523,293)	Annual Surplus (Deficit)

If the 4% fee level from the Feasibility Study is applied, it represents an overall increase of about 400% in fees for wired access lines, as shown in the graph and table below, using the Baseline decline in access lines.

Revenue Projection with Feasibility Study 4% Rate with Baseline Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

Line Fees

Residential lines	0.84	per month
Business lines	1.98	per month
Business trunks	2.12	per month

Revenue Projection with Feasibility Study 4% Rate with Baseline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	18,058,849	2030 Estimated Annual Revenue
Total	65,888,833	17,908,768	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	6,588,883	2,238,596	1,158,761	Annual Surplus (Deficit)

The graph and table below are for the same 400% increase, using wireline projections based on the JSI data.

Revenue Projection with Feasibility Study 4% Rate with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

Line Fees

Residential lines	0.84	per month
Business lines	1.98	per month
Business trunks	2.12	per month

Revenue Projection with Feasibility Study 4% Rate with JSI Forecast Decline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	16,043,711	2030 Estimated Annual Revenue
Total	29,301,092	(4,239,903)	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	2,930,109	(529,988)	(856,378)	Annual Surplus (Deficit)

The revenue projections above are combined with the current systems cost data provided by Motorola and data from the Feasibility Study to develop a Regional Radio System Financial Structure in the next section to show the required contributions from various revenue sources for the District to assume various levels of responsibility for Regional Radio Operations.

Conclusions

If the decline in access lines occurs as predicted by JSI Capital and (to a lesser extent) by Technology Futures, both shown on the next page, **the ability of the District to take on significant new cost commitments is in serious doubt**. In any case, careful management of revenue forecasts and operating budget will become more and more important over the next decade.

It is important to note that the revenue projections are <u>absolute</u> numbers, based on fixed line and wireless fees, whereas the operating budget is subject to inflation.

Again, the recommended annual review should consist of the following:

❖ Update the US forecasts of wireless lines and wired access lines from one or more sources.
❖ Examine actual current and historical revenue and operating costs and develop updated trend lines to detect any difference in the actual revenue trends in the District as compared to projected National trends.
❖ Based this analysis, update future budget planning to provide proper support for ongoing operations.

Study information used in developing these revenue projections is provided in the remainder of this Section.

JSI Capital Advisors published the chart below from a 2011 report showing significant declines in both residential and access lines over the next 10 years.

10-YEAR TELECOM INDUSTRY PROJECTIONS: ILEC AND FACILITIES-BASED CLEC ACCESS LINES																	
(millions)	2007	2008	2009	2010	'07 - '10 CAGR	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	'10 - '20 CAGR	'07 - '20 CAGR
ILEC Access Lines - Residential	92.31	78.96	70.15	61.47	-12.7%	52.71	44.54	36.95	30.25	24.43	19.47	15.31	11.86	9.06	6.65	-19.9%	-18.3%
ILEC Access Lines - Business	49.70	49.47	45.08	40.51	-6.6%	37.74	34.60	31.12	27.61	24.16	20.86	17.77	14.93	12.37	9.86	-13.2%	-11.7%
CLEC Access Lines - Residential	1.58	1.56	1.45	1.58	0.0%	1.59	1.62	1.64	1.64	1.61	1.56	1.49	1.38	1.26	1.12	-3.4%	-2.6%
CLEC Access Lines - Business	4.73	4.80	4.64	5.06	2.3%	5.41	5.72	6.00	6.23	6.34	6.38	6.30	6.10	5.77	5.35	0.5%	1.0%

Source: Phone Lines 2011, www.FCC.gov and JSICA estimates and calculations.

A 2008 graph from Technology Futures, Inc. also shows a steep decline in access lines over this coming decade, but quite not to the degree as the later study.by JSI. The JSI table indicates about 17.5 million ILEC lines in 2020, where the earlier TFI graph developed in 2008 shows about 45 million ILEC lines in 2020.
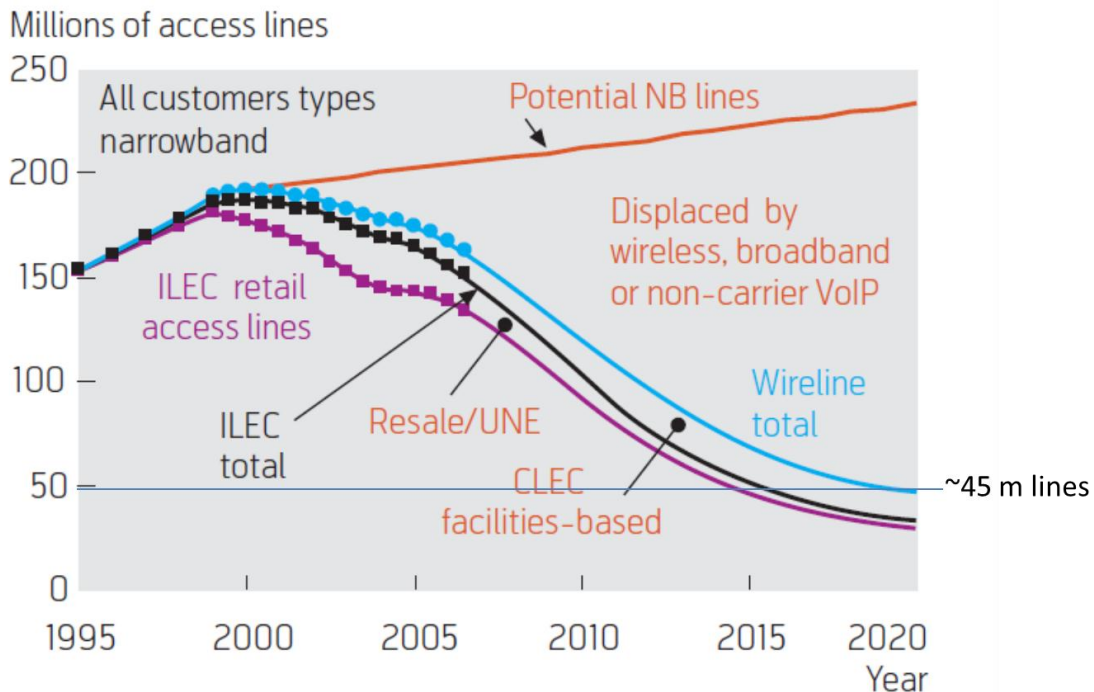
2008 Forecast - Technology Futures Inc.

In either case, there is a significant decrease from a 2010 level of about 100 million lines. As a result, the data indicate that District revenue from wireline (access line) charges is at **significant risk** in the future.

With regard to the growth in wireless subscribers, the graph below shows that wireless subscribers numbered over 302 million in December of 2010, where the population of the US is 310 million. The rate of growth is high, but will flatten out rapidly over the next few years as the market saturates.

Estimated Subscriber Connections

Year-End 2010 Estimated Wireless Connections
Up More than 17 Million from December 2009
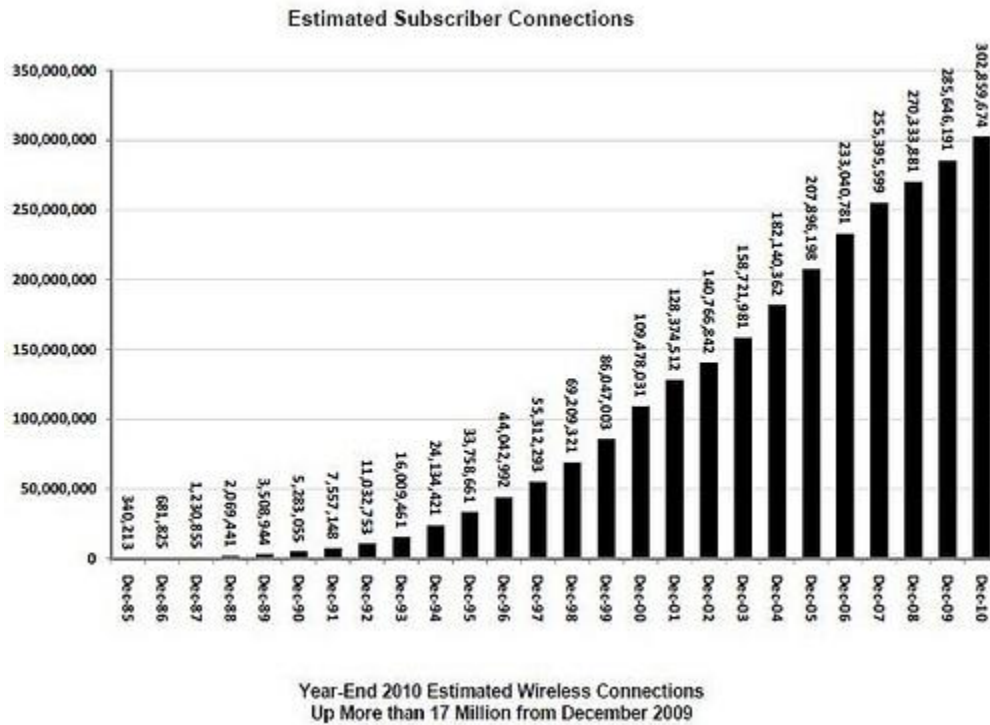
U.S. Wireless Growth

CTIA released its bi-annual survey this week, which tracks data submitted by carriers from January-December 2010, documenting subscriber growth, usage, revenue and capital investment.

It is possible that wireless growth will continue at a higher rate than projected in this section, compensating somewhat for wireline revenue loss. This fact reinforces the need to carefully examine actual revenue and industry forecasts each year to make appropriate budget and operational adjustments.

5. Estimated Systems Costs

Working with Motorola and the cities in the District, estimates of capital and operating costs have been developed, as follows:

❖ Costs for the City of Fort Worth and for the City of Irving are based on the contract costs and confirmed by Motorola.

❖ Estimated costs for the cities of Arlington, Grand Prairie, Mansfield and the NETCO consortium are based on costs provided by Motorola, which were based on discount structures offered to the City of Fort Worth.

❖ Estimated costs for three new sites were included to provide coverage in the Western part of the District. Discussions at various points in the study process have estimated a requirement from two to four new sites for full coverage.

❖ Motorola also provided estimates for ongoing support of the systems.

❖ As assumed in the Feasibility Study:
  ➢ Costs for subscriber units were NOT included in systems costs.
  ➢ Costs for civil works at each site, including antenna, tower, power and building modifications, are NOT included in systems costs.

The estimated costs for a District-wide Motorola P25 radio system, provided by Motorola, are as follows:

❖ $ 76,300,000 initial cost for systems, installation, testing and commissioning, exclusive of subscriber units and civil works.

❖ Motorola provided lease terms of 4.26% for 10 years, resulting in an annual cost of $ 9,529,251 over 10 years.

❖ Motorola estimated the ongoing annual cost of System Monitoring & Maintenance at $ 5,009,596.

❖ Motorola estimated the ongoing annual cost of Systems and Software Upgrades at $ 1,772,626.

The resultant annual cost for systems is $ 16,311,473 during the term of the lease and $ 6,782,222 after the lease.

Other costs included from the Feasibility Study include the following:

❖ Network Backhaul, which was estimated to be $ 250,000 per year from FY2015 forward.

❖ Expansion and refresh, which was estimated to be $1,500,000 per year from FY1013 forward.

It should be noted that the relative initial costs of the various system, as measured on a per subscriber basis or a per capita basis, vary significantly as shown in the two graphs below.

System Cost per Subscriber Unit
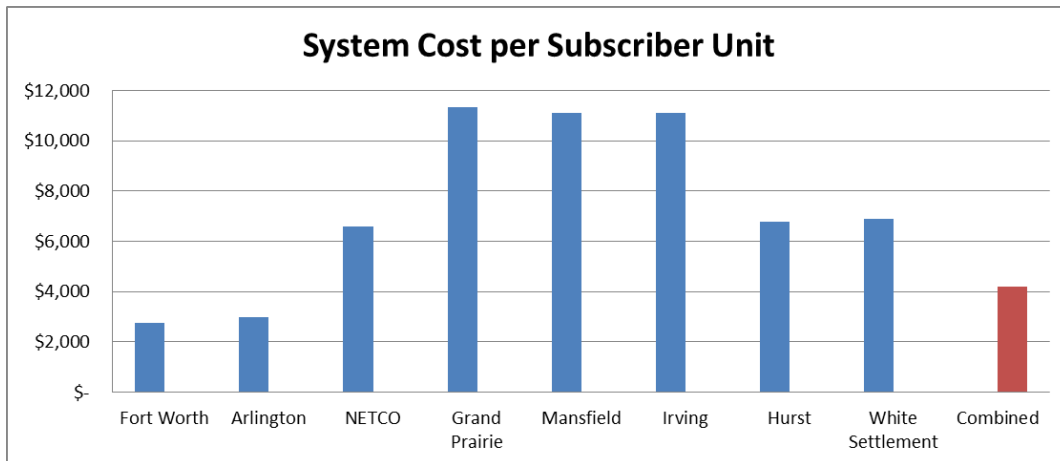
There is more than a 4 to 1 difference between the highest and lowest system cost on a per subscriber basis.

