



Vision Document



Transit Droid Team

Austin Takam
Daniel Magni
Paul Smelser
Razvan-Lada Moldovan
Yasser Al-Hasan

Contents

1	Problem Statement.....	4
2	Product Position Statement.....	4
3	Stakeholder Descriptions.....	5
3.1	Stakeholder Summary.....	5
3.2	User Environment	5
4	Product Overview	6
4.1	Product Perspective	6
4.2	Assumptions and Dependencies.....	7
4.3	Needs and Features	7
4.4	Alternatives and Competition.....	8
5	Other Product Requirements	8

REVISION HISTORY

Date	Version	Description
02/17/2013	1.0	Initial version

INTRODUCTION

Transit Droid is a software system that complements and expands upon the OPUS system, currently used by the Société de Transport de Montreal (STM). The Transit Droid mobile application will allow an individual to enter the public transit system using a Near Field Communication (NFC) enabled mobile device. Similar to how the OPUS card is currently used, clients will hold their NFC-enabled mobile device over the reader instead of a card. Our solution is not a replacement of the existing infrastructure that is already effective and heavily used. Rather, it provides clients with a mobile alternative. For the purpose of this project, we will be focusing on the Android operating system with the option of eventually extending to other NFC compliant platforms.

The NFC aspects of the project are not the only objective, however integral. We envision creating an ecosystem for seamless integration of mobile devices and a web application, each used in conjunction with OPUS to manage an account from either platform. OPUS account management will consist of purchasing and using transit fares as well as monitoring of a client's OPUS balance.

Additionally, we would like to exploit NFC technology to provide users with supplemental features including viewing upcoming bus/subway schedules as well as service delays/interruptions. It is possible to use the mobile device to view advertisements using NFC, like Quick Response (QR) codes are currently being used.

Montreal's public transit system is North America's third largest after Mexico and New York, and attracts the second-highest ridership per capita just behind New York. This, coupled with the world's continual convergence towards a mobile society makes this project a marketable and worthwhile endeavor.

POSITIONING

PROBLEM STATEMENT

The problem of	No mobile alternative to managing an Opus account.
Affects	Public transit users of the STM.
The impact of which is	Users will have to go out of their way to manage their Opus accounts
A successful solution would be	Create a system that would allow public transit users to manage and use their Opus card by a mobile device

PRODUCT POSITION STATEMENT

For	The Greater Montreal public transit users.
Who	Need a mobile alternative to the current Opus system, which may be managed online or via a mobile device.
Transit Droid	Is a mobile alternative that provides transit users with a mobile alternative in accessing and managing their Opus account?
That	Will provide public transit users with a way of using their Opus account directly from a mobile device, and also being able to manage the account from a web application.
Unlike	Using traditional Opus cards, which can only be refilled/managed at certain locations.

Our product	Will provide transit users with an alternative in using their Opus account on a mobile device and being able to manage their account from the comfort of their own home computer.
-------------	---

STAKEHOLDER DESCRIPTIONS

STAKEHOLDER SUMMARY

Name	Description	Responsibilities
Société De Transports De Montreal (STM)	The Montreal transit authority that administers the current Opus system in use for Montreal public buses and subways.	Ensures that there will be a market demand for Transit Droid 's features Ensures that the software will be given a test pilot to assess if it is an effective solution
Public Transit Users	The individuals that use the Opus system to access the Montreal public transit network.	To use the Opus system to access the Montreal public transit network. Purchase tickets or monthly passes in order to access the public transit system
Software Developers	Students from Concordia University's Software Engineering department that are undergoing the development of the Transit Droid pilot project.	Ensure that a quality software is implemented and tested that abides by the requirements and specifications of the software project and that such a project is completed in time and on budget.
Concordia University	The University that the Software Developers are currently completing their Capstone project at.	Ensures that the software developers have adequate workspace, hardware and software in order to complete the software project. Ensures that the Software Developers are given an adequate level of education in order to complete the project tasks successfully.

USER ENVIRONMENT

Currently, to complete the task of managing one's Opus account, there are at least two people required: the public transit user and the Opus ticket vendor. Managing an account at the present time consists of only purchasing new fare from a ticket vendor. This is usually a bus driver, a subway ticket clerk, or can even be a vendor at any place that sells Opus fare (ex: pharmacies).

The task of using the Opus card currently only involves the public transit user, who simply validates their card at various reader terminals in order to access the transit network.

The amount of time it takes to purchase Opus fare includes the time to travel to a destination that can sell the transit user the desired fare. This could change by giving the public transit user mobile anytime access to a web application in which they can purchase their Opus fare.

The proposed system will have a heavy mobile component, such that users will be able to manage their Opus accounts on their mobile devices or a web browser, and if the user's mobile device is NFC-enabled, they can also use their device to gain access into the public transit network.

