ITS Workforce Study Project Overview

- Goals of the project
  - Conceptual framework for understanding the ITS workforce
  - Framework Table – compilation and classification of relevant KSAs and tasks
  - Industry interviews and subsequent findings

- Main project deliverables
  - Spreadsheet-based Framework Table
  - Final project report that documents findings

- For this meeting
  - Initial findings
  - Feedback on conceptual framework

Framework Overview

ITS Workforce Project

Job Description Analysis

Company	Job Title
Streetline	DevOps Engineer
Parsons Brinkerhoff	Engineer I, Traffic
Parsons Brinkerhoff	Engineer II
Atkins North America	Entry-level Intelligent Transportation System (ITS) Traffic Engineer
ATSS Engineering	Intelligent Transportation Systems (ITS) Engineer
EAC Consulting	Intelligent Transportation Systems (ITS) Engineer
Atkins North America	Intelligent Transportation Systems(ITS) Traffic Engineer
Parsons Corporation	ITS Design Engineer
Arup	ITS Engineer
Econolite Group, Inc.	ITS Engineer
Street Smart Rental	ITS Engineer
STV Company	ITS Engineer
Schneider Electric	ITS Outside Plant Field Engineer
Cubic	Principal Systems Engineer
Kapsch TrafficCom	SCADA Systems Engineer
Ross and Baruzzini	Security Systems Engineer
Siemens	Senior Field Services Engineer - Intelligent Traffic Solutions
Atkins North America	Senior Intelligent Transportation Systems (ITS) Manager – Central
Atkins North America	Senior Intelligent Transportation Systems (ITS) & Signals Engineer
Jacobs	Senior ITS Engineer
Parsons Corporation	Senior Systems Engineer
Cubic	Software Engineer
Cubic	Solutions Architect (ITS)
Parsons Brinkerhoff	Supervising Traffic Engineer
AECOM	Traffic Engineer
Stanley Consultants	Traffic Engineer - Intelligent Transportation Systems (ITS)
Washington State DOT	Transportation Engineer 2 - Signal Operations Engineer
Washington State DOT	Transportation Systems Technician B
Ross and Baruzzini	Transportation / Intelligent Transportation Systems Engineer

Framework: Categories for Analysis

Generalized Position Type	Sector	Specialty Area or Discipline	Phase of Project Cycle
Electrical engineer	Public	Business development	Development
Field engineer	Private	Civil/roadway engineering	Planning
ITS/Traffic engineer		Client relations	Programming
Software engineer		Computer science	Design
Systems engineer		Construction engineering and inspection	Construction
Technician		Electrical engineering	Operations
		GIS	Maintenance
		Information technology	Oversight
		ITS	
		Personnel management/HR	
		Professional/interpersonal skills	
		Project management/administration	
		Systems engineering	
		Telecommunications/network engineering	
		Transportation engineering and operations	

Cell reference: I391 — Formula bar: Construction/Implementation/Deployment

	Generalized Position Type	Organization	Sector	KSA/Task	KSA or Task?	Specialty Area or Discipline	Additional Specialty Area or Discipline	Phase of Project Cycle
361	ITS/Traffic Engineer	Cubic	Private	Experience with formal requirements management and traceability	KSA	Project Management/Administration		
362	Software Engineer	Streetline	Private	Experience with integration with monitoring tools (e.g. Nagios, NewRelic)	KSA	Information Technology	Computer Science	
363	Software Engineer	Cubic	Private	Experience with Linux systems programming	KSA	Computer Science		
364	Software Engineer	Cubic	Private	Experience with Open Source Map Tools (such as: Leaflet, OpenMap, QGIS, PostGIS, SpatialLite)	KSA	Geographic Information Systems (GIS)		
365	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with operations	KSA	Transportation Engineering and Operations		Operations
366	ITS/Traffic Engineer	Kapsch TrafficCom	Private	Experience with PLC programming	KSA	Computer Science	ITS	
367	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with privately financed/ Public Private Partnership (PPP) tolling projects	KSA	Business Development	ITS	
368	Software Engineer	Streetline	Private	Experience with production deployment	KSA	Information Technology	Computer Science	
369	Software Engineer	Streetline	Private	Experience with production monitoring	KSA	Information Technology	Computer Science	
370	Software Engineer	Streetline	Private	Experience with production operational support	KSA	Information Technology	Computer Science	
371	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with public sector tolling projects	KSA	Business Development	ITS	
372	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with systems development	KSA	Electrical Engineering		Design
373	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with systems integration	KSA	Electrical Engineering		Construction/Implementation/Deploy
374	Software Engineer	Streetline	Private	Experience with the administration of message queues (Rabbit MQ)	KSA	Computer Science	Information Technology	
375	ITS/Traffic Engineer	Jacobs	Private	Experience with traffic systems implementation	KSA	ITS	Transportation Engineering and	Construction/Implementation/Deploy
376	ITS/Traffic Engineer	Cubic	Private	Experience working on firm fixed price/schedule projects with earned value performance reporting	KSA	Project Management/Administration		
377	ITS/Traffic Engineer	Cubic	Private	Experience working on software development projects following an agile SDLC	KSA	Computer Science		
378	Systems Engineer	Parsons Corporation	Private	Experience working the construction field	KSA	Construction Engineering and Inspection		Construction/Implementation/Deploy
379	ITS/Traffic Engineer	Street Smart Rental	Private	Experience working with DOTs and municipalities bidding on ITS systems	KSA	ITS	Client Relations	Development
380	ITS/Traffic Engineer	Street Smart Rental	Private	Experience working with DOTs and municipalities designing ITS systems	KSA	ITS	Client Relations	Design
	ITS/Traffic Engineer	Street Smart Rental	Private	Experience working with DOTs and municipalities	KSA	ITS	Client Relations	Construction/Implementation/Deploy