System Cost per Capita
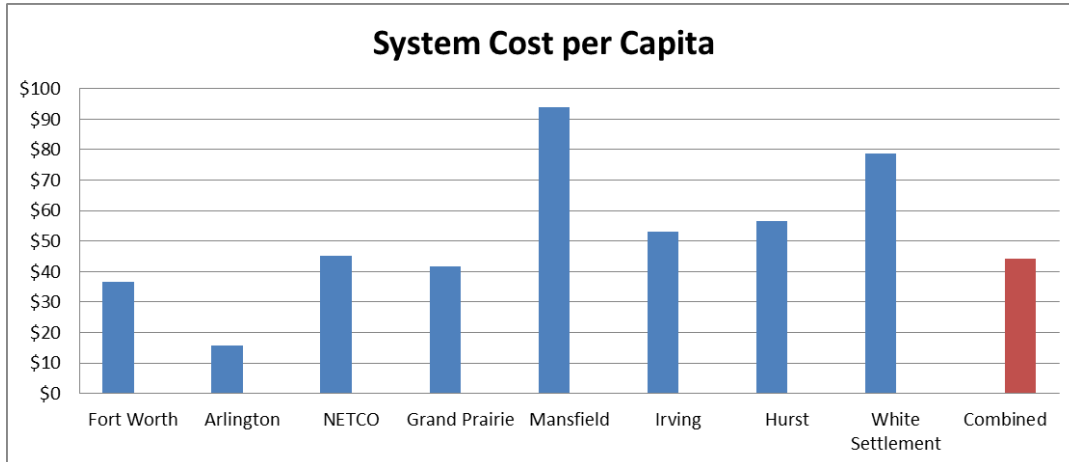
There is a 6 to 1 difference between the highest and lowest system cost on a per capita basis.

These variations in per subscriber and per capita capital costs indicate that an equitable transfer of ownership is not probable, even if the Business Case indicated that the District could assume ownership of all the systems.

6. Alternative Business Case Projections

The District revenue and operating budget projections from Section 4 above and the cost data from Section 5 above have been integrated into a cost model similar in form to the analysis in the Feasibility Study. The objective is to estimate the monthly subscriber unit fee required to supplement Regional Radio System costs that cannot be offset by revenue generated by 1) fee increases, 2) grant income and 3) income from future Interoperability Partners around Tarrant County.

Referring to the revenue projections in Section 4, the following four scenarios are provided in the cost model:

1. 250% Fee Increase with Baseline Decline in Wirelines
2. 250% Fee Increase with JSI Decline in Wirelines
3. 400% Fee Increase with Baseline Decline in Wirelines
4. 400% Fee Increase with JSI Decline in Wirelines

The model also provides for increasing or decreasing the grant income and interoperability income to examine the results on subscriber fees.

The estimate of radio subscriber units in each year was accomplished as follows:

❖ The larger cities provided estimates of subscriber units in 2015.
❖ That subscriber unit total was scaled forward at 1/2 the projected rate of population growth for each year.
❖ In 2015, the smaller cities (7% of the District population) were added with an increase in subscriber units to cover 100% of the population rather than 93%.

Since both the District revenue and the annual systems costs vary over time, four key points for subscriber fees have been selected in the Business Case projections:

❖ The first year in which both the annual support costs and the lease payments are in force – FY 2015 in the model.
❖ The last year of the 10 year lease term – FY 2022 in the model.
❖ Steady State operations in the first year after the lease is completed – FY 2023 in the model.
❖ Steady Sate operations in FY 2030, the end of the projection timeline.

For the four revenue scenarios above, the following monthly subscriber fees result:

Estimated Monthly Subscriber Fees

		Revenue Scenario			
		1	2	3	4
Lease and Maintenance Period	FY 15	57	65	40	53
	FY 22	64	75	54	70
Steady State Period	FY 23	27	36	17	32
	FY 30	31	36	26	33

Graphically, the monthly subscriber fee rate by year for each of the four scenarios is depicted below.
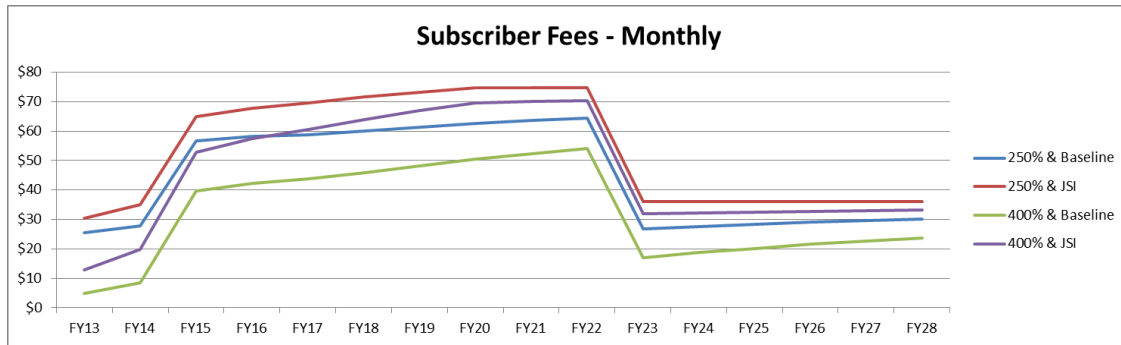
At the core of the Business Case financial analysis is the fact that revenue to the District is projected to decline each year, driven by ongoing erosion of revenue from wired access lines. Regardless of any fee increases applied by the District, any permanent increase in operating costs for the District for staff, systems etc. must eventually be offset by reduced operating costs or alternate sources of revenue.

The next two pages depict the model data for each of the revenue scenarios, maintaining the Grant and Interoperability income form the Feasibility study, even though there is a risk that these will not be at the level predicted.

The Business Case regarding District Involvement in a
Regional Radio System (RRS) Supporting Public Safety Operations

Revenue Scenario 1. 250% Fee Increase with Baseline Decline in Wirelines

FY16 - FY21 Hidden

Category	Yearly Average	Total FY13 -FY22	FY13	FY14	FY15	FY22	FY23	FY30
Total Funding Available from District (Four Alternatives)								
1. 250% Fee Increase with Baseline Decline in Wirelines	3,120,904	31,209,039	4,967,274	4,497,557	4,077,966	1,444,871	1,156,421	(261,993)
2. 250% Fee Increase with JSI Decline in Wirelines	-	-	-	-	-	-	-	-
3. 400% Fee Increase with Baseline Decline in Wirelines	-	-	-	-	-	-	-	-
4. 400% Fee Increase with JSI Decline in Wirelines	-	-	-	-	-	-	-	-
Grants	1,000,000	10,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Interoperability Partners	377,500	3,775,000	75,000	125,000	225,000	500,000	500,000	500,000
Total Funding Available for Radio System	4,498,404	44,984,039	**6,042,274**	**5,622,557**	**5,302,966**	**2,944,871**	**2,656,421**	**1,238,007**
Infrastructure Costs (Site Electronics, Engineering., Master Switch), District Project Management, QA (Mot.) — 76,300,000	9,529,251	95,292,510	9,529,251	9,529,251	9,529,251	9,529,251	-	-
Interest — 4.26%								
Term (years) — 10								
System Monitoring & Maintenance (Mot.) — 5.8%	4,007,677	40,076,768			5,009,596	5,009,596	5,009,596	5,009,596
Systems and Software Upgrades (Mot.)					1,772,626	1,772,626	1,772,626	1,772,626
Technical Staff & Systems (Est.)	525,550	5,255,500	130,000	305,500	403,000	631,000	631,000	631,000
Consulting (Est.)	102,500	1,025,000	250,000	150,000	100,000	75,000	75,000	75,000
Network Backhaul (Est.)	212,500	2,125,000	-	125,000	250,000	250,000	250,000	250,000
Expansion/Refresh	1,500,000	15,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Total Projected Expenses	17,295,579	172,955,788	**11,409,251**	**11,609,751**	**18,564,473**	**18,767,473**	**9,238,222**	**9,238,222**
Funding Gap	12,797,175	127,971,748	5,366,977	5,987,194	13,261,507	15,822,602	6,581,801	8,000,215
Estimated Subscriber Units (Note 4)			17,601	17,874	19,509	20,444	20,571	21,433
Average Monthly Subscriber Fee Needed to Offset Funding Gap			25	28	**57**	**64**	**27**	**31**

| | | | | | | **10 Year Lease Period** | **FY23 Steady State** | **FY30 Steady State** |

Revenue Scenario 2. 250% Fee Increase with JSI Decline in Wirelines

FY16 - FY21 Hidden

Category	Yearly Average	Total FY13 -FY22	FY13	FY14	FY15	FY22	FY23	FY30
Total Funding Available from District (Four Alternatives)								
1. 250% Fee Increase with Baseline Decline in Wirelines	-	-	-	-	-	-	-	-
2. 250% Fee Increase with JSI Decline in Wirelines	812,107	8,121,067	3,912,362	2,972,741	2,140,994	(1,061,940)	(1,149,386)	(1,523,293)
3. 400% Fee Increase with Baseline Decline in Wirelines	-	-	-	-	-	-	-	-
4. 400% Fee Increase with JSI Decline in Wirelines	-	-	-	-	-	-	-	-
Grants	1,000,000	10,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Interoperability Partners	377,500	3,775,000	75,000	125,000	225,000	500,000	500,000	500,000
Total Funding Available for Radio System	2,189,607	21,896,067	**4,987,362**	**4,097,741**	**3,365,994**	**438,060**	**350,614**	**(23,293)**
Infrastructure Costs (Site Electronics, Engineering., Master Switch), District Project Management, QA (Mot.) — 76,300,000	9,529,251	95,292,510	9,529,251	9,529,251	9,529,251	9,529,251	-	-
Interest — 4.26%								
Term (years) — 10								
System Monitoring & Maintenance (Mot.) — 5.8%	4,007,677	40,076,768			5,009,596	5,009,596	5,009,596	5,009,596
Systems and Software Upgrades (Mot.)					1,772,626	1,772,626	1,772,626	1,772,626
Technical Staff & Systems (Est.)	525,550	5,255,500	130,000	305,500	403,000	631,000	631,000	631,000
Consulting (Est.)	102,500	1,025,000	250,000	150,000	100,000	75,000	75,000	75,000
Network Backhaul (Est.)	212,500	2,125,000	-	125,000	250,000	250,000	250,000	250,000
Expansion/Refresh	1,500,000	15,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Total Projected Expenses	17,295,579	172,955,788	**11,409,251**	**11,609,751**	**18,564,473**	**18,767,473**	**9,238,222**	**9,238,222**
Funding Gap	15,105,972	151,059,721	6,421,889	7,512,010	15,198,480	18,329,413	8,887,608	9,261,515
Estimated Subscriber Units (Note 4)			17,601	17,874	19,509	20,444	20,571	21,433
Average Monthly Subscriber Fee Needed to Offset Funding Gap			30	35	**65**	**75**	**36**	**36**

| | | | | | | **10 Year Lease Period** | **FY23 Steady State** | **FY30 Steady State** |

The Business Case regarding District Involvement in a
Regional Radio System (RRS) Supporting Public Safety Operations

Revenue Scenario 3. 400% Fee Increase with Baseline Decline in Wirelines

FY16 - FY21 Hidden

Category		Yearly Average	Total FY13 -FY22	FY13	FY14	FY15	FY22	FY23		FY30
Total Funding Available from District (Four Alternatives)										
1. 250% Fee Increase with Baseline Decline in Wirelines		-	-	-	-	-	-	-		-
2. 250% Fee Increase with JSI Decline in Wirelines		-	-	-	-	-	-	-		-
3. 400% Fee Increase with Baseline Decline in Wirelines		6,588,883	65,888,833	9,319,487	8,678,302	8,076,116	3,983,828	3,517,651		1,158,761
4. 400% Fee Increase with JSI Decline in Wirelines		-	-	-	-	-	-	-		-
Grants		1,000,000	10,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000		1,000,000
Interoperability Partners		377,500	3,775,000	75,000	125,000	225,000	500,000	500,000		500,000
Total Funding Available for Radio System		**7,966,383**	**79,663,833**	**10,394,487**	**9,803,302**	**9,301,116**	**5,483,828**	**5,017,651**		**2,658,761**
Infrastructure Costs (Site Electronics, Engineering., Master Switch), District Project Management, QA (Mot.)	76,300,000	9,529,251	95,292,510	9,529,251	9,529,251	9,529,251	9,529,251			-
Interest	4.26%									
Term (years)	10									
System Monitoring & Maintenance (Mot.)	5.8%	4,007,677	40,076,768			5,009,596	5,009,596	5,009,596		5,009,596
Systems and Software Upgrades (Mot.)						1,772,626	1,772,626	1,772,626		1,772,626
Technical Staff & Systems (Est.)		525,550	5,255,500	130,000	305,500	403,000	631,000	631,000		631,000
Consulting (Est.)		102,500	1,025,000	250,000	150,000	100,000	75,000	75,000		75,000
Network Backhaul (Est.)		212,500	2,125,000	-	125,000	250,000	250,000	250,000		250,000
Expansion/Refresh		1,500,000	15,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000		1,500,000
Total Projected Expenses		17,295,579	172,955,788	11,409,251	11,609,751	18,564,473	18,767,473	9,238,222		9,238,222
Funding Gap		9,329,195	93,291,955	1,014,764	1,806,449	9,263,358	13,283,646	4,220,571		6,579,462
Estimated Subscriber Units (Note 4)				17,601	17,874	19,509	20,444	20,571		21,433
Average Monthly Subscriber Fee Needed to Offset Funding Gap				5	8	**40**	**54**	**17**		**26**