Currently, the Opus system is operated on an RFID card platform that is validated by a reader at several entry points to the transit system. However, in an increasingly mobile world, future platforms would like to see the merging of the card technology with mobile devices so that public transit users can use their NFC enabled mobile devices to gain access to the Opus system. This being said, alongside Android, platforms such as Blackberry, iPhone and Windows Phone 8 should be considered for future releases.

Our application provides an alternative, not a replacement to the current Opus system; for users that would like to access the transit system via their NFC-enabled mobile device, and that would like to be able to manage their Opus account from anywhere they please.

PRODUCT OVERVIEW

PRODUCT PERSPECTIVE

The Transit Droid system will be designed to be a component of the much larger Opus system, which is the system that is currently being used by the STM. The goal of the Transit Droid system is to provide a cohesive ecosystem for end users to manage and use their Opus account from a mobile platform. The system under development seeks to minimize any modifications to the current Opus system, but rather interface with it to provide a mobile alternative to transit users that will use Transit Droid on their respective devices. The major entry point into the Opus system that Transit Droid will interface with will be namely the current terminal readers that are being used to process transit fare at transit locations (currently in buses and subways stations). Transit Droid will interface with the terminal reader in the same fashion as the current RFID Opus cards that are being used, although using the Near Field Communication (NFC) standard rather, to interact with the current system. The following block diagram illustrates this pictorially.

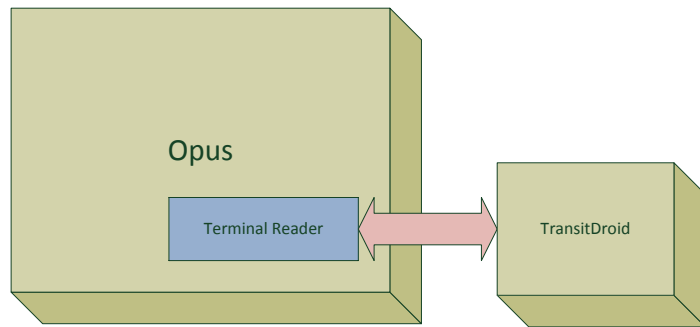


FIGURE 1-INTERFACING WITH EXISTING OPUS SYSTEM

ASSUMPTIONS AND DEPENDENCIES

The following table illustrates the assumptions and dependencies that the Transit Droid depends on in order to be completed. A change in the following assumptions will lead to a change in the current Vision document.

Assumptions	Dependencies
The Android operating system will be able to interface with the current terminal readers	NFC capabilities will interact similarly to current RFID capability
The STM will provide access to current encryption methods being used	Non-disclosure agreements must be filled out and returned in order to access sensitive, proprietary data
The system will be secure enough to be used by the STM	The STM must provide us with the current ISO standards it presently uses for security

NEEDS AND FEATURES

The following table illustrates the needs that Transit Droid is seeking to meet.

Need	Priority	Features	Planned Release
------	----------	----------	-----------------

To be able to use a mobile device to gain access to the public transit system	High	Android application that activates once passed near a terminal reader to process Opus fare	Q1 2013
To be able to manage an Opus account from a mobile device or web browser	High	Easily accessible interface for users to view and modify their Opus account	Q1 2013
To have a secure, encrypted system in place	High	ISO security standards that the STM uses	Q1 2013
To be able to purchase fare through a mobile medium	High	An 'Add fare to Opus account' option	Q1 2013
To be able to keep Opus account information private	Medium	A remote wipe feature on the mobile device that will erase the contents of the phone it is lost or stolen	Q2 2013
Be able to know when the next bus/metro is coming	Low	A 'View Schedule' feature on the mobile device	Q1 2013
Be able to know quickest way to a metro station	Low	A feature to geolocate the closest metro station to the user	Q2 2013
Being able to access Transit Droid in the language of choice	Medium	A user interface that has the option of changing the language	Q1 2013

ALTERNATIVES AND COMPETITION

Alternatives that are available to the STM is the use of a USB reader, which after connected to a computer and inserting an Opus card, will allow the user to manage their Opus card, such as to add additional fare. While this alternative does give the advantage of giving the end user a more convenient way to refill an Opus card (i.e. at the comfort of their own home), this comes with the disadvantages of having to rely on a tethered connection that can possibly have compatibility issues with some computers, when connecting (i.e. improper installation of drivers). This also does not provide the public transit user with a mobile alternative in managing their account, so that they may be able to manage their account with the use of a mobile device.

OTHER PRODUCT REQUIREMENTS

Other product requirements will be also required for this project. However, these will be more non-functional requirements that mainly pertain to:

- Security,
- Robustness
- Through-put.

These are all discussed in the supplementary specification artifact of the Transit Droid project.
