



Mobitex Service Catalogue



The contents of this document are subject to revision without notice due to continued progress in methodology, design, and manufacturing.

Mobitex Technology AB shall have no liability for any error or damage of any kind resulting from the use of this document.

Mobitex is a registered trademark of Mobitex Technology AB.

Contents

1	Introduction.....	3
2	Network Implementation Packages	4
2.1	Turn-key Network Implementation.....	4
2.2	Mobitex Network Start-up Service	6
3	Implementation Services	7
3.1	Installation BRU1	7
3.2	Installation BRU3.....	9
3.3	Installation MX	11
3.4	Installation NCC.....	13
3.5	Installation Alternative NCC.....	15
3.6	Installation IAS.....	16
3.7	System Acceptance Test.....	18
3.8	System Acceptance Optional Feature	19
3.9	System Acceptance Test E2E Solution	20
3.10	Network Configuration	21
4	Consultancy Services	22
4.1	Project Management	22
4.2	Network Design	24
4.3	Cell Planning for Network Optimization	26
4.4	Application Development & Design Support.....	28
5	Support and Maintenance Services	30
5.1	Support Services from Installation to Final Acceptance	30
5.2	Network Operation Service.....	32
5.3	Network Audit	34
5.4	Software Upgrade Support	36
5.5	On-site Support	38
5.6	Remote Network Diagnostics	40

1 Introduction

The data and telecommunications industry today is characterized by intensified and escalating service requirements. Customers who find themselves in a highly competitive market are becoming increasingly aware of the need of long-term efficient and cost-effective support services that provide not only system reliability, but also serve as a protection of investments. Mobitex Technology provides these services.

The Mobitex Service Catalogue includes several services which can be categorized into *Implementation Services*, *Consultancy Services* and *Maintenance & Support Services*. The services are available both for new implementation projects and for existing Mobitex Customers.

All services are performed by Mobitex Technology specialists for the specific task, which has obtained great experience from several Mobitex Customers and various network setups all around the world. The services presented may very well be customized to become tailored-to-fit solutions that match specific Customer needs and in-house skill.

Mobitex Technology also offers a wide range of training courses for managers, operations and engineering staff, system integrators, as well as System Overview courses for sales staff. Courses are held in Sweden or at the customer premises. The training courses are described separately in the *Mobitex Training Catalogue (3/2249-FGA 101 11)*.

2 Network Implementation Packages

2.1 Turn-key Network Implementation

FAF 102 19

The Mobitex Technology “Turn-key Network Implementation” service gets the Customers network solution in service faster, with an assured quality, and at minimal risk and cost. Mobitex Technology takes full responsibility for installation, integration and commissioning of Mobitex equipment and delivers a fully tested and fully operational network at a pre-defined date.

Contents

This service has been designed to cope with the complex task of implementing a mobile data network like Mobitex. The service is a package, including the following services:

- Project Planning
- Site Engineering
- Supply
- Installation Logistics and Transportation
- NCC Installation & Commissioning
- Switch Installation & Commissioning
- Base Station Installation & Commissioning
- Network Configuration
- E2E application Installation & Commissioning
- Network Integration
- System Acceptance

The service is often tailored for a particular network solution and the specific needs of the Customer.

Benefits

- Rapid and high quality implementation to get solutions in service as soon as possible, which gives the Customer revenues earlier.
- Fewer vendor interfaces.
- Minimal need for the Customer to obtain resources, skills and knowledge for the planning and building of a mobile data network, leaving more time and resources to focus on commercial preparations for the launch of the mobile data service.
- Tried and proven methodology for the installation and interconnection of network elements, without costly mistakes.

- Access to world-wide Mobitex Technology's skilled personnel and world-wide experience of projects in other markets.

Requirements

Site acquisition and preparations, civil works, as well as the supply of the distribution network are excluded from this service.

2.2 Mobitex Network Start-up Service

FAF 901 474

The Mobitex Network Start-up Service consists of several services related to the implementation of a Mobitex system in a Customer environment. This service is a bundle of different services packaged together to get the most out of an implementation project.

Contents

The Mobitex Network Start-up Services is a bundle of different services packaged together to get the most out of an implementation project. It includes the following services:

Site Installation and Commissioning

Mobitex Technology will perform a professional installation and commissioning of the Mobitex hardware and software according to the instructions for product installation. As part of the commissioning the base station is integrated into the Mobitex network and put into operation.

Installation and commissioning is provided for the following equipment:

- One BRU (FAF 901 467 alt. FAF 901 466, see section 3.1 alt. 3.2)
- One MX (FAF 901 468, see section 3.3)
- One NCC (FAF 901 493, see section 3.4)

System Acceptance Test

The included System Acceptance Test service offers execution of a package of functional tests, with the purpose to demonstrate that the functionality of the installed Mobitex Network System is in accordance with the functional specification. See section 3.7 (FAF 901 487) for a more detailed description.

Project Management

The Mobitex Technology Project Management service provides the Customer with a skilled and experienced Project Manager when a Mobitex implementation project is to be carried out.

The Project Manager plans, leads, follows up and reports on all implementation services provided in order to ensure Customer satisfaction and project completion within the agreed timeframe.

The included Project Management service is limited to maximum two man weeks or networks with <15 base stations. For additional project management, please refer to section 4.1 (FAF 901 473).

3 Implementation Services

3.1 Installation BRU1

FAF 901 467

Mobitex Technology will perform a professional installation and commissioning of the Mobitex hardware and software according to the instructions for product installation. As part of the commissioning the base station is integrated into the Mobitex network and put into operation.