	10 Year Lease Period	FY23 Steady State	FY30 Steady State

Revenue Scenario 4. 400% Fee Increase with JSI Decline in Wirelines

FY16 - FY21 Hidden

Category		Yearly Average	Total FY13 -FY22	FY13	FY14	FY15	FY22	FY23		FY30
Total Funding Available from District (Four Alternatives)										
1. 250% Fee Increase with Baseline Decline in Wirelines		-	-	-	-	-	-	-		-
2. 250% Fee Increase with JSI Decline in Wirelines		-	-	-	-	-	-	-		-
3. 400% Fee Increase with Baseline Decline in Wirelines		-	-	-	-	-	-	-		-
4. 400% Fee Increase with JSI Decline in Wirelines		2,930,109	29,301,092	7,628,503	6,241,349	4,989,108	23,372	(129,737)		(856,378)
Grants		1,000,000	10,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000		1,000,000
Interoperability Partners		377,500	3,775,000	75,000	125,000	225,000	500,000	500,000		500,000
Total Funding Available for Radio System		**4,307,609**	**43,076,092**	**8,703,503**	**7,366,349**	**6,214,108**	**1,523,372**	**1,370,263**		**643,622**
Infrastructure Costs (Site Electronics, Engineering., Master Switch), District Project Management, QA (Mot.)	76,300,000	9,529,251	95,292,510	9,529,251	9,529,251	9,529,251	9,529,251			-
Interest	4.26%									
Term (years)	10									
System Monitoring & Maintenance (Mot.)	5.8%	4,007,677	40,076,768			5,009,596	5,009,596	5,009,596		5,009,596
Systems and Software Upgrades (Mot.)						1,772,626	1,772,626	1,772,626		1,772,626
Technical Staff & Systems (Est.)		525,550	5,255,500	130,000	305,500	403,000	631,000	631,000		631,000
Consulting (Est.)		102,500	1,025,000	250,000	150,000	100,000	75,000	75,000		75,000
Network Backhaul (Est.)		212,500	2,125,000	-	125,000	250,000	250,000	250,000		250,000
Expansion/Refresh		1,500,000	15,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000		1,500,000
Total Projected Expenses		17,295,579	172,955,788	11,409,251	11,609,751	18,564,473	18,767,473	9,238,222		9,238,222
Funding Gap		12,987,970	129,879,695	2,705,748	4,243,402	12,350,365	17,244,102	7,867,960		8,594,600
Estimated Subscriber Units (Note 4)				17,601	17,874	19,509	20,444	20,571		21,433
Average Monthly Subscriber Fee Needed to Offset Funding Gap				13	20	**53**	**70**	**32**		**33**

	10 Year Lease Period	FY23 Steady State	FY30 Steady State

7. Operational Considerations

In terms of the District's ability to assume responsibility for Radio Systems related management and technology, the following are evident from the interviews and investigations in this study:

- ❖ The District **does have the management and organizational skills** to assume responsibility for a regional radio system at any level described in the Feasibility Study, should the District Board elect to do so.
- ❖ The District **does have the authority to assume this responsibility**, including accepting subscriber fees from participating cities, as presented in Appendix B, Use of Funds Presentation.
- ❖ The District staff is **trusted to deliver high quality support** in any endeavor for which they assume responsibility.

There is value in having a trusted resource to help the constituents in the District to effectively manage complex radio operations and interoperability in a way equivalent to current management of E9-1-1 and Next Generation 9-1-1, particularly for smaller cities with less access to objective resources.

The role contemplated for the District in these recommendations is as an **Operations Manager** for regional radio activities, as described further below. In the Feasibility Study all three roles described included some level of funding from the District to the cites in the District, beginning with the *Fiduciary Partner* role, where "*…the Board functions primarily as a funding source to the membership providing financial assistance to municipalities within the District for the purposes of improving public safety radio communications.*" The Administrative Partner role expands this to include collecting fees to offset expenditures and the Managing Partner role includes ownership of assets.

With the future revenue uncertainties detailed in this report, the District should consider a staged approach to Regional Radio Management services as described in this section. If forecast revenue and possible operational cost reductions over time allow some level of expansion, the District could, <u>without assuming ownership</u> of radio systems assets, expand its organization to address one or more of the capabilities listed below.

- ❖ Coordinate advice from existing operations and technical committees.
- ❖ Provide regional coordination and management for systems interoperability.
- ❖ Potentially provide funding, in the short term, for specific radio issues based on revenue cost and reserve funds projections.
- ❖ Assist small jurisdictions on interoperability and transition planning over time.
- ❖ Provide network communications and systems maintenance coordination.

❖ Provide integrated asset and service management.
❖ Provide region-wide performance and operations monitoring and management.
❖ Improve the performance of each of the systems and services vendors by monitoring the quality and costs of their services.
❖ Provide technical management for radio systems in the region.
❖ Provide a region-wide capability to identify and coordinate new sources of funds for operations and interoperability.
❖ Reduce the technical burdens on each systems owner.
❖ Foster and teach best practices for technical and operational activities.
❖ Investigate and plan advanced services in the region, including broadband/LTE services, collaboration & information management systems, etc.

The benefits of District management of radio operations as outlined above include the following:

❖ Better regional radio operations.
❖ Reduction/optimization of ongoing operations and systems costs for the region.
❖ Best utilization of available technical and operational resources.
❖ Optimization of systems utilization and performance.
❖ Supporting the planning and execution of studies and investigations designed to improve District operations and capabilities.
❖ Simplifying the planning and coordination of interoperability within the District and with neighboring jurisdictions.

As a result, the District would focus its efforts on helping everyone reduce radio operations and interoperability costs and improve operations with staff that the cities can trust to be objective & vendor-independent and that they may not otherwise be able to afford.

This approach is consistent with the role of an ECD in supporting all citizens in the District and is a more productive use of funds in an uncertain revenue environment. It is depicted on the next page as a "layered" approach that can be managed on a step-by-step basis.
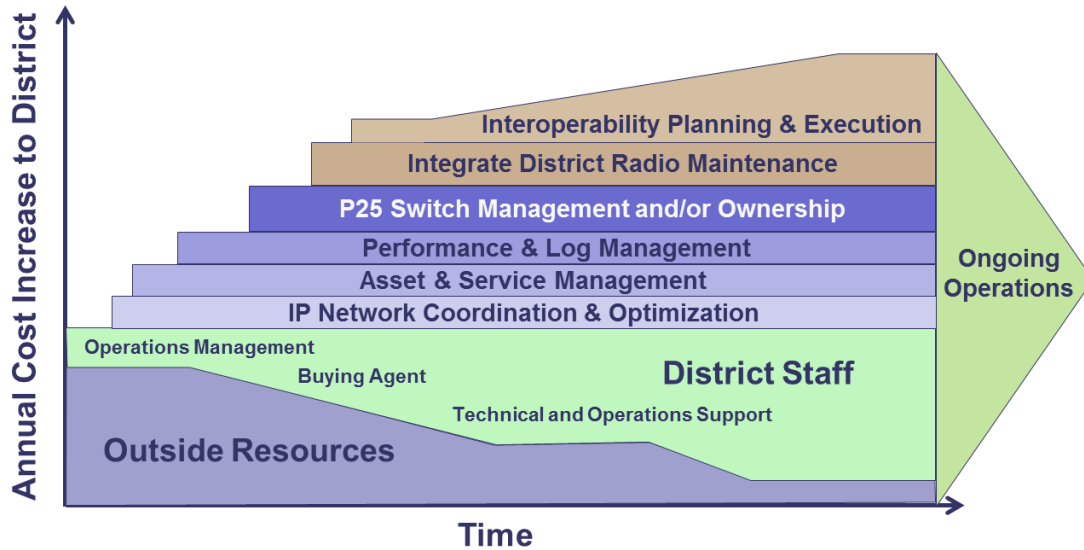
Each step can be managed for optimal costs and effectiveness and some layers may not be implemented, based on ongoing annual revenue and cost projections.

If the District moves forward with coordination and support of radio services in cooperation with the cities in the District, an appropriate staff must be assembled that is separate from the current E9-1-1 and NG9-1-1 operations. Over time, common functions may be integrated, but care must be taken to maintain the quality of the current functions of the District and extend that quality into radio operations support.

In the *Organizational Assessment Final Report*, published on November 30, 2011 by the Azimuth Group the Proposed Future Organizational Model on the next page was presented to provide for the possibility of Regional Radio Operations in the District. A new Assistant Director has been added at the left of the chart with additional resources to support radio operations.
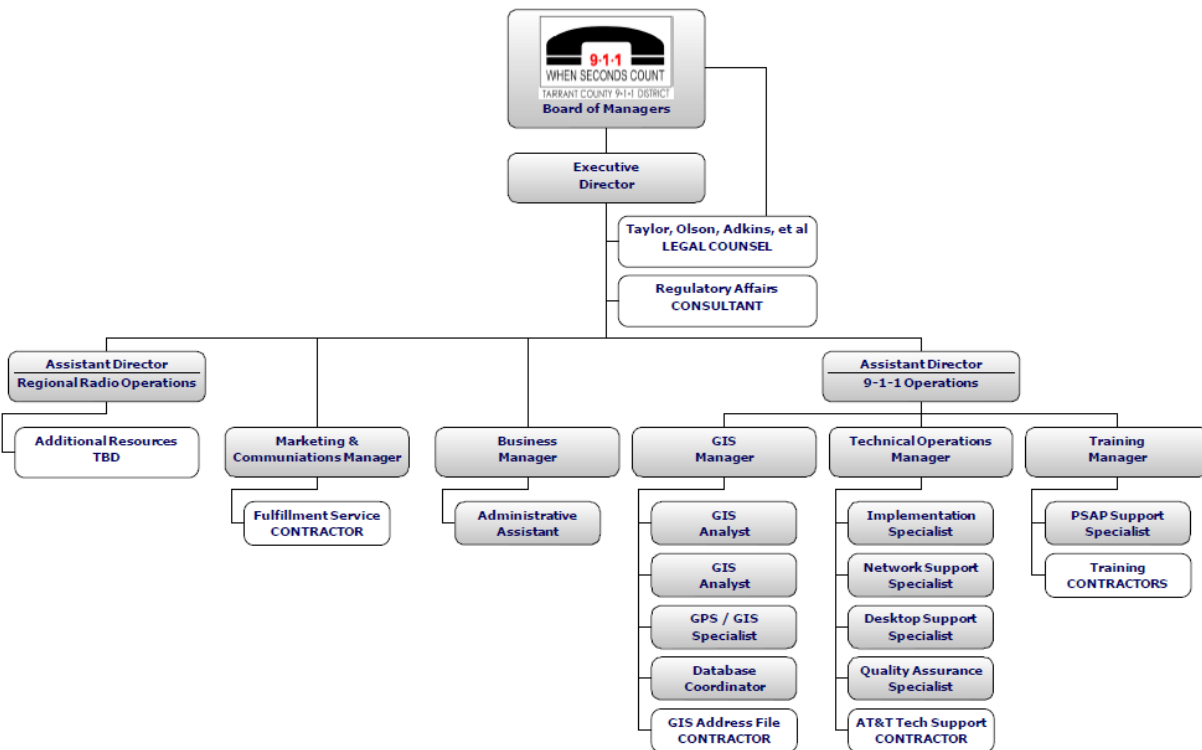
The Assistant Director should be knowledgeable in radio systems coordination and interoperability and, ideally, have knowledge of the operations in the District. The person should work well with others and be able to develop practical coordination and interoperability plans.

As required and approved by the Board, over time, recommended staff functions for radio operations reporting to this Assistant Director, Regional Radio Operations, are as follows:

❖ Coordination and Support Specialist, providing expanded coordination and documentation capabilities for the Assistant Director.

❖ Contracts and Purchasing Specialist, coordinating vendor contracts and group buying for radio systems and services in the District.

❖ Radio Systems Maintenance Coordinator, to oversee Asset and Service Management and advise the radio systems owners on the best use of service vendors, including integration of the District IP network as appropriate to reduce costs and improve reliability.

❖ Records Administrator, to coordinate asset data and maintain current data on radio assets in the District.

The required skills and expertise can be provided initially by managed outside contract resources and consulting resources, with permanent staff assuming their responsibilities as they are identified and hired. The estimated loaded cost for this staff in the model is $481,000 per year.

Three very important functions that have the potential for cost reduction in both 9-1-1 operations and in radio systems operations are 1) **Asset & Service Management**, 2) **Performance Management** and 3) **Log Management and Analysis.**

Asset and Service Management is an application suite, either locally installed or hosted by a services provider that allows all parties involved in equipment, software services acquisition or retirement to manage these process via a web browser. Key aspects of such a system are as provided below:

❖ All equipment and software items are maintained in a database that allows easy access to a variety of information:
  ➢ Item model number and description
  ➢ Initial Cost
  ➢ Date installed or spare item
  ➢ Location
  ➢ In service or in storage, working or not status
  ➢ Identification of the system that an item is part of so related items are tracked as logical groups
  ➢ Responsible maintenance vendor
  ➢ Repair/replacement history, etc.
❖ All vendors providing equipment, software, services, depot repair or other services to the District or city are maintained in the database with a variety of information:
  ➢ All contract data, including rates, discounts, terms of service, etc.
  ➢ Records of each interaction, including equipment or software sales, repair trips, regular maintenance trips, etc.
  ➢ Records of the activities of each individual sales, service or repair person.
  ➢ Information from the end users on the quality and timeliness of the vendors' services and support.
❖ Manage projects and upgrades, with tracking of equipment, people, tasks, etc.
❖ Enter and track repair and service tickets, with automatic notification of the correct vendor and the correct technician for that location.
❖ Support on-line training modules and track successful completion of training.
❖ Integrated document management so documentation related to specific equipment, systems, locations or other identifiers can be accessed when it is needed.

