DPRC-ACCESS: Accessible Maps System

DRAFT Use Cases

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A systems approach to Accessible Maps

In service to the SFSU DPRC mission of supporting autonomous activity for disabled students, staff and visitors to SFSU the ACCESS team seeks a reliable, efficient and economical solution for campus wayfinding and orientation. This document organizes user profile information into Use Cases in an effort to define requirements for such a system and economically meet them. Assumptions that inform this effort include the need for investment in:

- A centralized, highly structured spatial data repository
- Device-independent, highly customizable output capabilities
- A modular, robust system that promotes active updating
- A phased delivery schedule

These assumptions will be validated and modified considering the following dimensions:

- User Class: Who are clients of the Accessible Map System?
- Goals: What do they need and want to do?
- Activities: Description of workflows.
- Dependencies: Other systems that would be interdependent with Accessible Maps.
- Questions: What tests/studies need to be done to confirm requirements for an effective Accessible Maps System?
- Solutions: Set of tools or methods which will satisfy user requirements.

Use Cases

This analysis begins by considering the most universal needs and then focuses upon needs specific to disability, understanding that within these arbitrary designations there is great diversity. Each case is accompanied by a template specification. Organization of users into classes can facilitate economies of scale producing savings that can then be leveraged to create the highly personalized solutions characteristic of DPRC client base.

Client Use Cases

User Class	**Universal**
Goals	○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	Geodatabase [ARCGIS] that stores spatial & logistical attributes and can generate maps in various formats. Presentation layer manages web interface.[PHP, python] Constituent layer manages user profiles. [mySQL]

Universal Template

Configurable components for all client use cases.

User Class	**Blind, limited vision**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? "Common accommodations for students with vision impairments include alternative print formats, magnification devices, bright incandescent lighting, raised lettering, tactile cues, adaptive computer equipment, readers for exams, print scanners, early syllabus, priority registration, taped lectures, and lab or library assistants." For course work from DPRC site. NOTE: Audio maps will not help a blind map reader who is also deaf.

Blind, limited vision Template

Configurable components for Blind, limited vision users.

User Class	**Deaf, hard of hearing**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Note: if the deaf map reader is sighted a visual display will work, if not a tactile map is required.

Deaf, hard of hearing Template

Configurable components for Deaf, Hard of Hearing users.

User Class	**Mobility constrained**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? "Physical access to a classroom may not be the first barrier a student with a mobility impairment encounters on campus. A temporary construction project on a pathway, a lack of reliable transportation, or mechanical problems with a wheelchair can significantly impact a student 's experience." DPRC web site.

Mobility-constrained Template

Configurable components for mobility-constrained users.

User Class	**Dexterity-constrained**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Geodatabase [ARCGIS] that stores spatial & logistical attributes and can generate maps in various formats. Presentation layer manages web interface.[PHP, python] Constituent layer manages user profiles. [mySQL]

Dexterity-constrained Template

Configurable components for dexterity-constrained users.

User Class	**Combined constraints**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Geodatabase [ARCGIS] that stores spatial & logistical attributes and can generate maps in various formats. Presentation layer manages web interface.[PHP, python] Constituent layer manages user profiles. [mySQL]

Combined Constraints Template

Configurable components for users with combined constraints.

User Class	**Cognitive Constraints**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Concise organization, alternative print formats

Cognitive Constraints Template

Configurable components for users with cognitive constraints.

User Class	**Learning-Disabled**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Concise organization, alternative print formats

Learning-Disabled Template

Configurable components for learning-disabled users.

Administrative Use Cases

User Class	**Resource Worker**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assistive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Clear view of available adaptations (choices). Ease of generation and of reporting, tracking adaptations and results.

Resource Worker Template

Configurable components for Interface with assistive technology .

User Class	**System Administrator**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Geodatabase [ARCGIS] that stores spatial & logistical attributes and can generate maps in various formats. Presentation layer manages web interface.[PHP, python] Constituent layer manages user profiles. [mySQL] Clear issue tracking, transparency in Resource Worker's workflow. Modular structure with independence between presentation, data and application layers.

System Administrator Template

Configurable components for Systems and Reporting interface

User Class	**System Manager**
Goals	○ What do they need and want to do? ○ Be secure in travel and orientation. ○ Get map(s) tailored to abilities, activities and destinations.
Activities	Description of workflows. ○ ○ Travel freely between work, school, home and recreation. ○ Provide directions to others. ○ Explore. ○ Adapt to (unexpected) changes.
Dependencies	What other systems does the user depend on? Assitive technology, Public transportation, campus transportation, weather, time of day, construction, emergencies.
Questions	What tests need to be done to build an effective system for this user? How orientation & wayfinding needs differ specific to types of disability. Commonalities.
Solutions	What tools or methods may satisfy user requirements? Clear issue tracking, transparency in Resource Worker's and System Admin's workflow.

System Manager Template

Configurable reporting interface components

RESOURCES

- Description of DPRC services and scope.
  - http://www.sfsu.edu/~dprc/student.html
  - http://www.sfsu.edu/~dprc/bv_impairments.html

- ACM (2000) Conference on Universal Usability: http://sigchi.org/cuu/

- iSonic: http://www.cs.umd.edu/hcil/audiomap

- American National Standards Institute (ANSI) (1973) American National Psychoanalytic Terminology (No S3.20). American National Standards Institute, New York.

- Andrienko, G and Andrienko, N (1999) Interactive Maps for visual data exploration, International Journal of Geographic Information Science

- Definition for 'Haptic'
  http://en.wiktionary.org/wiki/haptic