Contents

Installation:

Mobitex Technology will unpack the BRU1 and Site Documentation ("C module") at the site, check the articles received against the Equipment Lists, and see to it that no parts are damaged or missing.

A Site Inspection is performed to make sure that the site has been prepared according to the Site Requirements documentation. Items checked are e.g., power supply, A/C, heater and network connection. The inspection is documented in a Site Inspection Protocol. Mobitex Technology issues a Site Acceptance certificate for an approved site.

After a site has been approved, an installation will be performed in accordance with the Installation Instructions for the equipment. Mobitex Technology provides necessary installation tools and material, with an exception for the items listed in the "Site Requirements" chapter of the BRU1 manual.

Commissioning:

Following an approved Installation, a complete hardware- and software commissioning in accordance with the commissioning procedures will be performed to ensure that the base station is working according to the specifications. A number of measurements/ tests are performed, like:

- Power tests
- Transmitter frequency measurement
- Receiver traffic tests
- Alarm overview
- Commissioning the computer
- Network Operation tests

Test tools like RF Attenuator, Multimeter, RF Power Meter, Frequency counter, test software and test cabling will be provided by Mobitex Technology personnel.

If necessary, trouble-shooting will be performed on installed Mobitex equipment and faults will be corrected until it is certain that the equipment has the specified functionality. If necessary, replacement of hardware will be included.

The Customer receives commissioning documentation, which includes the Commissioning Test Record. This record lists all measurements (including values) and tests performed. After a successful Node Commissioning, the Customer issues a "Node Acceptance Certificate".

Benefits

- An installation performed by a professional and certified Mobitex Technology engineer, is the best way to guarantee quality and minimize installation time.
- Costly operational problems due to faulty installations are avoided.
- Commissioning, which is performed by a professional organization specialized in data and radio communication, will ensure the best conditions for the future operation of the system.
- Minimized commissioning time, which provides the Customer with a network that can quickly be put into operation.
- The hardware is properly tested and documented. This makes it easier to find faults when the network is in operation.
- The equipment will be functional and operate in accordance with specifications.
- Training of the Customer personnel is not initially necessary. They can be recruited and trained as requested.

Requirements

- All criteria and obligations regarding Mobitex Site Requirements have been fulfilled and checked in a Site Inspection. The site shall be prepared with power supply, power cable and any external data communication equipment.
- Before the installation work may begin, the Customer should supply all required information and fulfill all pre-installation obligations as agreed between the Customer and Mobitex Technology.
- The Customer must allow Mobitex Technology's personnel access to the site on a specified date, in order to perform the commissioning.

3.2 Installation BRU3

FAF 901 466

Mobitex Technology will perform a professional installation and commissioning of the Mobitex hardware and software according to the instructions for product installation. As part of the commissioning the base station is integrated into the Mobitex network and put into operation.

Contents

Installation:

Mobitex Technology will unpack the BRU3 hardware, Installation Kit and Site Documentation ("C module") at the site, check the articles received against the Equipment Lists, and see to it that no parts are damaged or missing.

A Site Inspection is performed to make sure that the site has been prepared according to the Site Requirements documentation. Items checked are e.g. antenna connection, grounding, power supply, A/C, heater and network connection. The inspection is documented in a Site Inspection Protocol. Mobitex Technology issues a Site Acceptance certificate for an approved site.

After a site has been approved, an installation will be performed in accordance with the Installation Instructions for the equipment.

Mobitex Technology provides necessary installation tools and material, with an exception for the items listed in the "Site Requirements" chapter of the BRU3 manual.

Commissioning:

Following an approved Installation, a complete hardware- and software commissioning in accordance with the commissioning procedures will be performed to ensure that the base station is working according to the specifications. A number of measurements/ tests are performed, like:

- Power tests
- Transmitter frequency measurement
- Receiver traffic tests
- Antenna tests
- Alarm overview
- Commissioning the computer
- Network Operation tests

Test tools like RF Attenuator, Multimeter, RF Power Meter, Frequency counter, test software and test cabling will be provided by Mobitex Technology personnel.

If necessary, trouble-shooting will be performed on installed Mobitex equipment and faults will be corrected until it is certain that the equipment has the specified functionality. If necessary, replacement of hardware will be included.

The Customer receives commissioning documentation, which includes the Commissioning Test Record. This record lists all measurements (including values) and tests performed. After a successful Node Commissioning, the Customer issues a "Node Acceptance Certificate".

Benefits

- An installation performed by a professional and certified Mobitex Technology engineer, is the best way to guarantee quality and minimize installation time.
- Costly operational problems due to faulty installations are avoided.
- Commissioning, which is performed by a professional organization specialized in data and radio communication, will ensure the best conditions for the future operation of the system.
- Minimized commissioning time, which provides the Customer with a network that can quickly be put into operation.
- The hardware is properly tested and documented. This makes it easier to find faults when the network is in operation.
- The equipment will be functional and operate in accordance with specifications.
- Training of the Customer personnel is not initially necessary. They can be recruited and trained as requested.

Requirements

- All criteria and obligations regarding Mobitex Site Requirements have been fulfilled and checked in a Site Inspection. The site shall be prepared with power supply, antenna installation and any external data communication equipment.
- Before the installation work may begin, the Customer should supply all required information and fulfill all pre-installation obligations as agreed between the Customer and Mobitex Technology.
- The Customer must allow Mobitex Technology's personnel access to the site on a specified date, in order to perform the commissioning.

