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# ISU Transportation Services Kiosk Implementation and Parking Lot Redesign

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# ISU Transportation Services Kiosk Implementation and Parking Lot Redesign

## **Problem Statement**

Constructed in 1970, the Iowa State Transportation Service Building and adjoining lot have been home to the complete fleet of vehicles made available to various departments of the university. Transportation Services is an operation of only seven employees. This small but efficient staff, led by Director Kathy Wellik, responsible for tracking and maintaining a fleet of over six hundred vehicles, stay true to their mission of providing economical transportation options for the university faculty to perform their duties.

Currently, fleet rentals can only be made within operating hours, 6:15 A.M. to 5 P.M., when there is staff on-site to process the reservation. However, there has been an increase in demand for off-hours rentals. To alleviate the economic burden of staffing the facility 24-hours a day, Transportation Services has invested in a Kiosk customers can use to rent and return vehicles during off-hours.

The client has requested the fenced lot be redesigned to support one hundred and twelve vehicles, that can be rotated out as the fleet inventory and demand changes. The kiosk system must be outfitted with an accessible and easy to understand interface that will guide a customer through the process of picking-up and dropping-off a vehicle. All training material must be clear and concise, applicable for a customer with any level of experience renting a vehicle.

Many different industries are undergoing similar changes to address needs of the customer outside of normal business hours. The self-service kiosk is becoming a common solution. Most of the big-name car rental industries employ a similar method to the one mentioned above. With the success and economic benefits seen in the car rental industry, the self-service kiosk has spread from the postal industry to tech repair and continues to grow.

## **Disciplines**

Bioresource and Agricultural Engineering | Industrial Technology

# IOWA STATE UNIVERSITY

Department of Agricultural and Biosystems Engineering (ABE)

TSM 416 Technology Capstone Project

## ISU Transportation Services Kiosk Implementation and Parking Lot Redesign

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## 1 PROBLEM STATEMENT

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### Problem Statement

Constructed in 1970, the Iowa State Transportation Service Building and adjoining lot have been home to the complete fleet of vehicles made available to various departments of the university. Transportation Services is an operation of only seven employees. This small but efficient staff, led by Director Kathy Wellik, responsible for tracking and maintaining a fleet of over six hundred vehicles, stay true to their mission of providing economical transportation options for the university faculty to perform their duties.

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*Dept. of Agricultural and Biosystems Engineering ([abe@iastate.edu](mailto:abe@iastate.edu)) aims to be a premier team serving society through engineering and technology for agriculture, industry and living systems. ABE welcomes opportunities to discover & improve technologies for all stakeholders. 1*

Many different industries are undergoing similar changes to address needs of the customer outside of normal business hours. The self-service kiosk is becoming a common solution. Most of the big-name car rental industries employ a similar method to the one mentioned above. With the success and economic benefits seen in the car rental industry, the self-service kiosk has spread from the postal industry to tech repair and continues to grow.

### Business Case Statement

Presently, the layout of the individual parking spaces and fence line are not conducive to support the off-hours kiosk system. The lot must be redesigned to support the desired vehicles in such a way to support an efficient flow of traffic through the lot.

If the issue were not to be addressed, Transportation Services would not only have to forego the opportunity to bring in an additional income stream, but they would also not be fully adhering to their mission.

This problem transpires from 5:00 P.M. to 6:15 A.M., during non-business hours. The lot is not staffed and rental services are limited. Presently, there is a drop-off box which can accept returns, but vehicles cannot be taken out at these times.

By providing a solution, Transportation Services can rent vehicles more efficiently, provide better customer services, and increase revenue without an increase in expenses.

Kathy Wellik, the Director of Transportation Services, has expressed an interest in solving this issue. The results will be beneficial not only for the entire department, but also for their customer base.

## 2 GOAL STATEMENT

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- **Main Objective(s) and Specific Objectives**

**The main objective is to:** develop and implement a new parking lot to work in unison with the recently installed kiosk system to provide 24-hour rental service.

**Specific objectives include:**

- Move Fence Lines
  - The fence lines must stay within the existing lot
  - The newly designated lot cannot encroach on the neighboring fire training parking lot
  - The fence line must not impede on the utilization on standing structures (i.e. car wash)
  - The mechanic shop must be fenced in
- Redesign of the Parking Lot
  - Individual parking spaces must be large enough to support the largest available vehicle
  - Maximize available parking spaces (Lot must hold at least one hundred and twelve spaces)
  - The design must allow for navigation of cumbersome vehicles (i.e. trailers, 15 ft vans) into and out of their designated spaces
  - The design cannot hamper the flow of traffic during normal operating hours
- Implementation of Kiosk System
  - The system must be user-friendly
  - The system must be clear in its pick-up and drop-off procedure
  - The system must be easily accessible for first-time users
  - Training material must be available and easy to understand

- **Rationale**

- Increase their fleet availability to 24 hours a day
- Prevent the need to increase staffing

