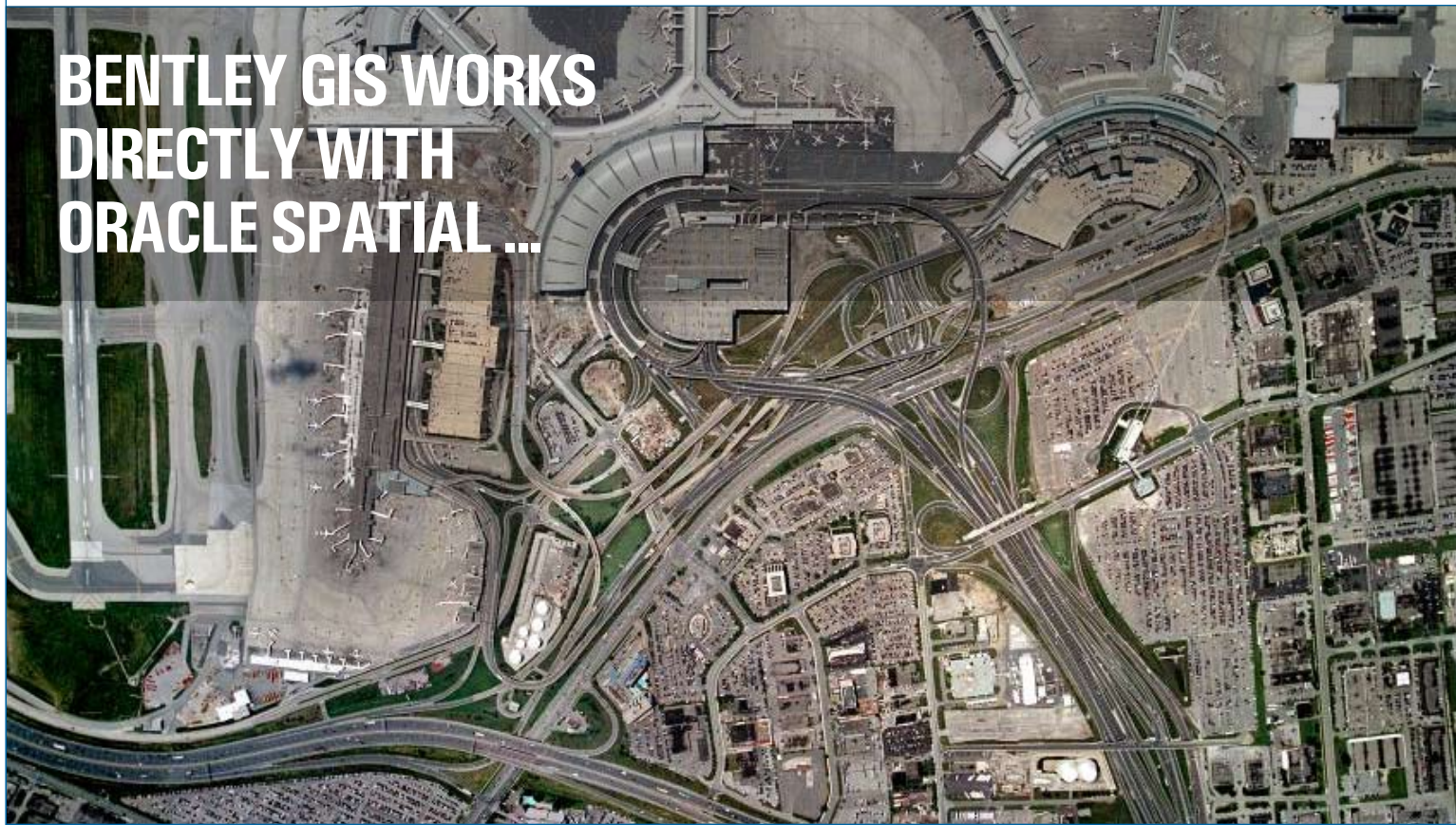


# BENTLEY GIS WORKS DIRECTLY WITH ORACLE SPATIAL ...



## ...to deliver world-class productivity for the Greater Toronto Airport Authority's engineering resources

The Greater Toronto Airports Authority (GTAA) is a not-for-profit corporation with a mandate to provide the Greater Toronto Area with a regional system of airports that meets the current and future demands for air services. The mandate of the GTAA is to operate Pearson International Airport within a regional system of airports to enhance the economic growth and development of the Greater Toronto Area.