3.3 Installation MX

FAF 901 468

Node Installation - MX is a Mobitex Technology service that will install the Mobitex hardware and software according to the Mobitex Technology instructions for product installation.

During the Commissioning of an MX Area Exchange, the hardware- and software functions of the installed Mobitex equipment are verified by performing measurements according to the Mobitex Commissioning procedures. As part of the service the MX is integrated as a MOX or MHX into the Mobitex network and put into operation.

Contents

Installation:

Mobitex Technology will unpack the MX hardware, Installation Kit and Site Documentation (Module C) at the site, check the articles received against the Equipment Lists, and see to it that no parts are damaged or missing.

A Site Inspection is performed to make sure that the site has been prepared according to the Site Requirements documentation for MX. Items checked are e.g. grounding, power supply, cable ladder and network connection. Mobitex Technology will issue a Site Acceptance certificate for an approved site.

A complete installation will be performed in accordance with the installation instructions for the equipment. This involves e.g.:

- Connection of ground
- Connection of power supply
- Connection of modem cables
- Installation of a Backbone Inter-working Unit (BIU) if applicable.

Commissioning:

Following the installation, a complete hardware- and software commissioning in accordance with the commissioning procedures will be performed to ensure that the area exchange is working according to the specifications. Examples of activities performed are:

- Strap and switch settings
- Power tests
- Hardware Alarm tests
- Software Installation
- Commissioning the computer
- Network Operation tests

Test tools like Multimeter, portable PC and software, Portable Hard Disk Unit (PDU) will be provided by the Mobitex Technology personnel.

If necessary, trouble-shooting will be performed on installed Mobitex equipment and faults will be corrected until it is certain that the equipment has the specified functionality. If necessary, replacement of hardware will be included.

The Customer receives commissioning documentation, which includes the Commissioning Test Record. This record lists all measurements (including values) and tests performed. After a successful Node Commissioning, the Customer issues a "Node Acceptance Certificate".

Benefits

- An installation performed by a professional and certified Mobitex Technology engineer, is the best way to guarantee quality and minimize installation time.
- Costly operational problems due to faulty installations are avoided.
- Commissioning, which is performed by a professional organization specialized in data and radio communication, will ensure the best conditions for the future operation of the system.
- Minimized commissioning time, which provides the Customer with a network that can quickly be put into operation.
- The hardware is properly tested and documented. This makes it easier to find faults when the network is in operation.
- The equipment will be functional and operate in accordance with specifications.
- Training of the Customer personnel is not initially necessary. They can be recruited and trained as requested.

Requirements

- All criteria and obligations regarding Mobitex Technology Site Requirements have been fulfilled and checked in a Site Inspection.
- Before installation work may begin the Customer should supply all the required information and fulfill all pre-installation obligations as agreed between Mobitex Technology and the Customer.
- The Customer must allow Mobitex Technology's personnel access to the site on a specified date, in order to perform the installation.

3.4 Installation NCC

FAF 901 493

The Mobitex Technology service Installation NCC includes a full-scale installation or upgrade of Mobitex software in the NCC (Network Control Centre) and results in an operational NCC that is connected with the Mobitex network.

Contents

Prior to a first-time installation, the NCC hardware and its operating system will be checked and documented in an Inspection Protocol, to see if the platform for the NCC software complies with the requirements.

Mobitex Technology will install new software in the Network Control Centre (NCC) and connect it to the Mobitex switching nodes, provided that a top node has been installed. All work will be documented in the Site Documentation for NCC (C module).

The following activities are carried out during the installation/commissioning:

- Adjustment of VMS system parameters
- Definition and connection of peripheral units
- Installation of the NCC Database software
- Installation of all NCC software products
- Configuration of the NCC
- Verification of NCC to top node connection
- Definition of NCC users
- Disk back-up
- Functional checks of each NCC application and process.

In the case of a major Mobitex system software upgrade some of the above listed activities may not be applicable, while others may be more important, like the preservation of existing network configuration- and subscriber data.

Benefits

- A software installation conducted by a professional organization, with the necessary NCC platform (e.g. Alpha/Open VMS) and Mobitex skills, will assure the best conditions for future operation of the system.
- Minimized installation time, which provides the Customer with a network which can quickly be put into operation.
- Training of the Customer personnel is not initially necessary. They can be recruited and trained as requested.
- Operational errors due to faulty installations are kept at a minimum.

Requirements

- The Customer must allow Mobitex Technology's personnel access to the site on a specified date, in order to perform the installation.
- If the NCC platform (hardware and operating system) has not been purchased through Mobitex Technology, the Customer is responsible for the platform to comply with the NCC System Hardware and System Software requirements described in the Material List. This means that the hardware and its operating system must have been installed and be operational.
- The site complies with the Site Requirements NCC documentation.

3.5 Installation Alternative NCC

FAF 901 469

The Mobitex Technology service Installation Alternative NCC includes a full-scale installation of a Mobitex Alternative NCC (Network Control Centre) and results in a highly redundant NCC environment that is connected with the Mobitex network and configured for physical redundancy in case of the ordinary NCC server fails or is taken down for maintenance.

Contents

The Installation Alternative NCC includes a full installation of NCC hardware and software as described in section 3.4 Installation NCC.

After the installation the Mobitex system will be configured for easy fall-over from the ordinary to the alternative NCC in case the ordinary NCC fails or is taken down for maintenance.