These capabilities can be brought into play as they are needed, where the initial process is to import and/or automatically acquire equipment and software records over time in such a way as to avoid a large, complex systems implementation process.

Additionally, the Asset and Service Management System can be offered as a service to the cities in the district to manage nay technology or other assets (including vehicles equipment, etc.) at almost no additional cost to the Districts, provided the cities pay the license fees for any additional users thet need to access the system.

Performance Management utilizes packet monitoring and standards-based SNMP tools (Simple Network Management Protocol) to query a wide variety of equipment types via the TCP/IP network to acquire and maintain a variety of information related to each system, including:

❖ Bandwidth, channel or circuit utilization to allow for planning as loads in the system change and grow
❖ Communications channels among systems to track applications probelms
❖ Status of systems and subsystems to track reliability and troubleshoot outages
❖ Operational information, including configurations, temperatures, voltages, capacities, etc.

The data collected is correlated to expected normal values and only items outside the expected parameter range are flagged for attention. All data is stored and available for long term analysis of a particular equipment item or communications channel.

Automated processes and ongoing IP discovery tools allow the system to be brought on-line quickly and acquire equipment and services data for systems management. Performance data can be tied to maps, equipment and circuit items in the Asset database or other related information.

Log Management and Analysis allows examination of event records related to a variety of administrative actions, equipment failures, intermittent failure events and other data that result is event logs for various systems. This process has several important characteristics as follows:

❖ Log entries produced by each system are sent to a log server or servers, where they are stored as unchangeable, read-only data.
❖ All systems are operating on internal clocks that are synchronized to a central network clock, allowing events affecting multiple systems to be correlated among the systems.
❖ Ongoing analysis of logs is automatically performed to detect abnormal log entries and produce appropriate alerts to technical staff.
❖ Log data can be used to validate a number of different performance parameters that are being collected via SNMP by the Performance Management system.

These tools, properly configured and designed to deliver alerts for only abnormal conditions can be extremely effective in reducing work effort and increasing the quality and reliability of systems and services.

8. Recommendations

There are two sets of recommendations, the first addressing **management of revenue risk**, regardless of any decision on Regional Radio Operations, and the second addressing **District involvement in Regional Radio Operations**.

Revenue Risk Management:

As described in detail in Section 4, there is a significant risk of revenue decline due to a rapid decrease in the number wired access lines due to wireless competition in residential services and a variety of alternative communications capabilities for businesses.

Consider *immediate action to mitigate probable declines* in wired access line revenue, as follows:

❖ Immediately determine the maximum possible increase in wireline fees and implement the increases. The ongoing decline in wired access lines will continue regardless of any other factors. The sooner a fee increase can be effected, the more revenue will be available to build reserve and contingency funds to help offset any declines in revenue over time.

❖ Examine cost optimization for technology upgrades and services in ongoing District operations. Newer technologies, hosted PSAP solutions and even "PSAP in the cloud" arrangements may hold an opportunity to reduce and stabilize ongoing operations costs for E9-1-1, NG9-1-1 and possible regional radio operations.

❖ Do not assume new operational or technical responsibilities unless there is a reasonable expectation of revenue to support them. Short term, expansion of staff is not a cost issue, if fees are increased. Longer term, the efficiency and cost reduction efforts of the District are critical to support the most valuable assets: the knowledge, experience and dedication of the staff.

❖ Consider non-traditional, but related, revenue sources, such as a fee on each highway toll transaction. The North Tarrant Express is projected to begin taking toll transactions in 2017. If the District could negotiate a 5 cent fee per transaction, on the basis that the NTE represents a source of accidents and medical emergencies in the District, it may be reasonable to fund part of the district form NTE.
According to forecast data on transactions and revenue published by the NTE, a 5 cent fee would represent $1.3 million in District revenue in 2017 and would be less that 1% of the NTE revenue. In 2030, District revenue would be $2.1 million and about 0.5% of NTE revenue.

The projected decline in wireline revenue also requires that the Dist*rict conduct an annual review of wireless and wireline revenue and operating* budgets. The objectives of this annual review are as follows:

❖ Update the US forecasts of wireless lines and wired access lines from one or more sources. Forecast reports from Technology Futures in Austin are about $2,500 and from JSI Capital Advisors about $400.

❖ Examine actual current and historical revenue and operating costs and develop updated trend lines to detect any difference in the actual revenue trends in the District as compared to projected National trends. Actual data form the past, extended each year with new data, allows a more accurate projection forward that can be compared with purchased reports.

❖ Based this analysis, update future budget planning to provide proper support for ongoing operations and reserve funding required to support the responsibilities of the District. This will also include any projections related to cost reductions possible from more efficient operations within the District.

Regional Radio Responsibilities – The revenue risks require that the District carefully consider new responsibilities and obligations. Note that, with regard to Regional Radio System Operations, the role of *Operations Manager* recommended below does not fit any the roles suggested in the Feasibility Study, all of which assumed that the District would be a funding source for an RRS starting with the Fiduciary Partner role and continuing with the Administrative Partner and Managing Partner roles.

It is Avistas' belief that radio operations and coordination support from the District has significant value to the cities in the District, more so for the smaller cities than the larger cities.

In the environment of revenue uncertainty and large capital costs for P25 radio systems in the District, the following priorities should guide the Board's decisions to assume more responsibilities:

❖ Initial Priorities:
  ➢ Assume an Operations Manager role, in which the District has no ownership in the systems and does not contribute funds to cities in the District, but provides planning and operations leadership and technical staff to manage day-to-day operations.
  ➢ Based on operational evaluations and revenue projections, begin developing appropriate operations and technical staff under the management of an Assistant Director, Regional Radio Operations. Initially, managed outside resources should be used to identify priorities and to also assist in the process of identifying cost reduction opportunities and possible new revenue sources.

- ➢ As they are identified and hired, integrate the new Radio Operations staff into the successful management structure of the District.
- ➢ Assume Buying Agent role for radio systems purchases in the District, where the District will establish relationships with current and eligible vendors of radios systems, support services, carrier services and other functions related to the successful operation and interoperability of radios systems in the District.
- ➢ Begin providing technical and operations assistance through the radio management staff and appropriate managed outside resources.
- ➢ Consider specific, one-time funding to constituents to address critical radio issues, provided it can be justified by analysis of revenue projections, ongoing cost projections and appropriate funding of reserves for 9-1-1 systems and operations.

❖ Next Priorities:
- ➢ Develop plans to optimize communications network resources between the current 9-1-1 fiber-based TCP/IP network and microwave resources that are part of the various multi-site radio systems to achieve the best reliability at the most reasonable overall costs.
- ➢ Establish asset and service management processes and create procedures to transfer asset data and enter asset data from the cities in the District. This function should apply to both the 9-1-1 area and radio systems area.
- ➢ Establish/expand performance management and log management capabilities to include radio systems functions as well as 9-1-1 functions.

❖ Longer Term Possibilities:
- ➢ Assume management and possibly ownership and maintenance P25 Switches if the staff, advisory committees and the Board determine it is in the best interests for Regional Radio Management and that long term revenue is projected to support the asset transfer and ongoing maintenance. In any case, coordinated management of the P25 switch databases on behalf of the cities should be a District function.
- ➢ Begin consolidated maintenance support for a "best cost" model. Using the asset and services management capabilities and performance management tools, coordinate radio maintenance operations to 1) improve responsiveness for the smaller cites, 2) manage the quality of services delivered by the vendors and 3) allow development of "self-maintenance" in the district, as appropriate, to further reduce radio operations costs in the District.
- ➢ Develop an interoperability strategy appropriate to the needs of all cities in the District. This would include support for interoperability with the conventional VHF and UHF systems, coordinated planning for interoperations in the District and with neighboring jurisdictions as well

     as coordination with NCTCOG on expansion of P25 in the 16 county area.

➢ Identify the best uses of available funds for long term extension of interoperability, reduced operating costs and improved operational effectiveness for the cities in the district.

The Initial and Next priorities above can have significant value for cities in the District, where the smaller cities will likely benefit the most. A District staff focused on radio and interoperability issues can provide objective, vendor-neutral assistance to cities, as required, and provide buying services that can reduce the costs of radio acquisitions.

As interoperability among systems and with neighboring entities becomes more important, the District would be a logical focal point for these efforts with the advice of the current technical and operations advisory groups in the District.

Again, this "staged approach" is depicted below, where adding each level of responsibility (and ongoing costs) would be a function of the best available long term revenue and operating budget projections.
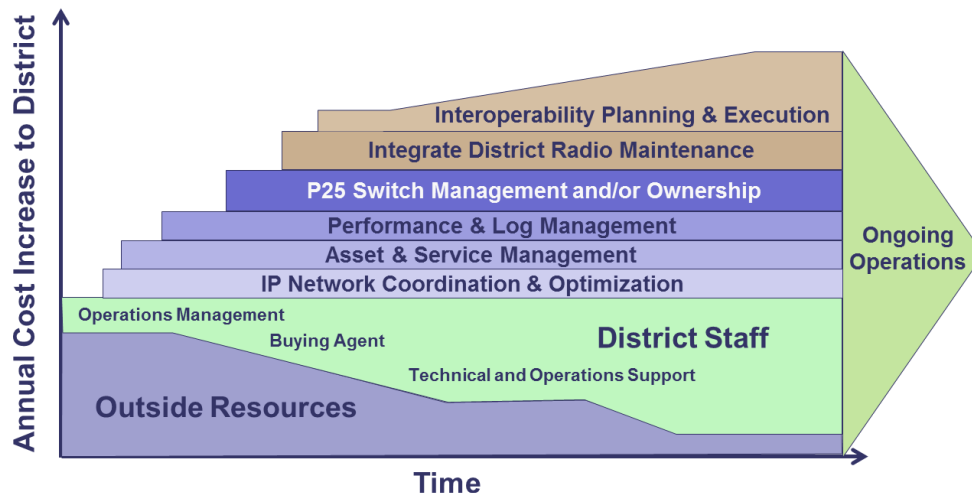
Please note that, as revenue projections are reviewed and if potential expanded sources of revenue are identified and begin to provide new, predictable revenue sources to the District, it may become possible to begin to provide or expand direct financial support to cities in the District for radio operations. The current District PSAP Assistance Program has established the process to accomplish this, based on available revenue.

Appendix A
Interviewees and Data Sources

Interviews:

The interviews conducted for this Business Case ranged from large to small cities and Tarrant County, as well as Motorola, as listed below.

A summary of discussion points is provided after the listing of interviewees, followed by other data sources used in the Business Case development.

Interviews completed are as follows:

❖ District Executive Director Greg Petrey:
Multiple discussions have taken place with Mr. Petrey, both before this engagement began and thus far in the engagement. He has also been copied on all communications related to this engagement.

❖ District Business Case Sub-committee:
Weekly conference calls and in-person meetings have been conducted on the progress of the project.

❖ Arlington Communications Services Administrator Gerard Eads:
Discussed Arlington's participation in an RRS as the second largest entity in the District.

❖ Chief Larry Boyd of the Irving Police Department:
Discussions included his views of the RRS as the Chair of the District Board and as the Police Chief of the City of Irving.

❖ Motorola Sales Representatives Jake Price and Rob Bondurant:
Discussed their current activities with the cities in the District and requested a summary of the current offered pricing for the individual cities and pricing if a single contract were signed by the District for Arlington, NETCO, Grand Prairie and Mansfield.

❖ Fort Worth Senior IT Manager Alan Girton and Jeffrey Stock of Buford Goff & Associates:
Discussed the status of their new P25 system implementation, systems costs, other cities they support, subscriber population and details of the new system. Mr. Girton has provided documentation on systems details and costs which will be included in the final report.

❖ NETCO member Gary Gregg of Euless:
We reviewed the arrangements among the six cities in NETCO, plus service provided to Westlake as a customer. Discussions included systems operations and ownership and technical issues related to tower sites and disaster recovery provisions.

❖ Mansfield Police Commander Kyle Lanier and Radio Systems Manager Steve Krause:
We reviewed multiple radio systems upgrade proposals provided by Motorola over the past year or so and discussed the fact that their city growth will require an additional tower site and an increase in the number of channels currently operational (5) in their trunked system.

