# Utilizing the ArcGIS 9 Reader Control in the TxDOT Traffic Count Program

Written by: Michael Chamberlain

TxDOT is using the ArcGIS 9 Reader Control and Publisher extension to create specialized applications to assist traffic data collection contractors, TxDOT District staff, MPO staff and traffic data review analysts. The process replaces repetitive and laborious paper map production with needs based VB applications that display geographic data using the Reader Control. Contractors use the application on laptop computers to select stations from an ordered data collection schedule and zoom to the selected station. TxDOT district and MPO staff use the application to systematically review traffic data collection site placement and data. Traffic analysts use the application in the office to view multiple years of geographic traffic data and make corrections to the traffic count database.

Introduction

In the past paper maps were created for each of the 25 TxDOT districts depicting traffic count locations. The maps were created, maintained and printed using CAD. Annually each district received two sets of rigorous maintenance, draft printing and final printing. The final product was distributed by district on 24 x 36 inch paper. Using these paper maps, TxDOT personnel and contractors would navigate through an ordered list of traffic count sites to collect traffic data. Traffic review analysts used the second set of maps to review collected data and make changes when necessary. A third set of maps are used in the urban traffic count cycle. The third set is distributed to 4-6 districts per year as needed.
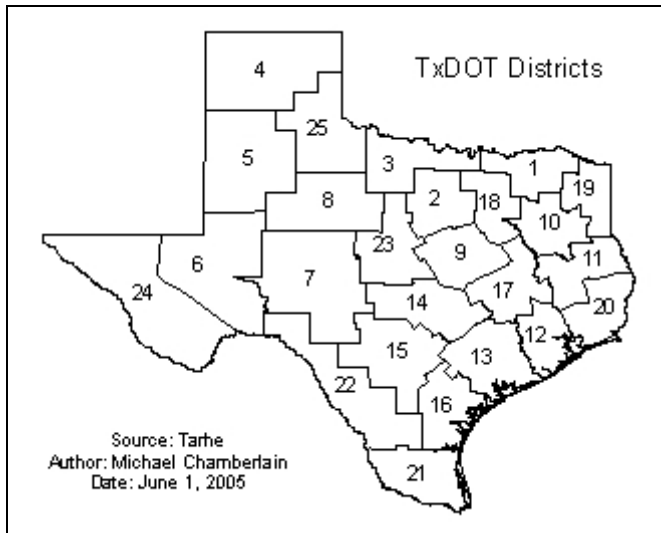

Using the ArcGIS Reader Control, Publisher extension and set of published map files two applications were created in Microsoft VisualStudio 6. The goal was to quickly and simply provide a stand alone map based interface that allowed the presentation of geographic information. The field application would be used by TxDOT traffic count contractors. The map and accompanying controls simplify navigation between traffic count locations. The office application retains the map based interface with common map navigation controls. Additional controls provide access/update capability to the traffic count database.

Finally, published map files were created and distributed to TxDOT districts as part of the urban saturation count process. A saturation count is conducted every 5 years for cities in Texas greater than 50,000 in population. Using ArcReader from ESRI and the .pmf created using the Publisher extension both GIS and non-GIS users can seamlessly review/comment on data for upcoming count cycles.