The activities performed include the activities done during a normal "NCC Installation" with the addition of parameters for the Alternative NCC functionality.

Benefits

- A software installation conducted by a professional organization, with the necessary NCC platform (e.g. Alpha/VMS) and Mobitex skills, will assure the best conditions for future operation of the system.
- Minimized installation time, which provides the Customer with a network that can quickly be put into operation.
- Operational errors due to faulty installations are kept at a minimum.

Requirements

- The Customer must allow Mobitex Technology's personnel access to the site on a specified date, in order to perform the installation.
- If the NCC platform (hardware and operating system) has not been purchased through Mobitex Technology, the Customer is responsible for the platform to comply with the NCC System Hardware and System Software requirements described in the Material List. This means that the hardware and its operating system must have been installed and be operational.
- The site complies with the Site Requirements NCC documentation.

3.6 Installation IAS

FAF 102 48

Installation IAS is a Mobitex Technology service that will install the Mobitex hardware and software according to the Mobitex Technology instructions for product installation. As part of the commissioning the IAS is integrated into the Mobitex network and put into operation.

Contents

Prior to a first-time installation, the IAS hardware and its operating system will be checked and documented in an Inspection Protocol, to see if the platform for the IAS software complies with the requirements.

Mobitex Technology will install the hardware and operating system according to SUN and Solaris installation routines.

The IAS software will be installed. If SNMP management applications are available, the IAS will be setup to send SNMP trap alarms to the SNMP management station.

Finally the IAS will be connected to a Mobitex switching node.

Following the completed installation a short demonstration of the IAS functionality will be performed. (Requires that a FST is configured in the Mobitex network).

Benefits

- A software installation conducted by a professional organization, with the necessary IAS platform (SUN/Solaris) and Mobitex skills, will assure the best conditions for future operation of the system.
- Minimized installation time, which provides the Customer with a network that can quickly be put into operation.
- Operational errors due to faulty installations are kept at a minimum.

Requirements

- The Customer must allow Mobitex Technology's personnel access to the site on a specified date, in order to perform the installation.
- If the IAS platform (hardware and operating system) has not been purchased through Mobitex Technology, the Customer is responsible for the platform to comply with the IAS System hardware and System Software requirements.
- Cables between the IAS and the MOX. If agreed, standard cables between the IAS and MOX may be included.

For optional tests, the following is required

- FST and MOB terminals defined in SAM.
- FST connections defined in NMS Client and activated in the MOX.
- 2 computers to run the IAS Host Example application on (preferably laptops). The application requires Java 2 run-time software.
- A radio modem (or an existing IAS installation) to use for FST to mobile terminal testing.

3.7 System Acceptance Test

FAF 901 487

The “System Acceptance Test” service offers execution of a package of functional tests, with the purpose to demonstrate that the functionality of the installed Mobitex Network System is in accordance with the functional specification.

Contents

The generic System Acceptance Test proceedings are always a part of the Network Implementation process. It results in a state where Customer and Mobitex Technology jointly have ascertained the installed network functionality and where a “System Acceptance Certificate” can be signed.

Mobitex Technology will prepare a tailored “Acceptance Handbook” that fits the target network and includes test for the functions to be covered. This handbook is approved by the Customer.

After preparation of the test environment Mobitex Technology personnel will thereafter, together with Customer personnel, perform the tests according to the Handbook. Each test result will be documented in an Acceptance Test Record. Each deviation from the expected result will be documented in a System Problem Report. After completion of the tests, the results will be evaluated and presented in a Completion Report.

The time scope for the tests depends on the customer network site features.

External gateways, applications, end-user equipment or performance tests are not included in this service.

Benefits

- Different end-user services will be run trough by the Customer and Mobitex Technology to ensure that their functionality meets the requirements and that they are ready for use by the end-user.
- Any faults will be detected and corrected before any commercial Customers do.

Requirements

- The Customer must allow Mobitex Technology's personnel access to the NCC and network during the week(s) of execution of this service. During this period the network is assumed to be completely available to the Mobitex technology personnel performing the service.
- The Customer is obliged to issue Node Acceptance Certificates for each network node that is part of the Network Test Configuration where this service will be performed.

3.8 System Acceptance Optional Feature

FAF 901 470

The “System Acceptance Test Optional Feature” service offers execution of a package of functional tests for selectable software options, with the purpose to demonstrate that the functionality is in accordance with the functional specification.

Contents

The Customer may select optional features that will be commissioned separately, for example for software options not included in the generic System Acceptance Test (FAF 901 487) or after new functionality has been installed in the network and is about to be used commercially.

It results in a state where Customer and Mobitex Technology jointly have ascertained the installed network functionality and where a “System Acceptance Certificate” can be signed.

Mobitex Technology will prepare a tailored “Acceptance Handbook” that fits the selected features and includes test for the functions to be covered. This handbook is approved by the Customer.

After preparation of the test environment Mobitex Technology personnel will thereafter, together with Customer personnel, perform the tests according to the Handbook. Each test result will be documented in an Acceptance Test Record. Each deviation from the expected result will be documented in a System Problem Report. After completion of the tests, the results will be evaluated and presented in a Completion Report.

Benefits

- Different end-user services will be run through by the Customer and Mobitex Technology to ensure that their functionality meets the requirements and that they are ready for use by the end-user.
- Any faults will be detected and corrected before any commercial Customers do.