- ❖ Tarrant County Fire Marshal Randy Renois and Tarrant County Communications Manager Eric Wersal:
  Reviewed the emergency management needs of the unincorporated portions of Tarrant County, where the volunteer fire departments have simple radio systems.
- ❖ Grand Prairie Deputy Chief Mike Taylor:
  Discussed the financial issues associated with a new system, as theirs is just 10 years old (in service in 2002).
- ❖ Texas Department of Public Safety, Mike Simpson, Chief, Interoperable Communications & Statewide Communications Interoperability Coordinator (SWIC), Texas Homeland Security, Texas Department of Public Safety:
  Discussed his experiences with forming and governance of regional radio systems in Texas and interoperability issues.
- ❖ Azle Fire Chief Will Scott:
  Reviewed interoperability as it relates to the city's VHF operations and the compatible VHF systems of the Texas DPS and Texas Forest Service. Very limited interconnection with Fort Worth. They have completed equipment upgrades to support narrowbanding.
- ❖ Hurst Assistant Police Chief Rick Winstanley and Assistant Fire Chief David Palla:
  Discussed their P25 system and issues related to District support of systems such as dispatch, records management and mapping data as a way to simplify management and reduce costs over time.
- ❖ Benbrook Assistant Fire Chief Mark O'Conner:
  Discussed issues related to how a regional system may work – all required to participate, new systems, etc. They interact with over 20 cities in mutual aid relationships. Their vehicle radios are P25 ready and all radios are UHF.
- ❖ Burleson Police Chief Tom Cowan and Fire Inspector David Butler:
  They interact with Johnson County who is planning a P25/800MHz upgrade. Burleson has a UHF Motorola analog trunked system with 5 channels for fire, police and city services.
- ❖ Crowley Communications Supervisor Rob Winkle:
  They currently have 3 repeater VHF radio system and have not completed narrowbanding. They are considering joining the Fort Worth System, which would require about $1millin in subscriber radios.
- ❖ White Settlement Police Lieutenant J. P. Bevering:
  They have a single site P25 system installed in 2008.   Their radios are compatible with P25 and Smartnet II so they can use the Fort Worth system. Their goal is improved interoperability.
- ❖ Edgecliff Village Fire Chief Jeff Balew:
  They have a VHF system with one repeater. They have a plan in place to replace the systems using grants to address the FCC narrowband requirement. They have UHF radios for interoperability.

- ❖ Saginaw Fire Chief Doug Spears and Bobby Davenport:
  Their UHF system is compliant with narrowband requirements. They use extra portable radios to interact with neighboring jurisdictions, as required.
- ❖ Tarrant County 9-1-1 District staff, including Sarah Therrien, Yvonne Serl, Bill Horne, Wanda McCarley, Kevin Kleck, Monte Cockrum and Greg Petrey:
  We reviewed the RRS concept and findings thus far. concerns included revenue and staffing to support any new responsibilities.
- ❖ North Central Texas Council of Governments (NCTCOG) Director, Department of Community Services and Public Safety Communications Fred Keithley:
  The 700MHz overlay funded by NCTCOG is going well. They would like to see expanded interoperability in the area. Recent budgetary issues for the COGs and CSEC restrict what can be done in the future.

Key Points from the Interviews:

Information gathered in these interviews included the following:

- ❖ Each organization pointed out that this is a financial decision to the City managers and City councils, so they want to know whether they will pay more or less or the same to get better service from the RRS.
- ❖ There is trust in the District to provide excellent services in whatever new duties it assumes with regard to radio systems.
- ❖ The concept that the District will own the assets at some point in the future was recognized.
- ❖ Everyone wants to be assured that "Transitional Equity" can be effectively managed and accurately communicated.
- ❖ Subscriber radio units and/or software upgrades for units compatible with P25 are generally accepted as being the responsibility of the user organizations, since the P25 compatibility of subscriber units is very different among organizations.
- ❖ Irving has purchased a complete high speed, 4G data overlay with Motorola LTE systems (Long Term Evolution), where Fort Worth has purchased only enough LTE equipment to conduct field trials for high speed data.
- ❖ Buford Goff & Associates assumed a decline in wire-line 9-1-1 fees of 3% per year and an increase in wireless fees of 9% per year.
- ❖ Most organizations recognize that the stated goal of the Texas Statewide Communications Interoperability Plan (SCIP) is to have standards-based (P25) digital radio interoperability in place by 2015. The objective of each organization is to be in-service by the end of 2014 to meet this goal.
- ❖ There is concern that this SCIP goal is just that, a goal and not a mandate.

- ❖ Irving has purchased a P25 core as part of their system with the intent of connecting to the City of Dallas and to the city of Fort Worth. They could also be a backup switch in a Regional Radio System.
- ❖ It was noted that Motorola said the City of Fort Worth contract pricing expires in May of 2012.
- ❖ There is a concern for interoperability for the 17 smaller cities with older systems and perhaps limited budgets for upgrades.
- ❖ The smaller cities have mutual aid relationships with many other cities and Texas DPS and Forest Service.
- ❖ The smaller cities are in various stages of meeting the FCC narrowband requirement of 12.5kHz channels by January 1, 2013.
- ❖ The potential for both tower location consolidation and for future expanded capacity should be considered.
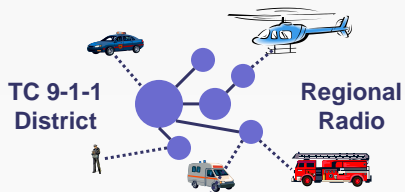

Other Data Sources:

A variety of sources were used to acquire and validate revenue and cost data for the business case development as listed below.

- ❖ Historical TC9-1-1 District revenue data (FY 1996 – FY 2011) for both wireless fee income and wireline fee income
- ❖ Historical District Operating budgets (FY2005-FY2011)
- ❖ Current District provided data on wireline quantities by type of line in the District
- ❖ Current line fees charged by the District
- ❖ Historical and future population projections from the Texas Water Development Board for the cities in the District
- ❖ US Cellular growth projections for 2010 – 2015 from IE Market Research, used to validate estimated cellular revenue growth projections in the Business Case
- ❖ Wired access line forecast for the US by Technology Futures, Inc. from a 2008 study.
- ❖ Wired access line forecast for the US by JSI Capital Advisors from a 2011 study.
- ❖ Systems cost data from various systems owners and implementers.
- ❖ Cost data from Motorola including systems costs, implementation processes and leasing terms for the systems either under contract or under consideration by NETCO and the five other largest cities in the District
- ❖ Radio systems identification and frequencies for systems in Tarrant county from RadioReference.com
- ❖ Forecasts of radio subscriber units provided by each of large systems.
- ❖ Proposed systems concept information from the report "Public Safety Radio System - Regional Radio Communications Master Plan", developed by Buford Goff & Associates, Inc. and published January 27, 2011.

- ❖ Proposed systems, operational and organizational information from the report "Tarrant County 9-1-1 District Feasibility Study Regional Radio System", ", developed by Buford Goff & Associates, Inc. and published August 15, 2011.
- ❖ Future District organizational considerations from the report "Tarrant County 9-1-1 District Organizational Assessment", developed by The Azimuth Group, Inc. and published November 30, 2011.

Appendix B
Use of Funds Presentation

TC 9-1-1 District   Regional Radio

Use of 9-1-1 Funds to Support a portion of a Regional Radio System

November 28, 2011

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TC 9-1-1 District   Regional Radio

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Rationale for RRS funding from 9-1-1 Fees

◈ The portion of a Regional Radio System (RRS) attributable to the dispatch function is appropriate for funding from 9-1-1 fees.

◈ Support of a portion of IP interoperability among Emergency Services, including 9-1-1 PSAPs, is appropriate for funding from 9-1-1 fees.

◈ Support of ESINet development and expansion for radio and 9-1-1 intercommunication is appropriate for funding from 9-1-1 fees.
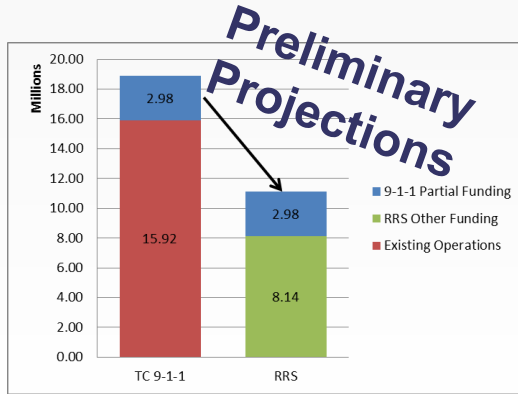
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Regional Radio System Funding

Preliminary Projections

Chart (Millions):
- TC 9-1-1: 9-1-1 Partial Funding 2.98, Existing Operations 15.92
- RRS: 9-1-1 Partial Funding 2.98, RRS Other Funding 8.14

Legend:
- ■ 9-1-1 Partial Funding
- ■ RRS Other Funding
- ■ Existing Operations

◆ Chart is based on FY2017 data from the Feasibility Study.

◆ District Revenue in FY2017 is estimated at $ 18.9m, including an increase in wireline fees.

◆ Estimated funding of RRS in this projection is 16% of revenue.

◆ Other RRS funding is from:
   ✓ Subscribers
   ✓ Grants
   ✓ Interoperability Partners

The 9-1-1 Partial Funding to the RRS supports radio functions for dispatch, ESINet integration and interoperability to support 9-1-1 responsibilities.

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Relevant Texas Code Provisions

HEALTH AND SAFETY CODE, TITLE 9. SAFETY, SUBTITLE B. EMERGENCIES

◆ Fees controlled by the Commission:
Sec. 771.075. USE OF REVENUE. Except as provided by Section 771.0751, 771.072(e), 771.072(f), or 771.073(e), fees and surcharges collected under this subchapter may be used only for planning, development, provision, and enhancement of the effectiveness of 9-1-1 service as approved by the commission.
NOTE: Based on current CSEC initiatives, this would include NG9-1-1 and Radio Interoperability.

◆ Emergency Communications District (over 860,000 population):
Sec. 772.207. POWERS AND DUTIES OF BOARD.
(a) The board shall control and manage the district.
(b) The board may adopt rules for the operation of the district.
(c) The board may contract with any public or private entity to carry out the purposes of this subchapter, including the operation of a 9-1-1 system.

◆ Sec. 772.212. TRANSMITTING REQUESTS FOR EMERGENCY AID.
(a) A 9-1-1 system established under this subchapter must be capable of transmitting requests for fire-fighting, law enforcement, ambulance, and medical services to a public safety agency or agencies that provide the requested service at the place from which the call originates. A 9-1-1 system may also provide for transmitting requests for other emergency services, such as poison control, suicide prevention, and civil defense, with the approval of the board and the consent of the participating jurisdiction.

◆ Sec. 772.213. POWERS OF DISTRICT.
(a) The district is a body corporate and politic, exercising public and essential governmental functions and having all the powers necessary or convenient to carry out the purposes and provisions of this subchapter, including the capacity to sue or be sued.
(b) To fund the district, the district may apply for, accept, and receive federal, state, county, or municipal funds and private funds and may spend those funds for the purposes of this subchapter. The board shall determine the method and sources of funding for the district.

◆ Sec. 772.217. ALLOWABLE EXPENSES.
Allowable operating expenses of a district include all costs attributable to designing and operating a 9-1-1 system and costs for related services that the board considers necessary.

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Supporting State and Federal Initiatives

◆ CSEC and ECD's are aggressively pursuing NG9-1-1 activities and all entities have expended considerable funds on Next Generation capable PSAP equipment.

◆ The US DoT defined an environment of completely integrated Emergency Services systems in 2007 and before.

◆ CSEC's ENHANCE 9-1-1 grant efforts include extensive NG9-1-1 capabilities, an initial ESINet, Statewide mapping capabilities and the inclusion of Radio over IP in cooperation with the Texas DPS – services all related to 9-1-1 services and dispatch functions.

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US Department of Transportation View in 2007
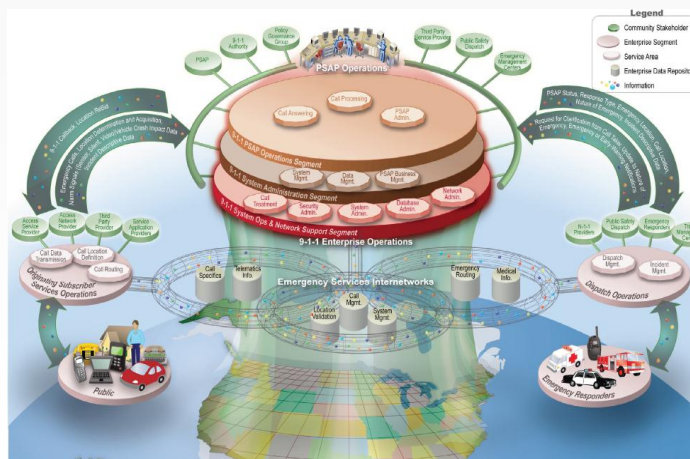
From:

Next Generation
9-1-1 System Initiative
Concept of Operations

U.S. DoT, Intelligent
Transportation System

April 6, 2007

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State of Texas View in 2011

From:
COMMISSION on STATE EMERGENCY COMMUNICATIONS
Next Generation 9-1-1
Master Plan
VERSION 3. 0, Dec, 2010
Page 24

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CSEC Master Plan, Dec, 2010, Page 23

"The CSEC will support the Texas Department of Public Safety Law Enforcement Support Division in its effort to build a statewide "system-of-systems" network consisting 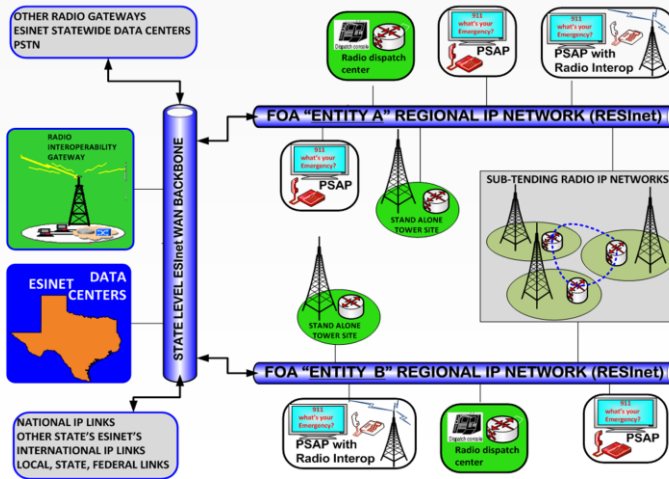of regional standards-based shared voice and data communications systems for the purpose of statewide communications interoperability."