Sheet tabs: Categories and specialty areas | Consolidated Framework | KSAs-reduced | Tasks | KSAs | Tasks - ITS-Traf Engineerir ...

I391 — Construction/Implementation/Deployment

	B	C	D	E	F	G	H	I
1	Generalized Position Type	Organization	Sector	KSA/Task	KSA or Task?	Specialty Area or Discipline	Additional Specialty Area or Discipline	Phase of Project Cycle
361	ITS/Traffic Engineer	Cubic	Private	Experience with formal requirements management and traceability	KSA			
362	Software Engineer	Streetline	Private	Experience with integration with monitoring tools (e.g. Nagios, NewRelic)	KSA		Computer Science	
363	Software Engineer	Cubic	Private	Experience with Linux systems programming	KSA			
364	Software Engineer	Cubic	Private	Experience with Open Source Map Tools (such as: Leaflet, OpenMap, QGIS, PostGIS, SpatialLite)	KSA			
365	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with operations	KSA			Operations
366	ITS/Traffic Engineer	Kapsch TrafficCom	Private	Experience with PLC programming	KSA		ITS	
367	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with privately financed/ Public Private Partnership (PPP) tolling projects	KSA		ITS	
368	Software Engineer	Streetline	Private	Experience with production deployment	KSA		Computer Science	
369	Software Engineer	Streetline	Private	Experience with production monitoring	KSA		Computer Science	
370	Software Engineer	Streetline	Private	Experience with production operational support	KSA		Computer Science	
371	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with public sector tolling projects	KSA		ITS	
372	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with systems development	KSA			Design
373	Electrical Engineer	Parsons Brinkerhoff	Private	Experience with systems integration	KSA			Construction/Implementation/Deploy
374	Software Engineer	Streetline	Private	Experience with the administration of message queues (Rabbit MQ)	KSA		Information Technology	
375	ITS/Traffic Engineer	Jacobs	Private	Experience with traffic systems implementation	KSA		Transportation Engineering and	Construction/Implementation/Deploy
376	ITS/Traffic Engineer	Cubic	Private	Experience working on firm fixed price/schedule projects with earned value performance reporting	KSA	Project Management/Administration		
377	ITS/Traffic Engineer	Cubic	Private	Experience working on software development projects following an agile SDLC	KSA	Computer Science		
378	Systems Engineer	Parsons Corporation	Private	Experience working the construction field	KSA	Construction Engineering and Inspection		Construction/Implementation/Deploy
379	ITS/Traffic Engineer	Street Smart Rental	Private	Experience working with DOTs and municipalities bidding on ITS systems	KSA	ITS	Client Relations	Development
380	ITS/Traffic Engineer	Street Smart Rental	Private	Experience working with DOTs and municipalities designing ITS systems	KSA	ITS	Client Relations	Design

Filter dropdown (Specialty Area or Discipline):
- Sort A to Z
- Sort Z to A
- Sort by Color
- Clear Filter From "Specialty Area or..."
- Filter by Color
- Text Filters
- Search
  - ☐ ITS
  - ☐ Personnel Management/HR
  - ☐ Professional/Interpersonal Skills
  - ☑ Project Management/Administration
  - ☐ Systems Engineering
  - ☐ Telecommunications/Network Engineer
  - ☐ Transportation Engineering and Opera
- OK Cancel

Sheet tabs: Categories and specialty areas | Consolidated Framework | KSAs-reduced | Tasks | KSAs | Tasks - ITS-Traf Engineerir ...