The Field Application

The interface to the field application provides basic map navigation controls and custom controls used to build queries. The program is intended for the contractor in the field environment on a laptop or tablet pc. The application contains custom controls aimed at providing a method to sequentially navigate between count locations. Maps are loaded programmatically using a district drop down list and schedules are displayed in a list box. Stations are displayed in collection order after a schedule has been selected. When the user selects a station from the ordered list the map is zoomed to that station.
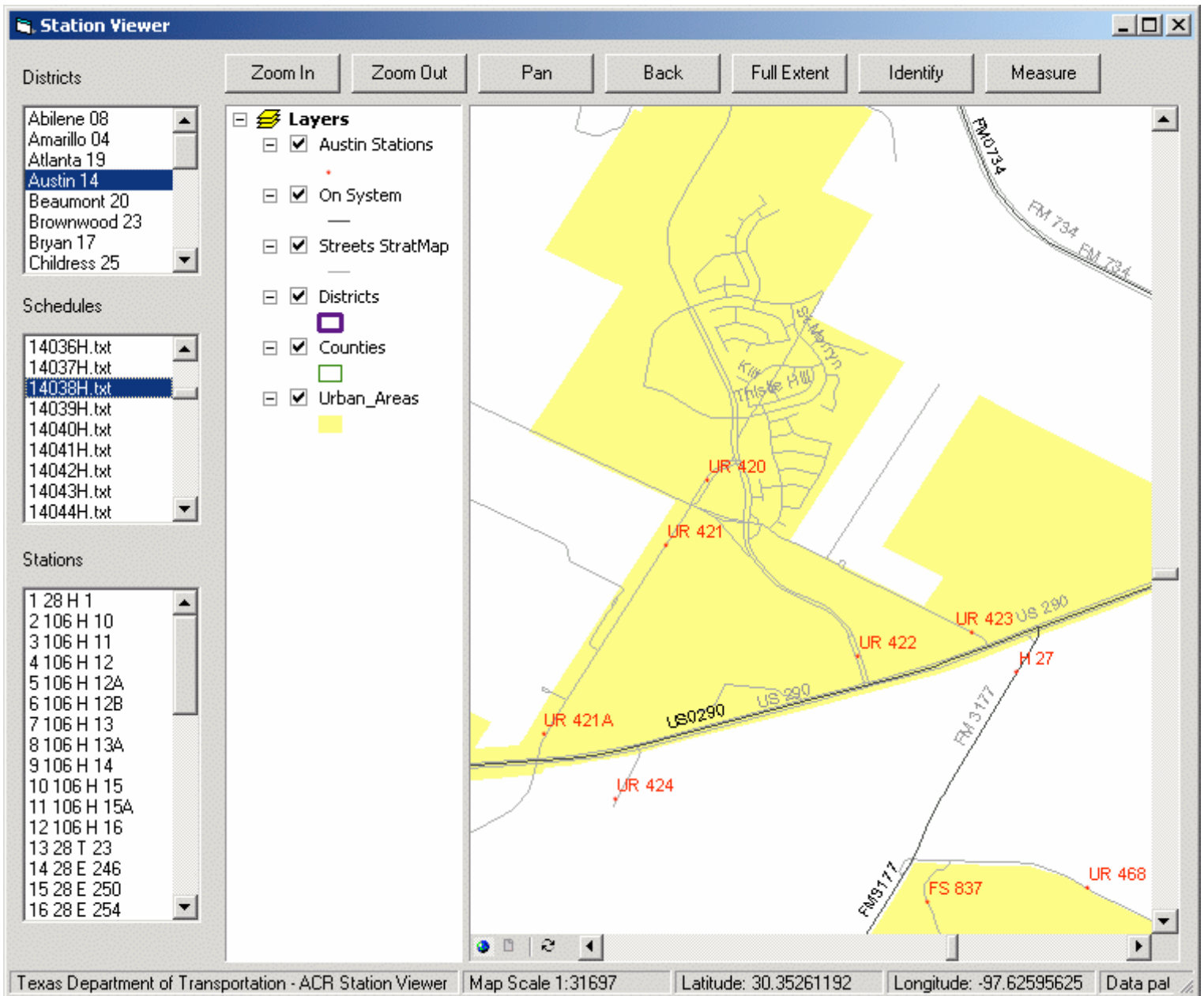
Strengths:

- The interface replaces the printed map
- Provides standard navigation tools
- Updates or corrections can be sent electronically
- Unlimited copies of the data can be distributed to the contractors in the field

The Office Application

The office application is intended for the office environment on a pc. In addition to locating count stations, the office application provides a method to analyze 4 years of count data on the same map and make changes to the count database as needed. The map displays stacked labels at traffic count locations to enable an analyst to quickly evaluate historical data along a corridor. The analyst can work through all stations in the district or jump to a station using the find button.