"The Texas "System of 24 Regional P25 Voice Communications Systems" is being built at the regional level utilizing the regional framework of the 24 Council of Governments and five U.S. Department of Homeland Security -designated Urban Areas of Houston, Dallas/Fort Worth/Arlington (these three areas operate as a single metro urban area), Austin, San Antonio and El Paso; by planning and collaborating on the strategic implementation of regional communications systems infrastructure. [This is] The same approach used by CSEC and the 76 9-1-1 entities for the transition to the Texas NG9-1-1 System."

"The CSEC and Texas Department of Public Safety intend to leverage the collective state level and regional ESINet backbone (IP-enabled network infrastructure) to achieve long-haul radio communications interoperability with Radio over Internet Protocol (RoIP)."

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TC 9-1-1
District

Regional
Radio

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Other Research Data

From an FCC report on use of funds in other states (report only, no review of the reasonableness of the use of funds):
REPORT TO CONGRESS ON STATE COLLECTION AND DISTRIBUTION OF
911 AND ENHANCED 911 FEES AND CHARGES
Submitted Pursuant to Public Law No. 110-283, FEDERAL COMMUNICATIONS COMMISSION

"West Virginia distributes 911 fees to the State Police and the Division of Homeland Security and Emergency Management for the expansion of an interoperable radio system and to the Public Service Commission for the expansion of cell towers."

Texas Response to this question:
… ECDs "include all costs attributable to designing a 9-1-1 system and to all equipment and personnel necessary to establish and operate a public safety answering point and other related answering points that the board considers necessary."

The NET 911 Act provides that:
"Nothing in this Act … shall prevent the imposition and collection of a fee or charge … for the support or implementation of 9-1-1 or enhanced 9-1-1 services, provided that the fee or charge is obligated or expended only in support of 9-1-1 and enhanced 9-1-1 services, or enhancements of such services, as specified in the provision of State or local law adopting the fee or charge."

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TC 9-1-1
District
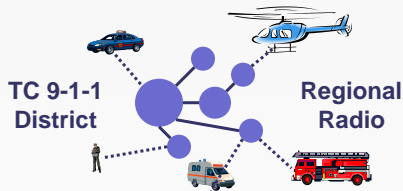
Regional
Radio

Regional Radio System

- - -

Use of 9-1-1 Funds to Support part of an RRS

Thank You.

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Appendix C
Final Board Presentation
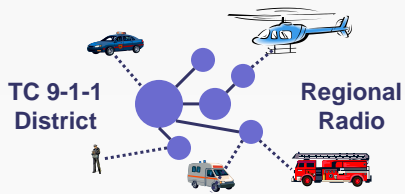
TC 9-1-1 District   **Regional Radio**

The Business Case regarding District Involvement in a Regional Radio System (RRS) Supporting Public Safety Operations

January 23, 2012

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TC 9-1-1 District   Regional Radio

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Key Business Case Points

◆ Protect Current Operations
  ➢ Existing revenue is at risk.
  ➢ Near-term wired access line fee increases are prudent, regardless of Regional Radio functions.

◆ Consider Some Level of Radio Systems Management
  ➢ Take care in expanding responsibilities.
  ➢ There is value to your constituents to assist with regional radio planning and management.
  ➢ It is not probable that radio systems ownership will be prudent.

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Current Revenue Projections

Baseline Projections using Excel Trend Lines (Power Projections) from 1998-2011 Revenue Data
Tarrant County 9-1-1 District

Revenue Projection with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

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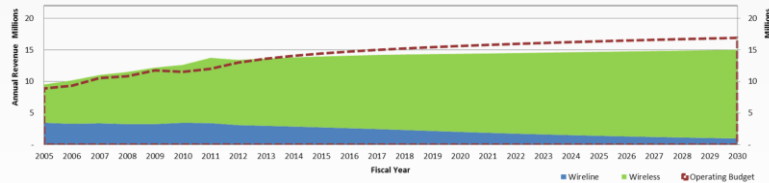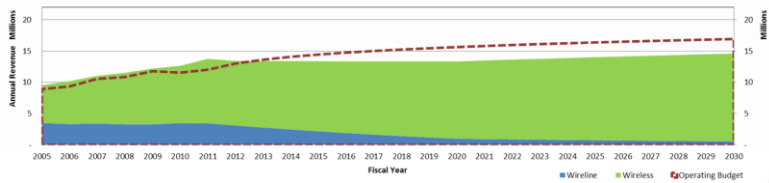
District Capabilities

◆ The District **does have the management and organizational skills** to assume responsibility for a regional radio system.

◆ The District **does have the authority to assume this responsibility**, including accepting subscriber fees from participating cities.

◆ The District **probably cannot contribute funds** at any level to cities in the District for radio operations.

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Radio Systems Cost Data for District Ownership

- ◆ Total 10 year lease cost:
  - ➢ $ 92,300,000 (initial capital is $76,300,000)
  - ➢ This is the Motorola estimated total cost for a system to cover the District, as described in the Feasibility Study.
- ◆ Ongoing systems maintenance and support:
  - ➢ $ 6,800,000
  - ➢ This is the Motorola estimated ongoing annual support cost
  - ➢ Begins in 2015
- ◆ Estimated Annual Expansion/Refresh Funding
  - ➢ $ 1,500,000
  - ➢ From the Feasibility Study

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Scenarios for Revenue Projections(4 total)

- ◆ Increase wired access line fees by 250%
  - ➢ Residential from $0.20 to $0.50 – the current COG rate
  - ➢ Business and trunk increased by the same ratio
- ◆ Increase wired access line fees to 4% of base rate
  - ➢ Based on Feasibility Study
  - ➢ Average increase about 400%
- ◆ Project new revenues for each of two line forecasts
  - ➢ Wireline revenue projected from District historical data, referred to as "Baseline"
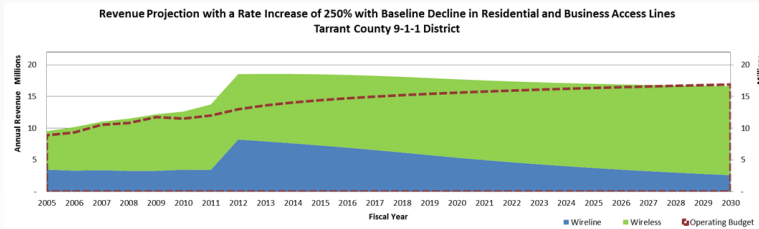 - ➢ Wireline revenue projected from JSI Capital Advisors data

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250% and Baseline Revenue Projection

Revenue Projection with a Rate Increase of 250% with Baseline Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

Line Fees

Residential lines	0.50	per month
Business lines	1.15	per month
Business trunks	1.88	per month

Revenue Projection with a Rate Increase of 250% with Baseline Decline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	16,638,095	2030 Estimated Annual Revenue
Total	31,209,039	3,052,647	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	3,120,904	381,581	(261,993)	Annual Surplus (Deficit)

250% and JSI Revenue Projection

Revenue Projection with a Rate Increase of 250% with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

Line Fees

Residential lines	0.50	per month
Business lines	1.15	per month
Business trunks	1.88	per month

Revenue Projection with a Rate Increase of 250% with JSI Forecast Decline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	15,376,796	2030 Estimated Annual Revenue
Total	8,121,067	(10,891,158)	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	812,107	(1,361,395)	(1,523,293)	Annual Surplus (Deficit)

400% and Baseline Revenue Projection

Revenue Projection with Feasibility Study 4% Rate with Baseline Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

Line Fees

Residential lines	0.84	per month
Business lines	1.98	per month
Business trunks	2.12	per month

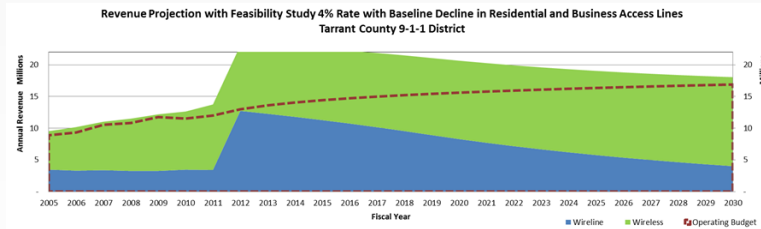Revenue Projection with Feasibility Study 4% Rate with Baseline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	18,058,849	2030 Estimated Annual Revenue
Total	65,888,833	17,908,768	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	6,588,883	2,238,596	1,158,761	Annual Surplus (Deficit)

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400% and JSI Revenue Projection

Revenue Projection with Feasibility Study 4% Rate with JSI Forecast Decline in Residential and Business Access Lines
Tarrant County 9-1-1 District

Line Fees

Residential lines	0.84	per month
Business lines	1.98	per month
Business trunks	2.12	per month

Revenue Projection with Feasibility Study 4% Rate with JSI Forecast Decline in Residential & Business Access Lines

Revenue in Excess of Operating Budget			Year 2030	
	2013-2022 (10 Yrs.)	2023-2030 (8 Yrs.)	16,043,711	2030 Estimated Annual Revenue
Total	29,301,092	(4,239,903)	16,900,088	2030 Estimated Annual Operating Budget
Average Annual	2,930,109	(529,988)	(856,378)	Annual Surplus (Deficit)

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Recommendations

◆ Protect Current Operations
  ➢ Increase wired access fees
  ➢ Conduct annual revenue and budget projections
  ➢ Continue to work on cost reductions
  ➢ Examine new revenue sources
◆ Examine Regional Radio Support
  ➢ Step by step, based on revenue and value
    1. Assistant Director, Regional Radio Operations
    2. Coordination and Support Specialist
    3. Radio Systems Maintenance Coordinator
    4. Contracts and Purchasing Specialist
    5. Records Administrator
  ➢ Other functions and support, as allowed by revenue and value
    to the District constituents
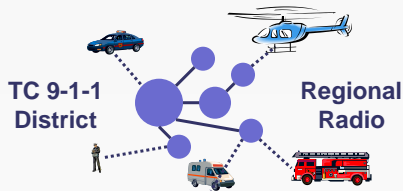
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The Business Case regarding District Involvement in a Regional Radio System (RRS) Supporting Public Safety Operations

Thank You.

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Appendix D
Avistas Proposal Letter

Avistas
The Summit at Las Colinas
545 E John Carpenter Fwy, Suite 300
Irving, Texas 75062-3958
214-544-0400 • Fax 214-242-2311
info@avistas.com • www.avistas.com

November 2, 2011

Greg Petrey
Executive Director
Tarrant County 9-1-1
2600 Airport Freeway
Fort Worth, TX 76111

Re: Development of a Third-Party Business Case for a Regional Radio System

Dear Greg,

It was great to talk to you yesterday afternoon about the Business Case for a Regional Radio System. As you described, the Tarrant County 9-1-1 District Board and Executive Director are planned to become the Fiduciary Partner, as described in Paragraph 2.1 of the Feasibility Study, with the following roles detailed in Table 2.0, Summary of Board Roles:

❖ Board provides reimbursement for preapproved expenses using established guidelines
❖ [Board] Develops and maintains a long-term plan for the regional radio system
❖ [Board] Uses SAFECOM Continuum as framework for line item funding
❖ [Board] Maintains equity of expenditures relative to allocation of service fees collected
❖ You also mentioned that the Board may migrate the model, over time, to an environment where the assets are actually owned and managed by the District.

Based on our discussion, the following are the expectations for the engagement:

❖ Collect and validate information relative to current and projected systems costs for equipment, end user radios and maintenance support in the existing environment.
❖ Collect and validate information relative to current and projected systems costs for equipment, end user radios and maintenance support in an environment with a Fiduciary Partner managing the process.
❖ Develop a 5 year timeline for costs under both environments to establish what advantages, if any, are gained under the proposed model.
❖ Provide by Friday, November 26th, an initial set of cost data for the use of the Board in the December 5th Board meeting. NOTE: This assumes a start date of Nov. 7, 2011.
❖ Complete the Business Case development and report by the end of January.
❖ The business case will include data from at least 80% of the jurisdictions in the defined group of Public Safety organizations, with a goal of more than 90% of the juisdictions.

The source data for the Business Case Development will include the following:

❖ Cost data provided by the TC9-1-1 District.
❖ Cost data provided directly by the Public Safety organizations.
❖ The report "City of Fort Worth Public Safety Radio Systems Regional Radio Communications Master Plan", dated January 27, 2011
❖ The report "Tarrant County 9-1-1 District Feasibility Study – Regional Radio System", dated August 15, 2011.
❖ Discussions with you, the Board and leaders of the various organizations.
❖ Discussions with Motorola.

