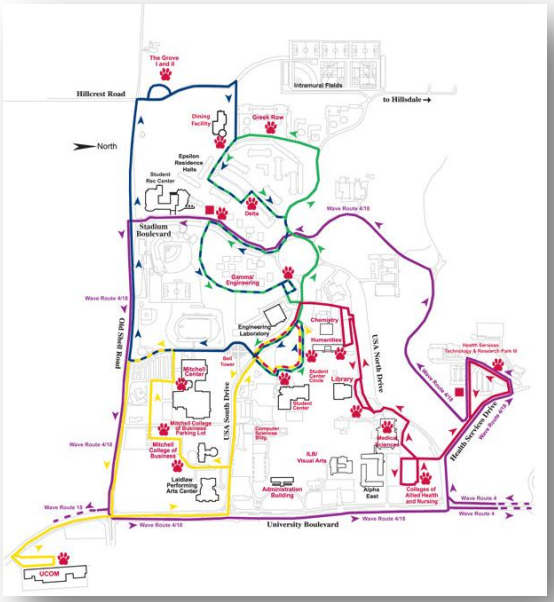
Course Project: JagTran

Background

JagTran[1] is the University of South Alabama's campus transportation system. It was created to provide easy, safe and efficient transportation for USA students, employees and visitors. JagTran vehicles run continuously throughout the day: no tickets, money or reservations are needed. Students park their cars in color coded lots, which they choose, and then walk or ride JagTran. Since JagTran's inauguration, there have been 1,000,000+ total riders, no injuries or at-fault collisions, a 25% reduction in traffic accidents in parking lots, a 50% reduction in pedestrians/vehicle accidents, and 17% reduction in motorist assist calls (keys, dead batteries, etc.).



Currently, JagTran offers travel on buses and trams for 5 different routes: Red Line, Blue Line, Green Line, Yellow Line, and WAVE as seen in Figure 1. Routes have buses that run 7:10 am – 2:30 pm. Some routes have late hours, such as Red, Green, and Yellow, which run 2:30 pm – 9:30 pm. Routes cover certain streets and have one or more stops. Some stops have buses from more than one route. JagTran can also be requested for use for special events (i.e., chartered).

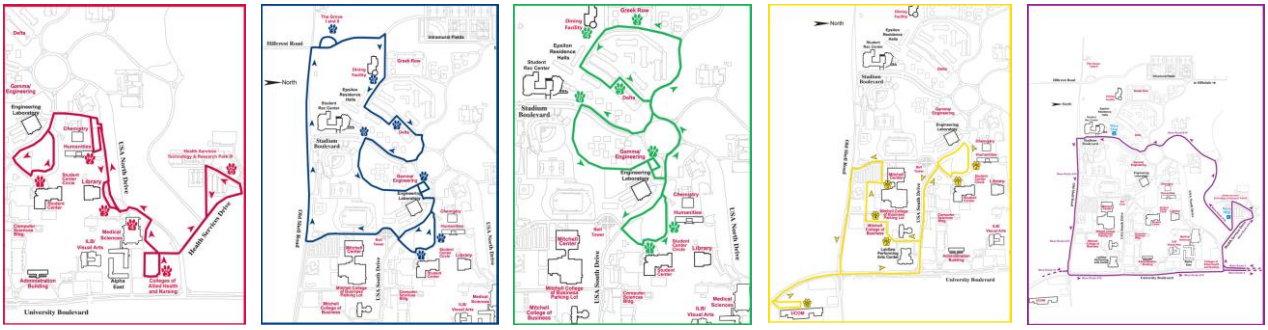


Figure 1: JagTran Lines

Users of JagTran currently do not know when a particular bus or tram will arrive or depart at a given stop on a given line. At times of heavy traffic, more trams may be added to a given line, but riders do not currently have knowledge of such adjustments. Access to this information online and in the form of cell-phone based applications would considerably improve the user experience for the JagTran system.

[1] http://www.southalabama.edu/jagtran/

Vision

In order to make JagTran a more enjoyable and useable experience for USA students, real time information regarding bus locations and their estimated arrival/departure times at JagTran stops would greatly benefit students and potential riders. In order to help load balance trams along different lines at different times of the day, information regarding waiting passengers at each bus stop would also benefit JagTran managers. The purpose of this project is to develop software that increases access to that information, providing real-time information for both potential JagTran riders and JagTran administrators.

This project will help to provide feasibility information for an actual implementable system in the future. It is designed to scope the requirements and architecture for a secure, efficient, reliable, and easily accessible software system which provides information for both passengers and JagTran administrators.

Constraints

The customers are represented by USA faculty members Dr. Todd McDonald (SCIS), Dr. Mike Doran (SCIS), and Dr. Sam Russ (School of Engineering). Dr. McDonald will be the sole intermediary between students, the customer team, and the JagTran department. No direct contact with the JagTran department should be required or initiated by the project development team. All questions regarding system constraints, requirements, feasibility, testing, and deployment will be answered by the customer.

In order for the software to work successfully and provide benefit to both customers and administrators of the JagTran system, two types of sensors are envisioned:

1) Sensors that track real-time locations of buses and trams within the JagTran system
2) Sensors that track passenger movements on buses and trams

The hardware devices and sensors that are necessary for the entire functioning of the system are outside the scope of this development effort. However, the data formats and interface specifications for these needed sensors are TBD and will be negotiated with the customer. Data from necessary sensors will be simulated for purposes of this project.

Data itself will be consolidated into a database server with accessibility across the Internet. The software system itself will interface with this database system and the development team will be responsible for the development and integration of this database.

The software system should provide broad access to information across a wide range of user platforms. Initially, the target application is for potential passengers using cell-phone applications while travelling on the JagTran system. The initial deployment environment will target the Android operating system, a very popular and widespread application framework for cell-phone based applications.

The software project team organization will vary as the project unfolds. Although the customer will recommend an initial team configuration, this organization will adapt to different phases of the development life cycle so that necessary tasks can be accomplished.

The customer is very comfortable working with iterative software development efforts and requires that the software project team follow the *Rational Unified Process* (RUP) as their primary software process model. All other decisions regarding development environments, technology requirements, testing and integration, team dynamics, prototypes, security, configuration management, quality assurance, etc. will be determined by the software project team. Other best practices from agile methods, extreme programming, and software reuse process models may be integrated by the software project team at their discretion.

Deliverables

The customer requires deliverables that are consistent with the inception and elaboration phases of a RUP development effort. These documents represent the scope, feasibility, requirements, analysis, design, testing, implementation, quality assurance, and configuration management aspects of the development effort. Briefings will be required by the customer from the software project team on a regular basis.