Geospatial Innovation in Transportation

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Presentation Outline

• Agency Overview
• ProTrack+ system design & functionality
• Sample Outcomes (of retail tools)
• Summary
• Questions & Answers
AGENCY OVERVIEW
DDOT Organization

- State + Municipal DOT
- 900 employees
- 9 facilities
- 80%+ Union
- ~ $50 billion in assets
- Diverse skill sets

DDOT

- Project Delivery: Planning, Programming Design, Construction, Research
- Operations: Transportation Operations, Permitting, Asset Management, Urban Forestry
- Performance Management: Performance Management, Information Technology, Fleet, Warehouse
- Administration: Human Resources, Contracting, Finance
DDOT’s Customers

• 650,000 residents, 500,000 daily commuters, 125,000 daily visitors
• Highest median household income
• 2\textsuperscript{nd} highest penetration of smart phones
• Multimodal transportation system
• Success of shared transportation concept - Capital Bikeshare, car share (traditional & point to point), transportation network companies
• Smartphone based interface with transportation system – pay by cell, rideDC, parkDC, See-Click-Fix, QR code based service request, gradeDC
• Multiple “non-traditional” stakeholders
Sources of Work at DDOT

- Programmatic
  - Capital projects
  - Safety program
  - Traffic signal construction program

- Proactive
  - Routine inspection
  - Asset management
  - Right of Way Management

- Reactive
  - 311
  - IQ
  - Social Media
  - E-mail
  - Phone calls

Cityworks TOPS (Permits)

Annual Budget ~$500M (excluding $380M to Metro); $150M Federal
External Factors Affecting Organizational Strategy

**Political Factors**
- Non-traditional stakeholders
- Performance focus

**Technology Factors**
- Smart devices
- Internet of Things

**Economic Factors**
- Accountability
- Fiscal pressures

**Social Factors**
- Millennials
- Urbanization
PROTRACK+
The problem.....disparate systems
Unique ID's -

- Call for Projects
- TIP ID
- DC Project #/Index
- FAP#
- DCKA#
- PASS Req.
- Task Order #
- Contract #
- PO#
Collaboration and conflict coordination challenges

- Capital Improvement Projects
- 311 Service Request
- Work Orders
- Public Space Permits
- Emergency Utility Work
- Utility Capital Projects
- Public Space Rental
- Traffic Management
- Special Events
The proposed solution...

- Responsive Web Design
- GIS-Centric
- Relational Database
- Support data driven governance
- Service-oriented architecture (SOA)
- Open application program interface (API)
- Business process management
- Integrated business intelligence tools
- Scalable and sustainable
Modular Approach

- Project initiation
- Call for projects
- Funding obligation
- Initiate new solicitation or task order
- Procurement and contract management
- Construction management
- Project close out
- Operations & Maintenance
Enterprise System — custom developed to support DDOT’s project life cycle management
The Solution
GIS Platform

• Linear Referencing System (LRS)
• Utilize feature and map services
• Identify shared points between geometric objects (i.e. project location)
• Create feature events on the fly
• Conflict notification (e.g. Permits, Special Events, Bike Share, etc.)
• Send alerts when activities occur within a project limits
GIS as a Foundation (GaaF)

Adding project location(s) to map (one-to-many relationship)

**Step 1**
Add project location by selecting road segment (i.e. LRS).

Modify start and end points.

**Step 2**
Feature is created

Select primary and secondary project ‘Work Types’
GaaF (cont.)

Step 3

Add open Work Orders (WO) to overall project scope. When the project is completed, the WO is automatically closed out in Cityworks via API.

Through the use of LRS and open APIs, ProTrack+ is able to detect open work orders, conflicts, and real-time activities (e.g. permits, special events, etc.) occurring within a proposed project area.
In addition to selecting roadway segments, you can also add a project location as a point, line, and/or polygon.

- Import projects from CSV or JSON
- Toggle layers
- Measure tool
- View attributes
- View DDOT’s owned street level imagery
- Export project feature(s) as GeoJSON
Demo – ProTrack+
PUBLIC ACCESS
District Transportation Access Portal (DTAP)

DTAP is the primary access portal for residents, contractors, vendors, and utility companies to get project information, SBE and DBE certification, perform contract management, and coordinate utility work. DTAP is directly connected to and managed by ProTrack+. 

![District Transportation Access Portal](image)
DTAP – Projects (Portal)

- Project Forecast
- Solicitations open for bid
- Task Orders assigned to an A&E or IDIQ contract
- Annual Paving Plan
- Projects currently under construction
DTAP – Certification (Portal)

- Small Business Enterprise (SBE)
- Disadvantage Business Enterprise (DBE)

DTAP – Contract Management (Portal)

- Construction Management
- Operations and and Maintenance
DTAP - Utility Work (Portal)

- Conflict notification
- Opportunities - cost sharing
- Suspended Streets (Five year moratorium)
DTAP’s map interface
Demo – DTAP

https://dtap.ddot.dc.gov
OUTCOMES
Measuring Organizational Performance

- Accountability
  - Track process and stakeholders productivity
- Track conflicts
  - Permit Office, Asset management, and Utilities
- Decommission legacy systems and spreadsheets
- Established enterprise project ID (parent record with a one-to-many relationship)
- Reduce duplicate data entry
- Improve data integrity and accuracy
- Operating cost savings
- Collaboration with outside stakeholders
  - Utility Companies, ANC, BIDS
SUMMARY
Challenges

- Adoption at different levels of the organization
- Resistance to change
- Union environment
- Identify early adopters – divisions/groups and individuals within groups to get to critical mass
- Funding – developed in-house; no dedicated funding
Success Factors

• Tools helped support data driven culture (weekly Transtat)
  – “Necessity is the mother of invention....... and adoption”
• End users saw value (WIFM – what’s in it for me)
  – Tools mapped business process; but several business processes were re-engineered as part of the development
  – End users part of business process re-engineering and requirements development
  – One stop shop - integrating redundant systems
  – Reusability of data; enter once, use multiple times
• Agile approach – “build a little, test a little”
• Continuous training/education for end-users
• Incorporate tools into business process to force adoption
  – FY 2017 Call for projects was collected using ProTrack+
Conclusion

• Combination of internal and external factors
• Top down approach; but trained larger masses
• Necessity; WIFM
• Successful results
• Culture change
Questions?

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