Requirements

- The Customer must allow Mobitex Technology's personnel access to the NCC and network during the week(s) of execution of this service. During this period the network is assumed to be completely available to the Mobitex Technology personnel performing the service.
- The Customer is obliged to issue Node Acceptance Certificates for each network node that is part of the Network Test Configuration where this service will be performed.

3.9 System Acceptance Test E2E Solution

FAF 901 471

The “System Acceptance Test E2E Solution” service offers execution of a package of functional tests of the entire Mobitex based end to end solution, including application and devices, with the purpose to demonstrate that the functionality is in accordance with the functional specification.

Contents

The generic System Acceptance Test proceedings are part of the Network Implementation process, which results in a state where Customer and Mobitex Technology jointly have ascertained the installed Mobitex solution and where a “System Acceptance Certificate” can be signed.

Mobitex Technology will prepare a tailored “Acceptance Handbook” that fits the target network and applications and includes test for the functions to be covered. This handbook is approved by the Customer.

After preparation of the test environment Mobitex Technology personnel will thereafter, together with Customer personnel, perform the tests according to the Handbook. Each test result will be documented in an Acceptance Test Record. Each deviation from the expected result will be documented in a System Problem Report. After completion of the tests, the results will be evaluated and presented in a Completion Report.

Benefits

- Different end-user services will be run trough by the Customer and Mobitex Technology to ensure that their functionality meets the requirements and that they are ready for use by the end-user.
- Any faults will be detected and corrected before any commercial Customers do.

Requirements

- The Customer must allow Mobitex Technology's personnel access to the NCC and network during the week(s) of execution of this service. During this period the network is assumed to be completely available to the Mobitex Technology personnel performing the service.
- The Customer is obliged to issue Node Acceptance Certificates for each network node that is part of the Network Test Configuration where this service will be performed.

3.10 Network Configuration

FAF 901 494

The Network Configuration Service offers configuration of new network entities such as switches and base stations in the NCC. Mobitex Technology personnel will ensure correct configuration for the specific network setup.

Contents

The service includes configuration of network nodes in the NCC based on a network architecture plan provided by the Customer. Below follows example of configurations that are made:

- Add Base Stations and Switches in the NCC database.
- Configuration of I/O units and ports for MOX.
- Configuration of connections between Base Stations and MOX.
- Configuration of alternative connections (if available).
- Configuration of Host connections to MOX (if available)
- Configuration of X.25 parameters.
- Configuration of Radio Parameters for Base Stations.
- Configuration of neighbor list for Base Stations.
- Configuration of flow control and congestion control parameters.
- Configuration of base groups (if available)
- Generation of configuration files for the network nodes.

Benefits

- Minimized installation time, which provides the Customer with a network which can quickly be put into operation.
- Training of the Customer personnel is not initially necessary. They can be recruited and trained as requested.
- Operational errors due to faulty installations are kept at a minimum

Requirements

- The Customer must allow Mobitex Technology's personnel access to the NCC and network during execution of this service. During this period the network is assumed to be completely available to the Mobitex Technology personnel performing the service.

4 Consultancy Services

4.1 Project Management

FAF 901 473

The Mobitex Technology Project Management service provides the Customer with a skilled and experienced Project Manager when a Mobitex implementation project is to be carried out.

The Project Manager plans, leads, follows up and reports on all implementation services provided in order to ensure Customer satisfaction and project completion within the agreed timeframe.

Contents

The Mobitex Technology Project Management service ensures a smooth, fast and business oriented Mobitex implementation project. The Customer can minimize investments in project management skills and benefit from the solution experience the Project Manager has developed working with Mobitex implementations.

The Project Management service gives the Customer a resource that can lead a project from beginning to end. The service can be split into three different phases:

1. *Preparation phase* - Formulate and communicate project goals and create a project team. Analyze implementation risks and take action to minimize them. Estimate and allocate time and resource requirements. Prepare and communicate all project documents. Communicate with all parties involved to win their commitment.
2. *System Integration phase* - Ensure that all work is done according to quality principles. Monitor projects progress and actively control the project. Track and follow up quality issues and co-ordinate the installation acceptance tests procedure.
3. *After Integration phase* - Track and follow up quality issues and co-ordinate the final acceptance. Ensure that the operation departments are ready to accept the system. Define and execute the windup activities after the acceptance installation test and before the final acceptance tests. To finish the project a final report of the project shall be written and sent to all project members and to the steering group.

A Customer Project Manager will:

- Provide a single interface to the services offered by Mobitex Technology.
- Have resource responsibility for the different Mobitex Technology activities.
- Co ordinate all activities with the Customer to minimize the risks of problems and delays.
- Propose any other solution(s) according to the newly identified needs of the Customer.
- Professional guidance during tests of the system in order to have the system up and running in the shortest possible time.
- Advice on the creation of test cases which test relevant functions of the system, thus shortening the test period.
- Professional guidance during tests to avoid any misunderstanding regarding the quality of the system.

Benefits

- The Project Manager will co-ordinate all activities to get the most effective result of the project/sub project.
- The Customer can minimize investments in project management skills.
- The Customer benefit from the solution experience the Project Manager has developed working with Mobitex implementations.

Requirements

For best results from the Project Management service, it is essential that the Project Manager and the Customer's staff and/or the channel work closely together. The service must therefore be seen as a joint venture between the Customer and Mobitex Technology.