Strengths:

- The interface replaces the printed map
- Provides standard navigation tools
- Rapid evaluation of historical data
- Direct editing of the count database

Published Map Files

Published Map Files are created using ArcGIS 9 and the Publisher extension. The map is created using consistent base map data and symbology. The data is then compressed and clipped to the visible extent. An extra empty dataset is added for the district or MPO to make station additions using ArcGIS. The final data is presented to the TxDOT district at the urban count map meeting with instructions and a short demo. The Published Map File (.pmf) can be viewed natively by users of ArcGIS. District or MPO personnel without ArcGIS can download ArcReader for free from ESRI and review the data.
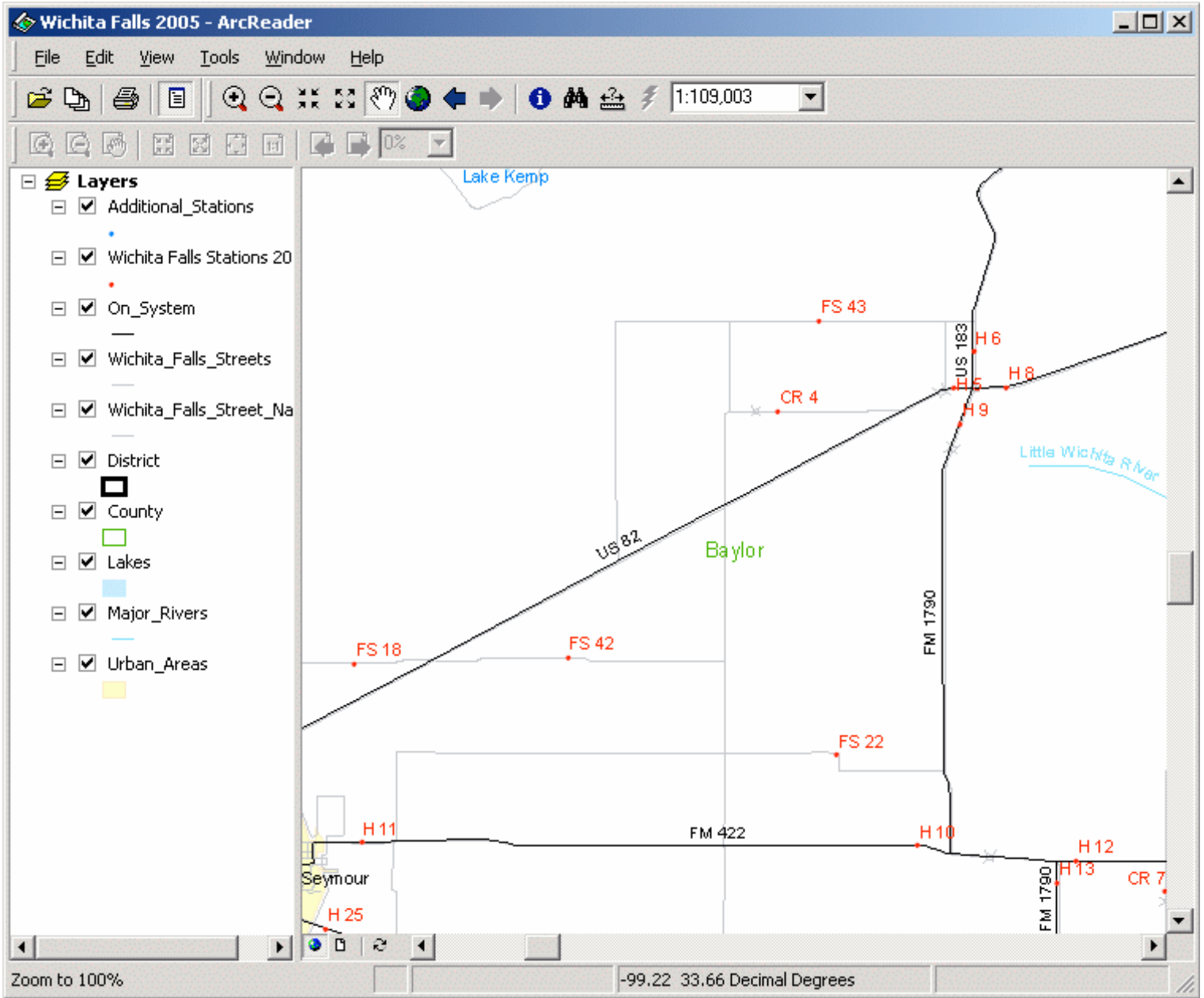
Strengths:

