SOFTWARE REQUIREMENTS SPECIFICATION

for

Automatic Creation of Fiber Netwoks Synoptics

Version 1.0

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1 Introduction

1.1 Purpose

In planning, construction and maintenance of network infrastructure is imperative that numerous project files be created. Amidst such files, a georeferenced map of the infrastructure's future layout in the desired terrain is created as well as multiple configuration tables. The georeferenced is created using *"Computer Aided Design" (CAD)* tools and it must be then converted to a logical representation of the same network infrastructure in a *CAD* diagram known as a Networks Synoptic map. This map is required for the acquisition of appropriate licensing and also for for future consultation of the network's devices, resources and existing connections for update or maintenance. This conversion from georeferenced map to Network Synoptics map is currently performed manually thus being subject to human error and being slow and time consuming.

1.2 Intended Audience and Reading Suggestions

An application for the automation of creation and update of Fiber Networks Synoptics maps is targeted and intended for numerous companies who are responsible for the construction of network infrastructures as well as it's update and maintenance.

1.3 Project Scope

Before a network's layout and infrastructure is designed, a detailed survey must be done in order to understand the targeted area's necessities and other existing infrastructures that may need be used in later stages, tis task is performed by teams in the terrain.
With the information gathered by the surveys, the team responsible for infrastructure design and project is then able to create a georeferenced map, wich displays the desired network layout and infrastructure over the geographic map of the area.
Georeferenced maps are large and complex and misses crual information making it impractical for consultation purposes, thus a Syoptics map is created wich displays the network in a logical diagram, containing all the devices and connections according to the georeferenced map and also is completed with adicional information such as device specific details and other types of data.
Networks Synoptics map is then used by maintenance teams in the terrain and used for license acquisition.
As described above, all the tasks are interconnected and each depend on other tasks, tis notion of relationship can be observed in the following Domain Model Diagram.

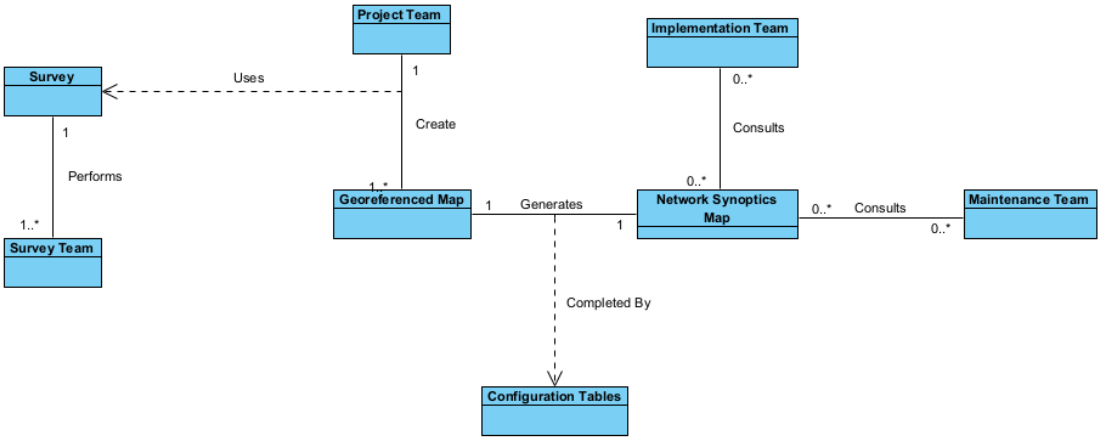

Figure 1.1: Domain Model for Fiber Networks Synoptics

2 Overall Description

2.1 Product Perspective and Functions

The automation of Network Synoptics map creation processes aims to reduce overall time consumption as well as human error while retaining the adaptability to change.