The prerequisites can be summarized as follows. The Customer must:

- Provide a contact person, e.g. an internal project manager.
- Participate in project meetings.
- Provide technical experts within the areas concerned.
- Prepare the site for implementation.
- Send technical operators / system administrators to attend the appropriated training in order to develop competence in the product(s).
- Understand the need of all activities in the project.

4.2 Network Design

FAF 901 488

The service "Network Design" provides the Customer with a recommendation for a correctly dimensioned Mobitex System that meets both operator and end-user demands in terms of traffic throughput, availability and economy.

Contents

The goal of this service is to find the optimal network configuration that meets demands in the areas of radio coverage, network traffic load, availability and redundancy in the most economical way. The work will be documented in a written report describing the result of the analysis including recommendations for improvement.

Recommendations for network configuration/optimization will consider:

- the network structure, specific hardware & software, accessories and configurations on an individual site basis
- line speeds and protocols for connections between nodes as well connections to fixed terminals and the NCC
- link budgets
- redundancy configuration
- network node numbering plan
- storage capacity to cover for the expected number of subscribers
- packet switching capacity for area exchanges and base stations

This service is usually performed prior to an initial network deployment, but may very well be performed e.g.:

- prior to a major network expansion
- prior to major changes in the network use
- prior to changes in the distribution network for inter-node connections.

Benefits

- As a designer of Mobile Data Networks like Mobitex, Mobitex Technology has the best knowledge on the market. The design knowledge, combined with the experience from the large number of network projects as well as many years of system support makes well prepared for this job.
- The Mobitex Technology tools used in this service consider all constraints, and provide necessary assistance in the complex process of planning the Customer's network as efficiently and economically as possible.
- Optimal utilization of the network depends on the degree of effective use of every component. Mobitex Technology will plan the system to meet those requirements.

- The network will be planned so that it facilitates methodical gradual expansion of the system in accordance with growing network and traffic demands that affect the operator.
- Free-up resources and reduce cost of in-house expertise for the Customer.
- Minimized investment for the operator based on the minimized amount of hardware.

Requirements

The Customer needs to provide Mobitex Technology with information such as:

- specifications and capability of access/ distribution networks
- expected traffic behavior per application in subscribers, volume, type, size, mobility, and periodicity
- expected Customers with regard to portable/vehicle devices, availability requirements etc.
- Redundancy and availability requirements

A detailed specification of tests and studies must be provided to Mobitex Technology. The more detailed and correct the input material to this service, the better will the results of the service be.

4.3 Cell Planning for Network Optimization

FAF 102 03

The Mobitex Technology Cell Planning service provides the Customer with a recommendation for implementation of the Mobitex System in accordance with the Customers request regarding the expected geographical coverage, traffic volume and other presumptions.

Contents

Assistance and recommendations with regard to verification of the cell planning made for Mobitex network. The objective is to cover the required service area as economically as possible, while allowing for maximum flexibility for future frequency reuse and expansion, dependent upon the number of available channels.

The service includes predictions of the coverage per cell, as well as predictions of co-channel. The work will be documented in a written report describing the result of the analysis including recommendations for improvement.

Site Acquisition is one of the Customer's assumed responsibilities and not included in this service.

Benefits

The use of experienced Mobitex Technology's experts and their methodology is the best guarantee for obtaining the most economical and efficient network cell plan possible.

There is no immediate need for the Customer to build and maintain expensive - but necessary - cell planning competence and tools.

Optimal utilization of the network depends on the degree of effective use of every radio channel. Mobitex Technology will plan the system to meet those requirements.

The initial network cell plan will be designed and documented so that it facilitates methodical gradual expansion of the system in accordance with growing coverage and traffic demands.

Minimized investment for the Customer based on the minimized number of BAS/MOX/MHX for the required coverage.

Accurate prediction of cell coverage since Mobitex Technology uses digital maps.

Customer's tasks

- Specification of the required service area (indoor/ outdoor)
- Specification of available frequencies

- Production of digitized map
- Cell Planning process, based on the "Cell Planning Guidelines" and coverage requirements resulting in predictions of coverage per cell and best base station locations, as well as predictions of co-channel and adjacent-channel interference.
- Provide Mobitex Technology input for their verification. In order to produce a satisfying verification this input shall consist of all of the above plus:
 - Map with equidistant curves and with the coverage of the cell plotted (signal strength),
 - For each site: frequency, type of base station (BRU1 / BRU3) and output power, geographical position, height, type (Omni/sector) and gain of each antenna, if sectored direction of antenna lobe.
 - Expected traffic behavior per cell in subscribers, type of mobile devices, volume, type (status, text, etc.), size, mobility, and periodicity.

Mobitex Technology's service

Mobitex Cell Planners will review the Cell Planning results as provided by the Customer. The following aspects of the performed Cell Planning will be examined and commented in a report:

- radio capacity (radio channels) per area
- coverage per cell
- frequency re-use pattern
- possibilities for methodical gradual expansion of the system in accordance with growing coverage and traffic demands

Other

Actual coverage tests using installed and operational equipment are recommended to be performed by the Customer, in order to verify the cell planning and discover possible problem areas before end-users do.

A detailed specification of tests and studies must be provided to Mobitex Technology. The more detailed and correct the input material to this service, the better will the results of the service and the performance of the network be.

The Customer needs to provide Mobitex Technology with information such as

- availability of frequencies
- specification of the required geographical area where radio coverage is required (in-door/ out-door)
- expected Customers with regard to portable/vehicle devices
- major population areas, planned highways, airports and business centers, noise levels and interference situations etc.
- For each site: frequency, type of base station and output power, geographical position, height of antenna and site location, type (Omni/sector) and gain of each antenna, the direction of antenna lobe for sectored antennas.