Cell reference: G361 — Project Management/Administration

	Generalized Position Type	Organization	Sector	KSA/Task	KSA or Task?	Specialty Area or Discipline	Additional Specialty Area or Discipline	Phase of Project Cycle
361	ITS/Traffic Engineer	Cubic	Private	Experience with formal requirements management and traceability	KSA	Project Management/Administration		
376	ITS/Traffic Engineer	Cubic	Private	Experience working on firm fixed price/schedule projects with earned value performance reporting	KSA	Project Management/Administration		
390	ITS/Traffic Engineer	Atkins North America	Private	Extensive project management experience	KSA	Project Management/Administration		
411	Systems Engineer	Parsons Corporation	Private	Frequently interfaces with other engineering disciplines	Task	Project Management/Administration	Professional/Interpersonal Skills	
412	Systems Engineer	Parsons Corporation	Private	Frequently interfaces with other regional departments	Task	Project Management/Administration	Professional/Interpersonal Skills	
413	Systems Engineer	Parsons Corporation	Private	Frequently interfaces with stakeholders	Task	Project Management/Administration	Professional/Interpersonal Skills	
425	ITS/Traffic Engineer	Atkins North America	Private	Good communications skills essential, including ability to present concepts verbally	KSA	Project Management/Administration	Client Relations	
428	ITS/Traffic Engineer	Atkins North America	Private	Good technical writing and communications skills	KSA	Project Management/Administration	Client Relations	
429	ITS/Traffic Engineer	Atkins North America	Private	Good technical writing skills	KSA	Project Management/Administration		
430	ITS/Traffic Engineer	Atkins North America	Private	Good technical writing, analytical and communications skills (including ability to present concepts verbally)	KSA	Project Management/Administration	Client Relations	
442	Software Engineer	Cubic	Private	Helps to identify how contracts operate	Task	Project Management/Administration		
443	Software Engineer	Cubic	Private	Helps to identify how to deliver project solutions	Task	Project Management/Administration	Client Relations	
445	Software Engineer	Cubic	Private	Helps to identify new opportunities and innovations within existing contracts	Task	Project Management/Administration	Client Relations	
450	ITS/Traffic Engineer	Atkins North America	Private	Identifies current and future staffing requirements and matches those requirements with current staff skills and the availability of staff	Task	Project Management/Administration	Personnel Management/HR	
455	ITS/Traffic Engineer	Kapsch TrafficCom	Private	Identifies resources required of the project team	Task	Project Management/Administration		
458	ITS/Traffic Engineer	Street Smart Rental	Private	Implements and monitors projects	Task	Project Management/Administration		Construction/Implementation/Deploy
463	Field Engineer	Siemens	Private	Informs management of all issues that may affect budgets, quality, or schedule	Task	Project Management/Administration		
464	ITS/Traffic Engineer	Montgomery County DOT	Public	Initiates correspondence and other communications with developers, designers, contractors, property owners, other governmental agencies and the general public in response to requests for information, to explain legal/regulatory requirements, or to provide technical assistance.	Task	Project Management/Administration	Professional/Interpersonal Skills	Oversight
				Initiates correspondence and other communications with developers, designers, contractors, property owners, other				

Sheet tabs: Categories and specialty areas | Consolidated Framework | KSAs-reduced | Tasks | KSAs | Tasks - ITS-Traf Engineerir ...

Framework Results

- Created an initial conceptual framework for further analysis of ITS workforce needs and trends

- Compiled a large sample of KSAs and tasks currently required of ITS workforce

- Developed a tool for ITS professionals in positions with authority for hiring and developing the workforce