The proposed engagement will be structured as follows:

❖ **Data Collection (Nov. 7th – 18th, two weeks):**
  ➢ Collect systems costs data, both current and projected.
  ➢ Investigate Motorola policies on systems pricing and projections of future costs, particularly for P25 end user radios.
  ➢ Review projected purchase for systems and equipment by the participating organizations.

❖ **Initial Business Case Development (Nov. 14th – 23rd, overlapping above):**
  ➢ Document projected cost estimates for common systems, end user radios and maintenance and support services in today's environment..
  ➢ Documents projected cost estimates for common systems, end user radios and maintenance and support services in the proposed environment.
  ➢ Develop key assumptions for the initial Business Case delivery.
  ➢ Draft the Table of Contents for the final Business Case Report.

❖ **Milestone (Nov. 23rd):**
  Deliver the initial Business Case to the Executive Director and Board for review in the December 5th Board meeting.

❖ **Report Development & Ongoing Data Validation (Nov. 28th – Jan. 20th):**
  ➢ Continue data collection and validation for remaining entities, as required.
  ➢ Obtain input from the Executive Director and the Board, as required, based on the Board review of the initial Business Case data.
  ➢ Develop the final report, including the following:
    ▪ Financial projections for the current and planned environments.
    ▪ Emphasis on key points from the two BGA reports that may affect ongoing operations with the Board as a Fiduciary Partner.
    ▪ Identification of risks, if any, to the deployment of the planned model.
    ▪ Summary of key elements in migrating to an Administrative Partner and/or Managing Partner model.
  ➢ Interact with the Executive Director and Board, as required, to assure that the Final Business Case Report includes the best available data.

❖ **Milestone (January 20th):**
  Deliver the Final Business Case Report and Summary Presentation for the Board.

The summary timeline is depicted below.

ID	Task Name	Nov 2011				Dec 2011				Jan 2012			
1	Data Collection	▬	▬										
2	Initial Business Case Development		▬										
3	Milestone - Initial Business Case		◆										
4	Report Development & Ongoing Data Validation					▬	▬	▬	▬	▬			
5	Milestone - Delivery of the Final Business Case Report										◆		

Avistas - Development of a Third Party Business Case for a Regional Radio System

Professional Fees for this effort are as follows:

- ❖ Effort to deliver the Initial Business Case to the Board for the Dec. 5th Board Meeting:
  - ➢ Data collection
  - ➢ Initial Business Case Development
  - ➢ Milestone – Initial Business Case
  - ➢ Fee - $8,500
  - ➢ Expenses – None, assuming the effort is confined to the DFW area.

- ❖ Effort to deliver the Final Business Case Report
  - ➢ Report Development and Ongoing Data Validation
  - ➢ Milestone – Delivery of the Final Business Case Report
  - ➢ Fee - $12,500
  - ➢ Expenses – None, assuming the effort is confined to the DFW area.

- ❖ Payments listed above will be made to Avistas at the two delivery milestones.

In summary, the total project fee will be $21,000, with no anticipated expenses.

The primary professional for this effort will be Mart D. Nelson, P.E., Consulting Principal and CTO of Avistas. His professional background and history is provided as an Attachment to this letter. Bill Morgan, Consulting Principal & CEO of Avistas, will provide technical input and Quality Assurance in this engagement. His professional background is also attached.

A partial list of applicable governmental clients for Mr. Nelson and Mr. Morgan is also attached.

We look forward to the opportunity to be of assistance to you and the Board in this process.

Sincerely,

Mart D. Nelson, P.E.

Accepted by Tarrant County 9-1-1 District

_____
Signature

Greg Petrey, ENP
Executive Director

_____
Date

Attachments:
- Professional Background of Mart D. Nelson, P.E.
- Professional Background of William L. (Bill) Morgan, Jr.
- Avistas Professionals Government Client History

MART D. NELSON, P.E.

Summary and Background

Experience over four decades in technology, operations, systems integration, product and systems design and management processes has established a practical, cost conscious approach to improving business and technology operations. This experience has been gained against a solid educational and professional background, as follows:

- Bachelor of Science degree in Electrical Engineering from the University of Houston
- Master of Science degree in Computer Science from the University of Houston
- Professional Engineer, licensed to practice in Texas and other states
- Member of the National Society of Professional Engineers (NSPE)
- Member of the Texas Society of Professional Engineers (TSPE)
- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Certified Information Systems Security Professional (CISSP) by ISC^2
- Certified as an Emergency Number Professional (ENP 9-1-1) by the National Emergency Number Association (NENA)
- Life member of the American Radio Relay League (ARRL)
- Continuing education courses in economics, project control, network design and systems technology

As an engineer in AT&T - the Bell System - responsibilities over the years allowed development of expertise in a number of areas, as follows:

- Large network forecasting and design
- Communications systems engineering and implementation management
- New facility construction management
- Operations management
- Process design and implementation
- Analysis of capital and expense to optimize project life cycle costs
- Design of wireless networks and systems
- Customer needs and operations analysis in the design and implementation of large, complex communications systems

As a consulting engineer for 30 years, complex business and technology management capabilities have been developed, including the following:

- Services and project optimization for existing projects
- Management analysis and business optimization processes
- Development and implementation of call centers and customer relationship management
- Complex application development and integration of existing systems with newer, web based and graphics systems
- Multi-location integrated network design, acquisition and implementation
- Data center design and implementation, including multi-location, failure resistant centers
- Complex infrastructure design and implementation, including wire, fiber and wireless services
- Optimization of existing operational and technology resources for a variety of clients
- Geo-location systems design and wireless integration
- Nationwide and worldwide network design and optimization
- Database applications development and integration

Services have been provided in a variety of industries, including:
- Banking and finance operations
- Retail operations
- Legal and accounting services
- Manufacturing and distribution
- Health care - hospitals and services
- State and local governments
- Non-profit and charitable organizations
- Oil and gas
- Transportation
- Insurance
- Hospitality
- Public network and wireless providers
- Universities and educational organizations

Mr. Nelson's primary focus is always on *the desired and proper business results* for each client in every case.

He was a (then) Governor George W. Bush appointee to the board of the Texas Telecommunications Infrastructure Fund. TIF was responsible for granting $1.1 Billion over eight years to enhance technology access and information access for all Texas citizens through public schools, libraries and hospitals.

A number of projects reflect the expertise and creativity developed over the years. The following project summaries illustrate key capabilities.

New Infrastructure for 48 Floor, 1.2 million sq. ft. Corp. HQ Relocation
Major North Texas Utility Co.
Engineering services were contracted to assist with relocation efforts of corporate headquarters to forty-eight floors (approximately 1.2 million sq. ft.) of newly renovated office space. The project included an assessment, design, selection, implementation and as-built documents for the infrastructure. Responsibility included the infrastructure design including copper, fiber, broadband coaxial, microwave, satellite and in-house two-way radio system. Services also included the design of the Voice, Data and Network Data Center, Computer Room, all IDF Closets and consisted of all fiber termination, hubs, routers, etc. Services included development of specifications, bidders list, bid conferences, bid process management, evaluation of bid responses, vendor recommendations, contract negotiations and monitoring of the implementation process. Throughout the duration of the relocation project, services included coordination with architects, engineers and real estate brokers.

Data Center Power Systems Upgrade Design and Management
- Measured and evaluated data systems power input, loading and cooling capacity.
- Analyzed weak points in the systems to identify Single Points of Failure.
- Designed an upgrade from a single feed for the data center to a Tier III dual feed system.
- Provided implementation management for the upgrade and subsequent testing to validate the changes.
- The upgrade allows portions of the data center electrical systems to be turned off for maintenance without turning off any equipment in the data center, using dual power supply equipment and automatic power switching.

Data Center Relocation
Award Winning Airline
The client required assistance with the relocation of a Data Center involving 35 different systems. Project management was provided, coordinating the move of technology, vendors and the Airlines' staff. The project also required the development and design of the infrastructure cabling for all voice and data communications, issuing the RFP and overseeing the installation.

Medical Insurance Call Center
- Developed and deployed a Customer Management integration system that allowed easy access to multiple mainframe applications, replacing 260 character based screens with a "one click away" graphical user interface.
- The system reduced cost per call by 70% and reduced calls per incident by 50%. Customer satisfaction was significantly increased and error rates reduced.
- The system was expanded over time to support over 20 legacy applications with minimal changes to those applications.
- Ancillary, integrated customer databases were integrated into the system, providing new functionality and detailed performance statistics for the call center agents.

Multiple projects for the State of Texas, including:
- Planning, design and vendor selection of the Capitol complex telecommunications system, servicing 20,000 users.
- Evaluation of vendors for the Greater Austin Area Telecommunications Network (GAATN), a high speed fiber network interconnecting schools, city, county and State offices.
- Evaluation and benchmarking of the Texas Workforce Commission Wide Area Network performance.
- Network design and vendor Request for Proposals development for TexAN-2000, a multi-service, integrated network for the state of Texas. The network supports over 200,000 employees and is the second largest government network in the world, second only to the U. S. Federal Government's FTS 2000 network.
- Development of a wireless cellular data Request for Offer to support all State agencies.

Enterprise Wide Project Assessment and Valuation
International Law Firm
With over 100 business and technology projects in process, the firm needed to understand the business value of each project. An assessment was conducted of all projects and an economic model of cost, resources, time to completion and value was developed. The model allowed the firm to examine each project in terms of its projected economic and operational effects over the next five years. As a result, the partners and management staff could easily focus on projects that were of most value and evaluate low value projects based on "soft" criteria. The result of the project was the elimination of a number of low value and negative value projects, immediately improving the firms profitability with no effect on long term growth or operations.

Integrated Voice/Data/Video Backbone, LAN Analysis, Integrated Customer Service Workstation
Large Health Care Provider
A number of projects were completed for this client. In a Wide Area Network analysis, A design was developed and recommended that saved thirty-five thousand dollars per month and justified the implementation of an integrated voice, data and video backbone network. In an analysis of their current Local Area Network design, network solutions were recommended to accommodate a new transaction intensive, on-line application for customer service agents. Finally, an information delivery system was developed and delivered allowing distributed processing and integration of customer service workstations for computer telephony integration (CTI). This effort has been in response to the Federal Government standards mandates and allows customer service agents access to patient accounting data and history.

Nationwide Integrated Data Communication Network
Large Convenience Store Operator
An Integrated Technical Architecture Design team was created and managed whose charter is to conceive, develop and design the WAN to support data communications to over 5,400 stores. This included the use of clustered high availability "Host" servers and an elegant file exchange transport over ISDN PRI, ISDN BRI and Switched 56Kbps and frame relay services. Finally, this enterprise network is fully SNMP managed to ensure high availability of the total enterprise data communications environment. The Data Communications Network includes the following systems:

- Point-of-Sale and Gas Pump Applications
- ATM
- Credit Card Authorization
- Back Office Applications, including Payroll and Inventory
- E-Mail
- Scheduling
- Training

This engagement is the foundation of a very significant retail automation and integration project.

Voice Systems Review, CTI, Computer Room Expansion
Large Non-Profit Organization
Engineering services were required to conduct a voice systems review and develop a recommendations report which identified gross savings in excess of seven million dollars over five years. A follow-on project was initiated to develop and evaluate a Request for Proposal for a new CTI capable PBX, Unified Voice Messaging, Voice Response Unit and conference bridge. Support was also required to prepare an association wide Long Distance Request for Proposal and to manage the design, selection and implementation of a new computer room, plus facilities and infrastructure expansion for over 600 users.

Computer/Telephone Integration Software Development
Multiple Clients
Development projects have included development of telephone systems integration interfaces at multiple levels to support a variety of applications/telephone integration projects, including the following:

- Low level switch to UNIX interfaces to integrate with a Windows environment
- An object oriented interface to a switch and a Voice Response Unit for a call center
- Call data collection and analysis processes
- CTI interfaces have included standards based drivers and applications.

Voice/Data WAN Optimization
International Law Firm
The client required optimization of their existing WAN and maximization of bandwidth by implementing both voice and data compression techniques, as well as implementation of firm wide Direct Inward Dialing, Satellite operations and ISDN Primary Rate Interfaces. The network has been upgraded to integrate packet based, TCP/IP voice interfaces.

Enhanced 9-1-1 Systems Upgrades and Emergency Communications Centers

Numerous Cities in the USA
Emergency communications projects for city and county governments have included:
- E9-1-1 systems planning and upgrades, including design, implementation management and commissioning
- Radio systems design and upgrade projects to integrate voice and data emergency services communications
- Automated Vehicle Location (AVL) and Computer Aided dispatch (CAD) design and implementation management
- Video surveillance systems, including wireless networking to support citywide communications
- Vehicular Mobile Data Terminal (MDT) projects to improve police fire and EMS communications capabilities.

WILLIAM L. (BILL) MORGAN, JR.

Summary and Background

Mr. Morgan is an Avistas Founding Principal, CEO and International Consultant with 18 years of proven experience managing the integration of business processes and complex technologies around the world. Focusing on "business relevance" (e.g., profitable revenue, revenue growth and risk mitigation), Mr. Morgan has provided valuable assistance to many clients with the alignment of critical business processes and their IT infrastructure. He is recognized in the international ebXML and UCC communities for his contributions to Service Oriented Architecture (SOA) standards related to Secure Electronic Collaboration, Supply Chain Integration and Enterprise Architectures.