4.4 Application Development & Design Support

FAF102 12

The Mobitex Technology service “Application Development & Design Support” will, through on-site support, provide professional technical guidance for the design and development of successful applications, operating over the Customer’s Mobitex network. The Customer will be able to build up his own competence in this area and create routines in order to be able to assist future Mobitex users with necessary guidance.

Contents

The Customer will have direct access to on-site consultation services of qualified application development and design personnel, who will assist him in the day-to-day solving of application development and design related matters.

Mobitex Technology can provide guidelines that can be used in relations with System Integrators and Software Developing companies, as well as in discussions with (potential) Mobitex users.

Mobitex Technology reserves the right to assign parts of the execution of the service to a subcontractor, in order to be able to present the best possible skill for each occasion.

Typical tasks that could be performed are:

- Application design recommendations in order to create the basis for a well behaved and successful application. Different applications are likely to have different demands on the Mobitex network.
- Select suitable Mobitex network functionality to support an application, like the use of Positive Acknowledgement, Host Groups or Gateways.
- Application performance studies
- Evaluate different types of equipment, hardware or software, that could improve a mobile data application over Mobitex

Mobitex Technology will distribute, to relevant personnel within the Customer's organization, information concerning application development and design based on Mobitex Technology's global experience and relations.

Benefits

- The Customer's organization will become familiar with what application development and design means in Mobitex, quickly and easily.
- A convenient, cost-efficient and fast way of reaching optimal performance for applications using the Mobitex Network.
- Serious problems can be avoided or solved as quickly as possible. It will contribute to keep a high performance level of the applications using the Mobitex Network, contributing to more satisfied users.

- An improved flow of information on technical subjects concerning application development and design within the Customer's organization.
- Guidelines being set early, thanks to the involvement of Mobitex Technology application development and design support personnel in the day-to-day activity.
- The Customer's organization will be better trained and prepared to manage future Mobitex application development and design questions.

Requirements

- The Customer provides an office and necessary equipment for the personnel performing the service. The office shall include access to a PC with e-mail and a telephone with international access.
- The Customer's personnel involved in application design matters should have completed the recommended Mobitex training, according to the "Mobitex Access Product Training" path. Furthermore, wireless modem courses are recommended.

5 Support and Maintenance Services

5.1 Support Services from Installation to Final Acceptance

FAF 901 489

This Mobitex Technology service will provide the Customer with highly experienced Mobitex support personnel. The Customer will get assistance in form of consultation, analysis and problem solving during the period from installation until final acceptance of the Mobitex system.

Contents:

Hardware Support

The Hardware Support service includes expert assistance from Field Support Centre or Technical Assistance Centre regarding hardware questions, consultation and fault diagnostics via the Mobitex Helpdesk.

Software Support

The Software Support service delivers expert assistance via the Helpdesk in form of consultation and analysis, and also contains software updates and appurtenant documentation that are designed to maintain and improve reliability and performance of the Customer's Mobitex network.

The Software Support services accomplish this by delivering corrections for software products thereby assuring that the software is performing according to its specifications.

System Support

- *Helpdesk*
Helpdesk includes expert assistance from Field Support Centre (FSC) or from Technical Assistance Centre (TAC) in form of technical consultations, analysis and/or fault location to solve any problems discovered in the System. All inquiries are registered and responded to and incoming calls will if possible be answered immediately.
- *Customer meetings*
When support personnel or Customer consider it necessary support personnel will arrange telephone meetings, typically every two weeks, to discuss the current status of open trouble reports and the measures being taken to solve the problems.
- *Remote installation assistance*
Remote Installation Assistance is provided when for example expanding the network with extra nodes or making software upgrades. Remote Installation Assistance is available from FSC or TAC during Normal Working Hours.

- *Remote network diagnostics*
In critical situations or whenever requested by Customer TAC can connect to Customer's system through a remote connection to the NCC Alpha server and provide System Support. The Contractor will facilitate the configuration of such a connection, however it is the Customer who decides how it should be done and also the terms for the Contractor to use the connection.
- *24-hour emergency support*
The emergency support is a 24-hour telephone support service available seven days a week. The Emergency support service gives the Customer access to an emergency support phone number, that can be called if for example one of the below mentioned serious situations occur.
 - Loss of contact between the NCC and the network.
 - Outage of the Operation & Management applications.
 - Node outage, resulting in traffic-handling capacity being severely reduced, according to the Customer.

Benefits

- With professional assistance from Mobitex Technology, just a mail or a phone call away, and with the latest technologies for state-of-the-art service delivery and knowledge transfer, you can rely on that your network will run at peak performance all the time, minimizing downtime and maximizing revenue.
- Minimized risk of an emergency occurring. If an emergency should occur, the risk is minimized through the 24-hour emergency support
- With access to Mobitex Technology's support organization there will always be someone to turn to if a problem should arise. This means that your own operation and maintenance organization can be minimized, freeing up your people for more important activities.

5.2 Network Operation Service

FAF 102 27

The Network Operation service implies that Mobitex Technology, as a strategic partner, will secure optimal operation of your network, by taking full responsibility of all network operation activities, e.g. planning, design, implementation of services and infrastructure, as well as the day-to-day operation and maintenance of the network.