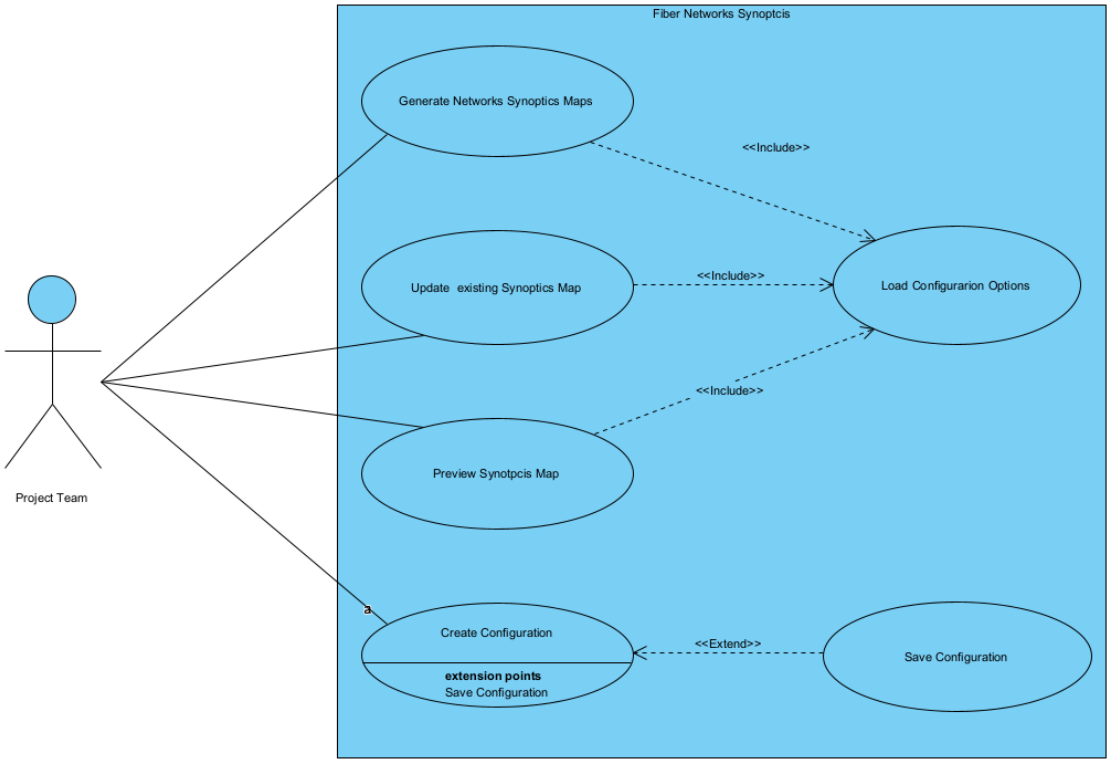

Figure 2.1: Use Case Diagram for Fiber Networks Synoptics

As seen above, a multitude of tasks can be performed, each performing a different action, with some tasks depending on, or using the result of other tasks. The use cases go as follows:

1. A new networks synoptics map of a specific georeferenced map can be generated, given a conversion settings configuration.

2. An Existing synoptics map can be updated, given a number of configuration tables

pertaining to devices and connections represented on the synoptics map, given a conversion settings configuration.

3. The resulting synoptics map of a georeferenced map can be previewed for validation of the georeferenced map, given a conversion settings configuration.

4. Conversion settings configurations can be created and saved so the conversion process is dynamic and can adapt to possible changes in networks infrastrucures creation procedures, changes in laws and regulations as well as being able to adapt to different *ISP*.

5. Configurations can be saved for further use, and loaded before a conversion is performed.

2.2 Operating Environment

The application will run mainly on desktop environment on windows operating system. No internet connection is directly required for use of this application.

3 System Features

"Fiber Networks Synoptics" aims for the automatic creation and update of Networks Synoptics maps, thus most of it's features and requirements pertain to such task and aim to perform it in the most versatile, efficient and yet user friendly way possible.