Toronto's Pearson International Airport is Canada's busiest airport, handling 29.9 million passengers in 2005. Established in 1939, Pearson Airport currently handles more than 1,200 arrivals and departures every day - or more than 383,000 aircraft movements last year. By the year 2020, the number of travelers passing through the airport's gates is expected to reach 50 million.

Pearson International Airport is the first airport in North America to receive certification to the ISO 14001 international environmental standard. Among their many recent undertakings is the design and construction of Terminal One's new Pier F and a revitalized and expanded Terminal 3. When the GTAA took over responsibility for the operation of Pearson International Airport from

Transport Canada in 1996, it took on major challenges. To maximize efficiency and to minimize cost, a bold plan was developed to phase the construction of a revitalized airport the size of a small city.

The construction component of the plan is now essentially complete - a remarkable logistical feat considering that the new structure was built on top of the existing facility. Clearly, the IT component of this ongoing effort is critical. Efficient management of a massive amount of diverse types of information is required for design and construction and for the ongoing operation and maintenance of the facility.

The GTAA Technical Data Center (TDC) is responsible for the creation and maintenance of building, site and utility information. The team in the TDC works closely with other GTAA functional groups including Project Services, Airside Engineering, Planning and Professional Services, providing facility and site engineering staff, and external contractors with information that is accurate, up-to-date and accessible. The TDC has recently chosen Oracle Spatial as their primary spatial data store. They also utilize Bentley's ProjectWise, spatially enabled with Bentley Geospatial Management, and the ProjectWise Connector for Oracle to complete the data editing and data maintenance workflows. By leveraging the disconnected edit-

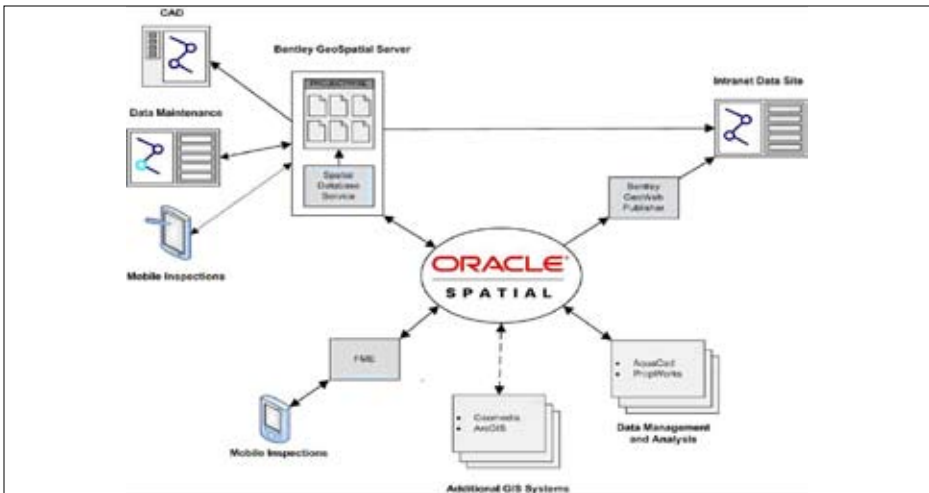


Fig.1: New workflows based on Oracle Spatial and Bentley geospatial solutions

ing workflow made possible by the ProjectWise Connector for Oracle, the TDC staff will be able to quickly enable field editing by engineering staff responsible for creating and maintaining the building space and site infrastructure data, thus reducing errors and streamlining work processes.