Mr. Morgan's strengths include his ability to identify, develop, document and gain consensus for "the business case" regarding the automation of collaborative business processes implemented as part of an enterprise-wide architecture. Working from a business relevance perspective, Mr. Morgan captures appropriate business performance metrics and works with IT teams to deliver solutions that comply with measurable business service level objectives. These business level requirements drive business continuity strategies and disaster recovery strategies that then influence technology architecture; infrastructure, interface, security, software and database upgrade decisions for improving corporate communications and secure electronic collaboration. He possesses solid experience in converged networks, VOIP, customer care, security, middleware, applications integration, audio-visual systems and underlying cabling infrastructures. *Mr. Morgan excels at both program management and project management for high profile and complex technical endeavors supporting business goals.*

Highlights of Recent Experience

- **Major MENA Management Consulting Group:** Mr. Morgan performed a critical assessment of core Information Systems and Information Technology skills that support a global market insights services business. Assessments included local and offshore (Indian) talent, product and service architectures, VoIP support infrastructure, product & services strategy & roadmaps, revenue attainment and customer care. Emphasis were placed on leveraging Web 2.0 and enhanced (AI) search capabilities to deliver near real-time actionable intelligence via terrestrial and mobile services.

- **Major International Legal & Intellectual Property Management Firm:** Mr. Morgan provided expert reviews and opinions regarding the market validity of an international patent under management to deliver unique, secure and reliable (e.g. non-repudiation of origin and receipt) electronic communications.

- **Major International Construction Corporation:** Mr. Morgan supported a major Knowledge Management initiative by providing detailed designs and specifications for establishing collaborative Communities of Practice (CoP) environments across a 10,000+ employee base. The CoPs capture tacit insights and harvest institutional knowledge used to strengthen the Human Capital within the corporation yielding increased agility, loyalty, profitability and enterprise risk mitigation.

- **Major MENA Developer:** Mr. Morgan provided master planning services to a major developer relating to the development of a new city on the Red Sea to support a population over 2 million. Services included the development and delivery of a VoIP-based "Smart City" operator Business Strategy, Business Plan, Business Architecture and Financial Model to deliver, operate, maintain and support all Information and Communications Technology (ICT) services within the City. The project is currently the largest undertaking of its kind in the region.

- **Major MENA Management Consulting Group:** Mr. Morgan performed a critical assessment of core business systems including email, calendar, knowledge management, customer relationship management, customer information systems, financials, human resources, business intelligence, application servers, networks, video conferencing, security, mobile platforms, internal and external communications processes and IS/IT staffing. Deliverables included a calibration of corporate resources and asset strategies for 2007 and 2008, followed by implementation assistance.

- **Major Wireless Broadband Provider:** Mr. Morgan currently serves as "Chief Strategist" for a broadband wireless provider that supports over 30 cities throughout rural North America. He provides consulting services relating to municipal master planning of IT services, technology infrastructure, applications and economic development activities that stimulate local economies and local skills development. It is part of a massive "revitalization" campaign for rural communities in North America to reinvest in themselves by leveraging mobile and advanced technologies used by citizens and commercial partners alike. He has also facilitated raising equity capital used to accelerate the growth and development of approximately 2,000 more new "intelligent communities".

- **Major North American Retail Headquarters:** Mr. Morgan provided major technology architectural updates; refresh design services and budgeting relating to campus cabling, telephony, LAN, video conferencing, CATV, radio communications and mobile services for a 2MM sq.ft. Campus headquarters of a 1,020+ store national retailer. These activities were driven by manufacturer-discontinued components used in an original design over 18 years ago by Mr. Morgan and his partner to support a 5,000+ employee campus.

- **Major Communications Provider:** Mr. Morgan provided advisory services to the CIO of a major carrier and provider of local exchange services regarding the spin-off and divestiture of a subsidiary CLEC supporting over 320,000 customers without service interruptions. Mr. Morgan master planned key separation activities, staffing plans, outsourced functions and cutover/conversions.

- **Native American Tribe:** Mr. Morgan provided advisory services to the Executive Management Team (CEO, CFO, CIO, COO, CAO, etc.) to develop master plans and business strategies in order reduce exposures to operational and financial risks while increasing the financial performance of the Tribe. Services included the development of a $40M+ IT Strategy and project portfolio of key initiatives including: COBIT Assessments, new IT Organization, Data Centers, MPLS WAN, business applications, enterprise security policies; new Human Resource function and leadership team, staffing and placement of key executive positions along with vendor-partner management.

- **Global Financial Services Provider:** Mr. Morgan provided comprehensive program management for the planning, design, implementation and deployment of a major technical infrastructure refresh (processors, storage, networks, staffing, operation procedures, etc.) supporting the processing of $4M per hour of unrecoverable revenue – 7x24x365. This endeavor supports both domestic and international transactions while maintaining near real-time failover and disaster recovery capabilities between data centers separated by over 1,000 miles. This project was the most successful upgrade in the history of the corporation.

- **Private Equity Firm:** Mr. Morgan provided advisory services to the CEO and Executive Management of an investment firm with strategic planning, product development and execution of a global strategy for deploying next-generation rich-media devices and subscription services. Collectively, this solution leverages the Internet and harnesses the knowledge capital for myriad niche communities of interests. Solutions are designed to rival traditional media and content distribution while stimulating a new class of transaction processing and wealth creation.

  Mr. Morgan continues to assist them by providing due diligence services for target acquisitions as well as various technical and product development advisory services in other portfolio companies.

- **Privately Held Financial Planning Firm:** Mr. Morgan provided advisory services to the Executive Management of a 50 year old firm and largest provider of financial plans for the United States military personnel around the world. Services include financial product and channel partner expansion while addressing SOA-based technical integration and joint marketing plans.

- **World's Largest Energy & Petrochemical Business:** Mr. Morgan provided strategy, design, user experience and implementation management expertise relating to major audio-visual, teleconferencing, network, Internet and security upgrades in the Executive Board Room and Executive Conference Rooms of their global headquarters. Operations and critical business processes were updated and integrated into a custom developed, wireless and graphical touch panel control sub-system.

- **Large Middle-Eastern Bank:** Mr. Morgan provided strategy and design assistance for a major bank who is in the planning process for the consolidation of services into a new 9K sq. ft. data center supporting over 120 technical personnel while preserving business continuity and disaster recovery capabilities that underpin all mission critical services offered through 190+ branches, 410+ ATMs and 2,800+ Point-of-Sale terminals.

- **Large Investment Bank:**   Mr. Morgan provided services relating to mission critical IT Systems planning, architecture, organization, operations, risks, budgeting and project planning relating to the acquisition of up to three major Gas Distribution Networks across the United Kingdom. His deliverables supported a successful tender (£1B+) by the Investment Bank.

- **Large Middle-Eastern Utility:** Mr. Morgan led on-site workshops for a major Water and Power Authority and two of its Water & Power Distribution Companies. These workshops were held in two cities and focused on the "meter to cash" process and addressed the following business functions: Billing & Accounting, Call Centers, Credit & Collections, Field Services, Front Office, Meter Reading & Remittance Processing.

- **Large Mid-West Utility:**   Mr. Morgan provided services relating to IT Performance Benchmarking and provided "best practice" recommendations to the CIO for improvements with their Service Level Objectives throughout their entire IT organization. These recommendations addressed overall organizational metrics, distribution of IT spending in various functional areas, Telecom organization, Help Desk organization, Network, Operations and Applications Support.

- **A Russian Federation Utility:**   Mr. Morgan recently completed an on-site scoping review of the IT landscape for a large utility interest located in the Russian Federation in preparation for a major change management effort. There, Mr. Morgan highlighted business and operational risks and developed follow-on IT project interventions relating to the development of a new IT Strategy, IT Outsourcing Review, IT Organizational Change and IT Alignment supporting all utility business processes, performance management and asset management functions.

- **Mid-West Utility:**   Mr. Morgan provided supporting services and recommendations for a broad IT Operations review. These recommendations addressed: IT shop benchmarks comparisons, a review and analysis of IT / CIS customer spend per month, a review of outsourced service contracts, a review of business applications (including Banner & Oracle) a review of their Systems Architecture Model, a review of CAPEX budgeting and forecasting practices within IT, a review of IT – Contact Center findings and a review of Voice over IP and telecom / network.

- **Information Solutions** division of the nation's largest title insurance and diversified real estate related services company: Mr. Morgan sat on the Board of Directors for the Chief Technology Office as an independent advisor regarding the assimilation and harmonization of existing assets into a comprehensive service oriented architecture underpinning internal operations, parent company operations, partner and customer services.

  This division is the leading provider of software solutions to the lending community serving banks, savings & loans, mortgage bankers, and sub-prime lenders with retail, wholesale, and correspondent business channels. The software accommodates every aspect of lending from POS through secondary marketing, as well as complete interfacing systems with servicing, flood, appraisal, title, etc.

Previous Experience

- **Innovative B2B Software Company:** Prior to co-founding Avistas, Mr. Morgan worked three years with a successful B2B software and services company where he served as Chief Solutions Officer reporting directly to the President, Chairman and CEO. Prior to that, he served as Executive Vice President of Product Management and Operations where responsibilities included establishing product directions aligned with solutions architectures, and setting priorities for software development and operations in response to client and market demands. As such, Mr. Morgan applied his ebXML, UCC and SOA knowledge to a number of business systems and functional processes, including SalesLogix, PeopleSoft CRM, and Oracle e-Business Suite.

  Mr. Morgan designed and supported both a product line and managed service offerings utilizing Business-to-Business (B2B) infrastructure software for transport, security, message center, routing, data transformation and stateful process management services to the Fortune 100 and over 200,000 of their most important business partners. Hosting solutions were based on IBM, SUN, HP & Intel hardware, Oracle, IBM & Microsoft databases, Multiple Client Operating Systems including: OS/390, Tandem, OS/400, VAX, AIX, HPUX, Solaris, Linux, and Windows 98-XP, RSA Security, High Speed OC3 SONET Networks and Interoperable Standards Based IP Communications (including first to market with interoperable EDIINT (AS1/AS2) and ebXML-based secure messaging products). This technology currently supports:

  - ❖ Every college and university in America
  - ❖ Every authorized Honda dealer in Canada and the USA
  - ❖ Every major FedEx customer and transportation supplier
  - ❖ One out of every four 401k-benefit administrators
  - ❖ Every supplier to the world's largest airline
  - ❖ Three out of four insurance companies in America
  - ❖ Major suppliers to the world's largest retailer
  - ❖ Major customers and service partners of the three largest banks in the US
  - ❖ Thousands of companies in the consumer packaged goods industry

International Management Consulting Company:

As the Partner-in-Charge on many multi-national accounts, Mr. Morgan lead the development and integration of large complex & integrated wide area networks, web-based initiatives, real-time processing of financial transactions, applications hosting, and services benchmarking. He also brings a depth of experience in processes design, development and fulfillment, as well as vendor contract management for clients ranging from the U.S. Government, the State of Texas, GAATN, and major corporations and legal firms such as FirstUSA (now part of BankOne), 7-Eleven, UUNET (now Verizon), Sidley & Austin, Baker & McKenzie, Hunton & Williams, Bryan Cave, TXU Energy and many others.

Mr. Morgan received his Bachelor of Science in Telecommunications Engineering Technology from Texas A&M University.

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Government Client History

- State of Texas - Telecommunications Services Division
- State of Texas – DIR
- Government of Rwanda
- U.S. Parole Commission
- Kendall County Emergency Telephone Systems Board
- Mason County Emergency Telephone Systems Board
- McHenry County Emergency Telephone Systems Board
- Morgan County Emergency Management Communications District
- Tazewell County ETSB
- Caddo Parish Communications District One

- The Chickasaw Nation (Oklahoma)
- Calcasieu Parish Sheriff's Department
- Brazos River Authority
- Alamo Dome, City of San Antonio
- City of Grand Prairie
- City of Nacogdoches
- City of Shreveport
- City of Temple
- Collin County
- Grand Prairie ISD
- Lower Colorado River Authority
- Texas Workforce Commission
- Upper Trinity Regional Water District
- Village of Hoffman Estates

Services Provided:
- Integrated network design, procurement and implementation management, including the State of Texas TEX-AN 2000 network and TEX-AN next Generation
- Telecommunications systems design, procurement and implementation management
- Audio Visual systems design and implementation
- Mobile radio systems analysis and design
- E9-1-1 and NG9-1-1 systems design and implementation
- Mobile data requirements and specification
- Data center design and relocation
- Security for Personal Identity and Information Access
- New facility technology design, procurement and implementation management

Avistas Business Proposition:
Business Relevance & Business Agility Acceleration
Avistas offers comprehensive, product-independent business and technology strategy, planning and implementation to our clients, targeted specifically to their point of need. We achieve rapid results by taking progressive and incremental steps that deliver success and strengthen our client's trust.

We are specialists in finding and fixing Operations and Technology problems.

Specific outcomes are linked to profitable revenue growth and intelligent waste elimination, using operational best practices for business and operational clarity.

Results, profitability, risk management and return on investment are critical when contemplating business and technology changes. Existing knowledge and resources should be maximized before considering new services and systems. Avistas professionals clearly understand these factors through working with over 300 clients internationally across most major industries. Our success is coupled directly to our client's success. We don't succeed until our clients succeed.

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