3.1 Description and Priority

"Fiber Networks Synoptics" features ordered form those with the most priority to those with least priority.

1. Converting an existing georeferenced map in it's respective networks synoptics map.
2. Updating an existing networks synoptics with the contents from configuration table files.
3. Configuration of the conversion parameters.
4. Saving and loading configurations.

3.2 Functional Requirements

Number	**Name**	**Description**	**Valid. Method**	**Valid. Entity**
FR.01	Georeferenced Map Loading	Must be possible to load a georeferenced map in the form of a *.DWG* or *.DXF CAD* file.	Manual testing.	Proef
FR.02	Primary Synoptics Map Generation	Must be able to generate synoptics maps related to a loaded georeferenced map.	Direct comparison between synoptics maps obtained from the system and manually created ones for the same georeferenced maps.	Proef

FR.03	Secondary Synoptics Maps Generation	For each *JSO* type block on a georeferenced map, the application must be able to generate one secondary synoptics map.	Direct comparison between secondary synoptics maps generated by the application and manually created ones based on the same georeferenced map.	Proef
FR.04	Synoptics Map Update	System must be able to update a synoptics map with information from Microsoft Excel *.XLSX* files given by the user.	Direct comparison between synoptics maps updated by the system and manually updated ones.	Proef
FR.05	Synoptics Map Generation Preview	System must be able to create a preview of a synoptics map generation for a given georeferenced map.	Direct comparison between a preview and a map previously generated.	Dev. Team
FR.06	Conversion Rules Cofigurability	It must be possible to change the conversion rules for every conversion.	Comparing synoptics maps obtained from differently natured georeferenced maps and comparing the results to manually created ones.	Proef
FR.07	Changing Block Names	Must be possible to process different block names for similar structures for georeferenced maps.	Analysing the resulting conversions of different georeferenced maps.	Proef
FR.08	ISP Adaptability	System must be able to handle georeferenced maps and synoptics form different ISP.	Analysing the resulting conversions of different georeferenced maps.	Proef
FR.09	Configuration Table Generation	Create a configuration table for each *Splitting Junction* type block of a georeferenced map.	Exhaustive testing for each possible georeferenced map type.	Dev. Team
FR.10	Automated Link and Splitter allocation	Each configuration table, in *.XLSX* format, must be filled according to optimization rules and performance targets, given the base information of that specific *Splitting Junction* block.	Exhaustive testing for each possible georeferenced map type.	Dev. Team

FR.11	Link Table Generation	Upon the creation of all synoptics maps, for a given georeferenced map, a link table must be created containing information regarding the optical cables that arrive and depart the *Optical Splitting Junction*.	Exhaustive testing for each possible georeferenced map type.	Dev. Team

4 Nonfunctional Requirements

4.1 Usability, Performance and System Requirements

This application is going to be used by a wide array of people with differing skills and expertise, thus the need for a easy and friendly user interface arises. It is assumed that every user of this application as prior knowledge regarding georeferenced maps and synoptics maps, as well as knowledge regarding network infrastructures projects. The description and targets for usability requirements can be represented in the following table.

Number	**Name**	**Description**	**Valid. Method**	**Valid. Entity**
NR.01	Synotpics Generation Usability	An unexperienced user must be able to generate a new synoptics map from any type of georeferenced map in under 3 minutes without the need for external guidance, other than the user's manual.	Acceptance testing	Proef
NR.02	Configuration File Editing Usability	A user with prior knowledge in networks infrastructures projects must be able to create a correct configuration file for a given *ISP* in under 10 minutes.	Acceptance Testing	Proef
NR.03	Synoptics Generation Performance	The functional requirement **2**, **3**, **9**, **10** and **11** must be all performed in under 3 seconds after the generation begins.	System Testing	Dev. Team
NR.04	Configuration File Size	The size of configuration files must be less than 4 MB.	System Testing	Dev. Team