In the TDC, team members typically perform data maintenance using as-built data coming from outside contractors. Often this data is in non-standard format and uses different specifications making integration with core data sets cumbersome and time consuming. As a new source of information, the TDC will be able to outfit GTAA field data editors with the ability to capture information on different assets located inside buildings or outside on the site using tablet PCs loaded with a MicroStation-based GIS application

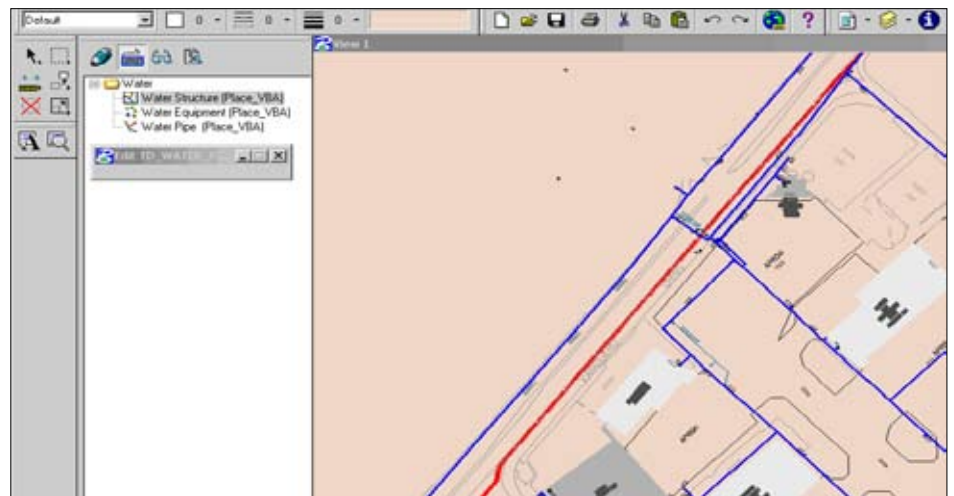


Fig. 2: XFM-ized GTAA utility data demonstrate the ability for connected or disconnected data editing

Connector for Oracle as updates to the enterprise Oracle Spatial database. This database will store most of the as-built information for the site and building spaces.

The Oracle Spatial database can be used to perform a wide variety of spatial and non-spatial analyses and reporting. It can be updated securely through the extract, modify, post paradigm supported by the Oracle Connector which relies on Oracle Spatial's versioning capabilities to manage a multi-user editing environment.

The TDC envisions allowing external contractors access to the ProjectWise data source to enable tighter collaboration with contractors and thereby enforce more strict standards in the future.

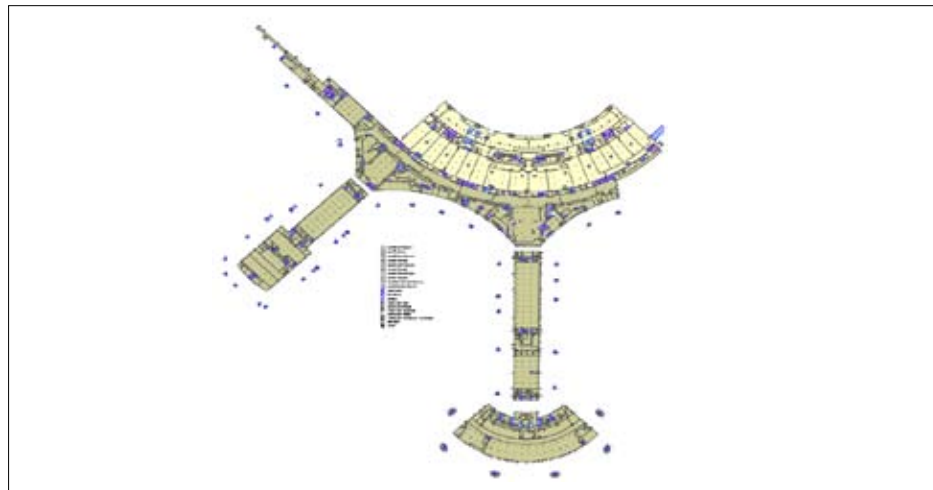


Fig.3: Thematic plan depicting various space classifications in Terminal 1

built with Bentley's XML Feature Modeling (XFM) capabilities. Future workflows will see contractors provided with direct access to data relative to their construction site. Upon completion, final as-built information will be incorporated into drawings extracted from the base data in Oracle

