The world is rich in geographical information in the form of maps that are continuously subjected to change, especially in urban area. Therefore maps have to be update. This can be done using satellite images because the satellites that are in orbit now provide images with a resolution of up to 0.6 m. More are planned. Maps often include different information models which can make updating quite specific.

Satellite images can be processed manually or (semi) automatically using change detection and classification techniques. Change detection is comparing satellite images with one another or with maps in order to find the areas that have changed. Classification techniques are used to translate the image into a map. In this dissertation an overview of techniques is given. One of the major new developments that is addressed is object-orientation.

To study the results, data sets of Landsat 5 (30 m), ERS 1 (30 m) Ikonos (4 m) and PHARUS (4 m) were used. Landsat 5 and Ikonos are optical/infrared satellites, ERS 1 is a radar satellite. PHARUS is an airborne radar representing the future generation of radar satellites which is planned to be in orbit from 2005. The focus was on data of urban areas in the Netherlands.

Classification of the images was done using spectral intensities, texture and in one case rules based on the relation between adjacent objects. Non-parametric techniques were applied because most textures appeared to be non-Gaussian. The best performing texture measures were variance, weighted-rank fill ratio and semivariogram.

The classification accuracy of Landsat 5 was best (83 %) due to the high number of bands compared to the low number of classes. Second was ERS 1 (52 %). The textures improved classification but the result was not optimal due to one band, differences in class definitions, map deficiencies and a lack of land-cover information content. Third was the result of PHARUS (48 %) and fourth that of Ikonos (42 %). Although these figures were due to map deficiencies as well, classifying high-resolution imagery is apparently more difficult than classifying low-resolution images.

In case of the change detection experiments, pre-classification techniques are preferred to post-classification change detection, unless the classification is accurate enough.

The results achieved are indicative for what can be achieved in image classification and change detection today. Although the methods can be improved, more information is required in the map-updating process. Instead of using a single sensor, images from multiple sensors covering different parts of the spectrum can be applied. Another possibility is to include information from the map that has to be updated. Map updating may not become fully automatic, but the job of a human operator can be made easier using the techniques investigated in this dissertation.