- The interface replaces the printed map
- Standard base map data and symbology
- Uses ArcReader (free from ESRI)
- Wide distribution
- ArcGIS users can edit the dataset

Core Components

Action	Code
Zoom In	ArcReaderControl1.CurrentARTool = esriARToolMapZoomIn
Zoom Out	ArcReaderControl1.CurrentARTool = esriARToolMapZoomOut
Pan	ArcReaderControl1.CurrentARTool = esriARToolMapPan

Previous Extent	If ArcReaderControl1.ARPageLayout.FocusARMap.CanUndoExtent Then
	  ArcReaderControl1.ARPageLayout.FocusARMap.UndoExtent
	End If

Full Extent	ArcReaderControl1.ARPageLayout.FocusARMap.ZoomToFullExtent
Identify	ArcReaderControl1.CurrentARTool = esriARToolMapIdentify
Measure	ArcReaderControl1.CurrentARTool = esriARToolMapMeasure

Zoom To	Dim sWhereClause As String
	sWhereClause = "S_FLAG = " & "'" & sStation & "'"
	m_pSearchDef.WhereClause = sWhereClause
	Set m_pFeatureCursor = pLayer.SearchARFeatures(m_pSearchDef)
	Set m_pFeature = m_pFeatureCursor.NextARFeature
	  If m_pFeature Is Nothing Then
	    MsgBox ("Station not found. Please try again."), , "Not Found"
	    Exit Sub
	  End If
	m_pFeature.ZoomTo

Load PMF	If ArcReaderControl1.CheckDocument(sFilePath) = True Then
	  ArcReaderControl1.LoadDocument sFilePath
	    Else
	      MsgBox "The " & district & ".pmf cannot be loaded!", , "Not Found!"
	      Exit Sub
	End If

Display Scale	Private Sub ArcReaderControl1_OnAfterScreenDraw()
	  StatusBar1.Panels(2).Text = "Map Scale 1:" & _
	  Round(ArcReaderControl1.ARPageLayout.FocusARMap.MapScale, 0)
	End Sub

Display Decimal Degrees	Private Sub ArcReaderControl1_OnMouseMove(ByVal x As Long, ByVal y As Long)
	  Dim xCoord As Double, yCoord As Double
	  ArcReaderControl1.ARPageLayout.FocusARMap.ToMapPoint x, y, xCoord, yCoord
	  StatusBar1.Panels(3).Text = "Latitude: " & CStr(Round(yCoord, 8))
	  StatusBar1.Panels(4).Text = "Longitude: " & CStr(Round(xCoord, 8))
	End Sub

Conclusion

A set of custom Microsoft VisualStudio 6 applications using the ArcGIS 9 Reader Control and Publisher extension were created to display, navigate to and update traffic count data. The field application replaces the need for paper map production and provides a method to sequentially navigate between count locations. The office application replaces the need for paper map production, allows the analyst to evaluate multiple years of traffic data and make changes to the count database as needed. The creation of published map files and the availability of ArcReader enable the widespread electronic distribution and review of urban traffic count locations.

ACKNOWLEDGMENTS

Michael Chamberlain
GIS Project Developer
Texas Department of Transportation
E-mail: mchamb1@dot.state.tx.us