This thesis presents Virtual Signs (VS) as a tool to notify drivers on short notice about traffic related information. VS are push messages created in Siemens’ traffic management center Sitraffic® Concert, triggered via geofencing and displayed via an app on a mobile device. This thesis provides a comprehensive overview of the commercial, legal, technical and application-related aspects of the product. Based on results obtained from a questionnaire, the usability of the VS is evaluated. A critical discussion of the results shows that VS serve as a useful bridge technology until C2X is comprehensively implemented.

VS inform users about upcoming disturbances on their trips and warn of areas or locations where there is more attention required. The signs are generated in the traffic management system Sitraffic® Concert and as soon as the user passes a geographic trigger line the corresponding message will appear on the screen. The messages are based on traffic information from Concert and external data sources such as the police, weather services or the city administration. The aim of VS is, to supplement and to replace conventional static and variable message signs (VMS) with additional information about real-time and future traffic related events. VS can be an add-on to an existing mobility app of a city or this service can also be provided by a Siemens standardized app.

The geographic coordinates of the user are determined via GPS. Although, the user is localized, the coordinates will not leave the device for data security reasons. The app compares the coordinates with the positions of the trigger lines by means of a geofencing library. If a user crosses any trigger, he receives the corresponding message. This is even the case when the app is not opened in the foreground.

The added value and success of VS critically depends on the user’s understanding and acceptance of the app. Therefore, this work studied these aspects and evaluated the sign content and the usability of the mobile application. The main results of this usability analysis are as follows. As the results of the questionnaire show, there are still aspects that have to be enhanced. First, the textual content of the VS needs to be shortened. This is to ensure that the driver is distracted from the driving task to the least extent possible. In order to still guarantee the same level of information, a pictograph and a few related keywords should be provided. Second, the user settings should include the option to select different categories of VS which the user wants to receive. This setting extension would increase user-friendliness and user-acceptance to a large extent. Third, functional aspects of the app should be improved. This includes, for instance, the triggering of VS, the quality of the voice output and the switching into other operation modes, such as battery saving.