Spatial. The very detailed design drawings of the building and site spaces will remain in DGN, DWG, TIF or PDF form securely managed by ProjectWise, while the core feature data would be finalized and quality-controlled using Bentley GIS applications and posted using the ProjectWise

Mike Robertson, Manager, Technical Data Center, Facilities Engineering explains, "GTAA is a long time user of Bentley products and as the central data custodians and maintainers, TDC staff continually investigate new advances that could make GTAA spatial data stores more readily available to end users with richer content. Bentley's introduction of the ProjectWise Connector for Oracle, combined with XFM technology, enables the TDC for the first time to migrate core GTAA data sets to a truly enterprise-wide GIS with only superficial changes to the maintenance environment. This helps avoid large training exercises or re-tooling of existing work-flows, and it facilitates rapid roll-over to the new environment."

"Further", adds Mike Robertson, "Bentley's XFM technology combined with Oracle Spatial enable a fully collaborative environment supporting virtually unlimited edit sessions for users both connected to and disconnected from the database. The Technical Data Centre eagerly awaits the release of Bentley Map that we believe will provide an intuitive desktop GIS that will expand the usefulness of GTAA spatial data along with



Fig. 4: Thematic plan depicting various space classifications in Terminal 3

facilitating a self-service option to GTAA users becoming more familiar with GIS tools. As a near de facto standard for GIS content, Oracle Spatial will allow GTAA users to find and use tools specific to their needs while not recreating data already managed in the TDC.”

Integrating the spatial information in the enterprise Oracle Spatial database allows the GTAA to perform many types of spatial and non-spatial analyses on the airport site and building space that would not otherwise be possible.

The information in Oracle Spatial represents a seamless view of the airport against which virtually any query or analysis scenario can be applied. Some examples include airport statistics per type of feature, detailed reporting on leases, grass coverage, floor covering areas, aviation surfaces and snow plowing areas. The information in Oracle Spatial can be used with Bentley’s GIS applications to produce useful thematic maps and perform overlay operations such as showing

which manholes, pipes, or other facilities are in particular planning areas or depicting functional space breakdowns of spaces within a facility.

The Oracle Spatial repository is also the perfect source for publishing information via the Intranet site to staff that need quick access to critical infrastructure information.



Fig. 5: The latest update of the TDC’s Map and data publishing portal dubbed “WINGS” utilizes Bentley Geo Web Publisher to provide on-line mapping services from CAD, Oracle Spatial and imagery data stores

## PROJECT SUMMARY

### Organization

Greater Toronto Airports Authority (GTAA)

### Vertical Market

Geospatial – Government

### Project Objectives

- Provide easy access to diverse forms of engineering documentation
- Use Bentley GIS systems in concert with Oracle® Spatial to support engineering workflows
- Simplify and automate systems so that there are fewer re-works and errors
- Work with and manage subcontractors more cost-effectively

### Fast Facts

- GTAA operates Toronto’s Pearson International Airport handling 29.9m passengers in 2005
- Pearson International Airport has over 1,200 departures and arrivals every day
- The GTAA Technical Data Center team is responsible for data creation and the maintenance of building and site information
- The GTAA’s GIS system is based on Bentley geospatial products linked to Oracle® Spatial as the primary data store
- Customized mobile solutions based on Bentley’s XFM technology ensure that data are kept up to date through regular field audits
- ProjectWise delivers enterprise-wide access to complex project data

### Bentley Products Used

- MicroStation
- MicroStation GeoGraphics
- ProjectWise
- Bentley Geospatial Management
- Bentley ProjectWise Connector for Oracle
- Bentley Publisher and Bentley Geo Web Publisher