- Would like feedback from University Workshop participants
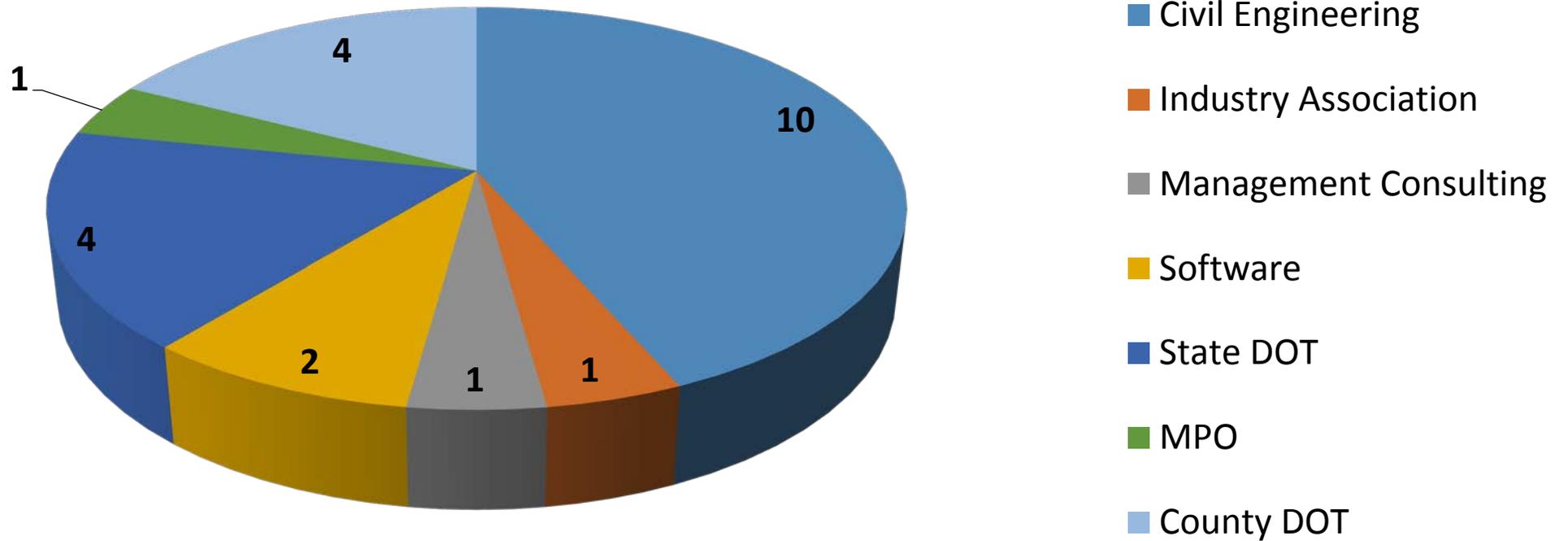
Industry Interviews Overview

ITS Workforce Project

Interviewees

- AECOM
- APTA
- Booz Allen Hamilton
- Bridj
- Delaware DOT
- Delaware Valley Regional Planning Commission
- HNTB
- Kimley-Horn

- Maricopa County (AZ) DOT
- Michael Baker International
- Michigan DOT
- Montgomery County (MD) DOT
- Parsons Brinckerhoff
- RouteMatch
- Timmons Group
- Washington State DOT

Interviewees, cont'd

Interviewees by Sub-sector

- Civil Engineering — 10
- Industry Association — 1
- Management Consulting — 1
- Software — 2
- State DOT — 4
- MPO — 1
- County DOT — 4

General Findings

- **Variety of position types**
  - Engineering, technician, business development, project management
- **All phases of project cycle**
- **Interdisciplinary nature**
  - No single college major on which organizations can recruit/rely on as a pipeline
- **Future technology**
  - Short-term ITS deployment needs outweigh future technology in importance
- **Soft skills are highly valued**
  - Especially as individuals advance

Public Sector Perspectives

- Transportation/traffic engineering is foundational
- Operations knowledge should be leveraged to inform design
- Interdisciplinary knowledge is increasingly important
- Soft skills!
  - Written/verbal communications
  - Willingness and ability to learn independently
  - Task/project management and contracts administration
- No university pipeline – no single major on which to rely for candidates
  - Candidate pool lacks education, training, and experience in ITS
  - ITS training occurs *on the job*
- **Must compete with private sector for limited candidate pool**
- **Job specs can be opened up successfully to widen candidate pool**

Private Sector Perspectives

- Transportation/traffic engineering is foundational
- Operations knowledge should be leveraged to inform design
- Interdisciplinary knowledge is increasingly important
- Soft skills!
  - Written/verbal communications
  - Willingness and ability to learn independently
  - Task/project management and contracts administration
- No university pipeline – no single major on which to rely for candidates
  - Candidate pool lacks education, training, and experience in ITS
  - ITS training occurs *on the job*
- **Career paths move towards task/project/program management and business development**
- **Software and technology companies represent new directions for the ITS workforce**
  - **Come with their own unique needs**

Next Steps

- **Report:** Submit draft report for review
- **Framework table:** Further refine by separating and consolidating list of KSAs and tasks
  - To resemble the NIST Cybersecurity Framework
- **Feedback from University Workshop participants:**
  - On conceptual framework categories and definitions
- **Professional Capacity Building:** continue to support JPO's PCB program
  - Trainings
  - University Workshops
  - Others