

# Planning and implementation of a measurement campaign to settle the handover functionality in an indoor GSM network

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# Introduction

- In GSM networks outdoor coverage and services are well managed today
- The high growth of capacity demand had led to a need to build up indoor networks
- Indoor environment is totally different from outdoor environment:  
Propagation circumstances; smaller cells than in normal outdoor network; cells are layered in three dimensions
- A remarkable part of the indoor network management is associated with the handover management
- A handover measurement campaign shall be organised to clarify the handover functionality
- The background for this thesis was the fact that till now exists only little documentation, which concentrates on the planning process of an indoor handover measurement campaign

## Introduction (continued)

- Scope of thesis

The topic of this study is to find the important milestones of a handover measurement campaign planning process for an indoor environment and to find the corner stones for a successful campaign.

## Presentation of the method

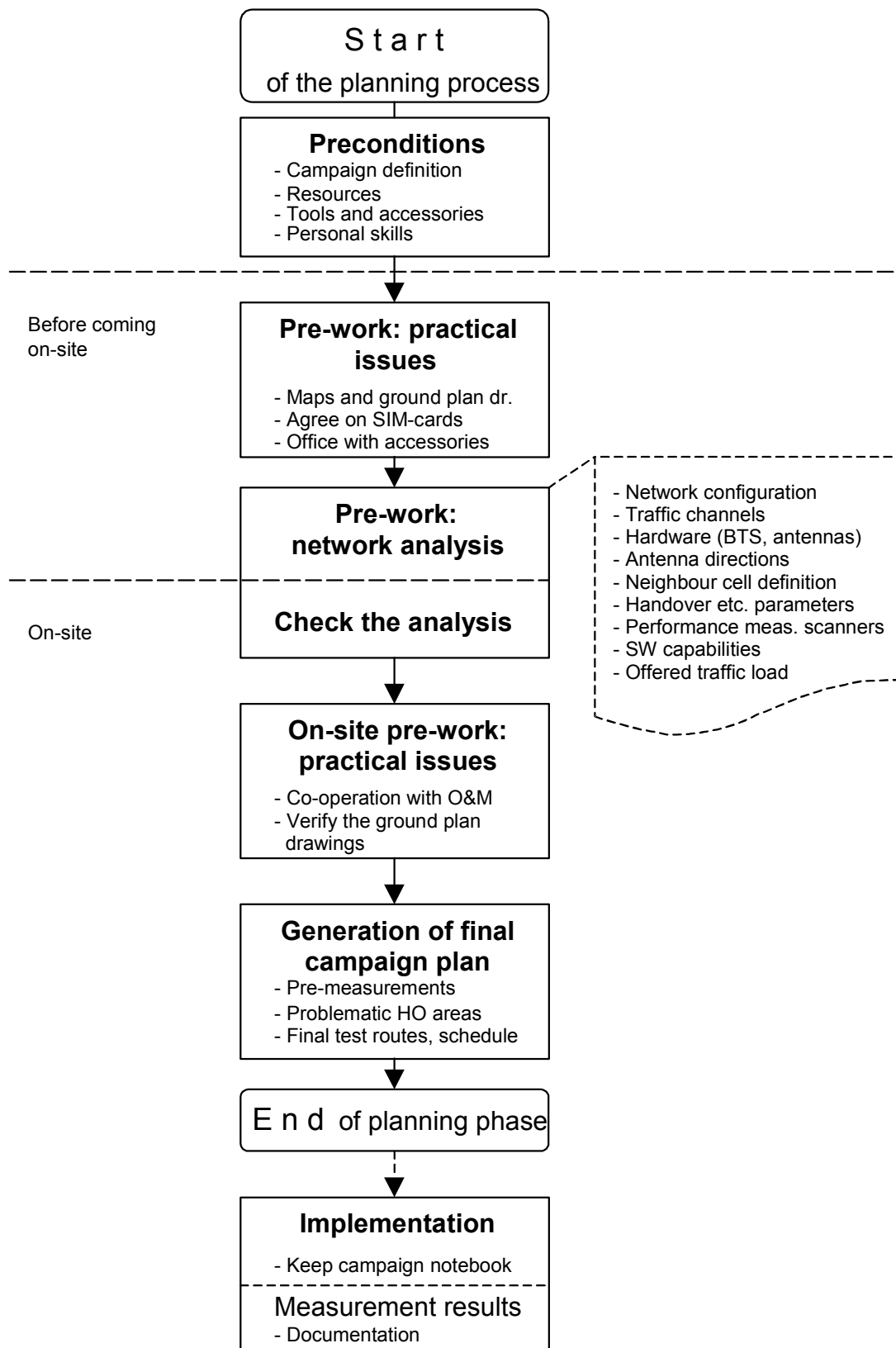
- The study was done by performing the plan for a real handover measurement campaign as a part of an indoor GSM trial
- After the implementation of the measurement campaign, the planning process account of the campaign was verified
- The final account of the planning process was made including the most important milestones

# Results

The planning process of a handover measurement campaign is described in thesis

- The planning process can be divided into the following main phases
  - Preconditions of a measurement campaign
  - Practical pre-work
  - Network pre-analysis before coming to the campaign site
  - On-site check of the analysis
  - Interpretation of the network analysis
  - Pre-measurements
  - Generation of the final measurement campaign plan
- A block diagram of the planning process is shown
- A check list of the handover measurement campaign planning process was generated and it is shown in thesis

# Planning process of an indoor handover measurement campaign



## Own contribution

- The pre-analysis of an indoor GSM field trial network was performed (and the on-site check of it)
- The handover measurement campaign plan was generated
- The campaign plan was executed in a hard partitioned high rise building
- The implementation phase was evaluated
- The planning process was verified and the corner stones of a campaign were studied



# Conclusions

The most important milestones in a planning process are:

- Preconditions of a successful campaign:
  - Campaign definition
  - Measurement tool choice
- The precise network analysis:
  - Analysis before coming to the campaign site
  - On-site verification of the network analysis
  - Importance of the network's visualisation
  - Co-operation with O&M personnel (this includes the agreement concerning the division of the daily measurement period versus the maintenance period)
- Well-planned pre-measurement routes
- A realistic campaign schedule

## Further investigations

- Planning process should be investigated in a trial based on the basic GSM network structure and the basic software
- How the results of this study are applicable into different network scenarios? An interesting subject could be a hierarchical network structure consisting of both indoor and outdoor cells / Impact on the planning process
- Investigations concerning the work effort in a certain part of the campaign planning process / Impact on a campaign schedule
- What is the possible impact of a GPRS network with packet service for the planning process?