- Increase customer satisfaction

### 3 PROJECT PLAN/OUTLINE

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#### Methods/Approach

- **Reference Materials**
  - ISU Transportation Services master fleet list
- **Data collection**
  - Improved Traffic Flow
  - Use AutoPark to test the flow of traffic
    - (Beckman et al., 2017)
  - Interviews with ISU transportation staff
- **Skills**
  - AutoCAD
  - Facility Planning
  - AutoPark
  - Traffic Flow
  - Writing SOPs
  - Filming and Editing
- **Proposed Solutions**
  - Move Fence
  - Reorganize spots and paint new lines
  - Increase number of accessible spots to at least 112
  - Make traffic flow smoothly throughout the lot and eliminate congestion
  - Preliminary options will be tested for traffic flow and feasibility
  - Clients will also be consulted when it comes to preliminary solutions
    - Find out what they like and don't like about each idea
  - Proposed solutions will be narrowed down by client and then final decision will be made using AutoPark flow results
  - A successful project will have at least 112 available spaces with an improved and direct flow of traffic
  - Proposed solution addresses all course objectives and the project scope
  - Training material must be approved by client to cover all desired areas
  - Client expectations will be met with the final proposed solution
- **Organization**
  - Client will be updated on project as milestones are reached
  - Work will be split up among team members as evenly as possible and team members will check-in with each other to keep accountable
  - **Major milestones**
    - Completion of preliminary ideas
    - Testing and client input on preliminary ideas
    - Decision of final design
    - Analysis of traffic flow
    - Developing SOP for the new lot and the kiosk
    - Completion of training video
  - Time has been built in to the project to allow for setbacks and unexpected changes

#### Results/Deliverables

- New Parking Layout
- SOP for the new parking kiosk and new organizational system

- Training Video
- Client's next step will be to analyze our proposed solution and decide on it
  - Finalize Kiosk Operation Tests
  - Start Making Changes to the Lot
  - Get Training Out to Customers

### Timeline

- **Design New Parking Layout**
  - Start - 10/30/17
  - Finish - 1/27/18
- **Create AutoCAD of Final Lot Layout**
  - Start – 2/3/18
  - Finish 2/10/18
- **Kiosk SOP**
  - Start – 3/31/18
  - Finish - 4/15/18
- **Kiosk Training Video**
  - Start – 3/15/18
  - Finish 4/9/18

## 4 BROADER OPPORTUNITY STATEMENT

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This project will have an effect across the entire Iowa State Campus. The fleet of Transportation Services serve a wide range of purpose for just about every department at the university. With this new system in place it will be easier than ever for university faculty and staff to utilize the benefits their fleet whenever the need arises.

The success of the university lends itself to the success of Ames. As the university grows, more businesses are enticed to come support the Ames community, bringing jobs and money into the town. As such, any contribution to the success of the university, no matter what size, is a step towards a more prosperous community as whole.

This project can have a beneficial influence on a number of industries and even other facilities at Iowa State. Parks library, for example, could utilize a similar self-service system for after-hour book rentals. The market for self-service kiosks has greatly expanded in the last ten years, allowing business to offer their customers increased availability to their product without much overhead cost beyond the initial investment. From the redesign aspect of the parking lot, anyone experiencing bottlenecking, flow issues, or unauthorized parking in their lots would benefit from looking into how a change in layout could resolve many, if not all, of those issues.

While Transportation Services does not have competition, we can view them simply as a car rental company to see how this very issue is handled across the industry. Larger companies, such as Hertz and Enterprise, have rolled out nearly identical systems to what is being installed here; kiosk systems that allow for 24-hour drop-off and pick-up. Smaller, more budget friendly, companies such as Dollar Rental and Avis have stayed with no after-hour pick-ups, but do offer after hour drop-off in the form of a drop box. Currently, Transportation Services utilizes this drop box method.

The benefit of the self-service kiosks is the minimal overhead cost, as mentioned above. If your lot is already advantageous for such an installation, you can save even more money on your initial investment. As for how much a company would be willing to spend, will vary from one company to the next. The complete acquisition and installation cost is fairly constant. With that in mind, it is simple enough to analyze whether your company has enough demand during off-hours to offset the cost. In the case of Transportation Services, there has been a display of demand for after-hours rental, and without the additional cost of staffing the facility, supplying that services will increase their profit

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margin. This will allow them to continue improving on their mission of providing safe, economical, and appropriate vehicles to the staff and faculty of Iowa State.

## 5 PROJECT SCOPE

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This project was nearly all inclusive of the business operations of Transportation Services. While we were focused mostly on the function and accessibility of the kiosk and fleet during off-hours, our design had to take into account the needs of client during hours of operation as well. We did not however, take into account any of the servicing or maintenance of the vehicles. Transportation services has a full car wash and mechanic shop on site which did not affect our lot layout or kiosk installation. Ideally, the lot could have been expanded and the existing structures (front office, car wash, maintenance shop) could have been placed in such a way that is most efficient for the flow of traffic in the lot and increase accessibility for both staff and customers. However, this was well outside of the budget, in addition, the lot is surround on one side by a railroad and on the other sides by Frederiksen’s Court.

## 6 GRAPHICAL ABSTRACT

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## 7 REFERENCES

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- John Beckman, Colton Murphy, Joseph Rauenhorst, Joseph F. Vanstrom, and Jacek A Koziel. St. Thomas Aquinas Parking Ramp. Final Report. TSM 416 Technology Capstone Project, April 28, 2107.

## 8 APPENDIXES

### Appendix I

First Parking Lot Iteration ( 187 Spaces)



### Appendix II

Second Parking Lot Iteration ( 167 Spaces)



Third and Final Parking Lot Iteration (188 Spaces)