Contents

The detailed scope of Network Operation Service is tailored for each specific Mobitex system, where the included services, reporting routines and responsibilities are mutually agreed by the Customer and Mobitex Technology.

The Network Operations Service may also include Customer specific set-ups where the Customer buys "network access" to parts of the Mobitex infrastructure, which is owned and operated by Mobitex Technology.

The key feature of the Network Operation Service is that Mobitex Technology takes full responsibility of all network and service operation activities on behalf of the operator. This allows the operator to focus on their core business, such as business strategies, product management and Customer management. Mobitex Technology provides the planning, design and deployment of the operator's strategies in terms of service capabilities as well as the management of the day-to-day operations of the operator's network, according to set performance goals.

Together - as partners - unique benefits in operations efficiency and quality can be achieved. This will lower the cost of network operations significantly and enable higher revenues, leading to an improved bottom line.

Benefits

- The Customer can focus on core business when Mobitex Technology manages the network operations. The Customer can utilize full management attention towards the core business, focusing completely on Customer's needs, and other revenue generating activities.
- Minimal need for the Customer to obtain resources, skills and knowledge for the planning and building of a mobile data network, leaving more time and resources to focus on commercial preparations for the launch of the mobile data service.
- Mobitex Technology implements best practice processes, organization and operational infrastructure securing a best-in-class effective and efficient operations.
- Economies of Scale are realized because Mobitex Technology can manage and operate the network of different Operators using partly the same systems, people and facilities. Resulting in more subscribers per employee and manage more network nodes per employee.
- The *Managed Operation* service implies a predictable cost factor for your operation set already from the beginning. You can be sure of no financial surprises related to operations, thus simplifying greatly the business planning.
- For situations when the Customer buys the service "networks access" where parts of the infrastructure is owned and operated by Mobitex Technology, the investment costs of Mobitex infrastructure components will be reduced.

5.3 Network Audit

FAF 901 437

This Mobitex Technology service will provide the Customer with a highly experienced Mobitex support engineer on-site, who will tune the network for optimum performance, based upon available network resources.

Contents

Driven by a Customers specific network performance objective, the Mobitex Technology engineer will evaluate current network performance, suggest improvements and assist in the planning and implementation of improvement projects. The findings will be documented in a written report describing the result of the analysis including recommendations for improvement.

"Network Performance" can be defined in a number of ways, and measured against different criteria, like traffic throughput, traffic capacity and reliability. The Network Performance Tuning engineer will therefore define these criteria together with the Customer, and evaluate and tune in areas like:

- Radio-link performance optimization (both up- and down link, considering different types of mobile users), tuning of roaming parameters.
- Tuning of the internal configuration of individual network nodes with respect to memory-use and switching capacity in order to obtain the highest possible performance for each node.
- Tuning of node-to-node communication, like line types and speeds, tuning of communication protocol parameters.
- Network redundancy configuration and tuning, in order to secure network reliability and availability.
- What-If analysis that will reveal necessary improvements in order to be able to offer high network performance to users even with sudden/ future fluctuations in traffic volume.

Benefits

- A great network attracts more subscribers more quickly.
- Maximum capacity, coverage, and functionality with the use of existing resources. Inefficient use of network resources will otherwise create a need to increase the number of resources, with the extra cost this involves.
- Maintain high performance in the network, also after re-configurations and network expansion.
- Gain access to the global and in-depth knowledge and experience of how Mobitex networks operate.
- Provides a way of producing valuable, Customer specific input to Mobitex software re-engineering.

- Lets you as a Customer discover possible (future) bottle-necks, before any network user does.

Requirements

- The Customer will have one of his staff available continuously to support the Mobitex Technology personnel performing the service.
- The Customer will provide input to define Performance Criteria.
- Provision of required test instruments is an assumed responsibility of the Customer, although Mobitex Technology can offer rental of these instruments.

5.4 Software Upgrade Support

FAF 901 481

The software upgrade support service includes a selected Mobitex software upgrade conducted by designated support personnel from TAC or FSC. An experienced Mobitex system expert will assist the Customer during the upgrade period to upgrade, verify and look after the network to minimize downtime and risks for unforeseen problems.

Contents

The software upgrade support service includes a selected Mobitex software upgrade conducted by designated support personnel from TAC or FSC. The software upgrade service consists of either a NCC or node upgrade or both.

The Software Upgrade Support service includes the following steps:

- *Preparations*
Phone meetings and email conversation to obtain current network configuration, functionality and requirements from the Customer Update or prepare checklists and upgrade routines that are necessary or will be helpful to conclude the upgrade in an efficient way.
- *Customer visit*
 - *Start-Up meeting*
Go through the upgrade procedure with the Customer.
 - *Upgrade*
Follow the agreed installation instruction to carry out the software upgrade. Verify that the network is running ok after the upgrade.
 - *Conclusion meeting*
Go through the upgrade again, what was actually done. Introduce the new features for the Customer.
- *Customer visit report*
The Customer will afterwards receive a report that describes the work that has been done and suggestions for further improvements that may increase performance.

The site visit with Mobitex Technology personnel after a software upgrade can be extended in time by adding the service On Site Support (see section 5.5).

Benefits

- An installation performed by a professional and certified Mobitex Technology engineer is the best way to guarantee quality and minimize installation time.
- Mobitex Technology attendance on site will help the Customer to perform the software upgrade with as low disturbance on the network and user traffic as possible.
- Costly operational problems due to faulty installations are avoided.

Requirements

- The Customer should authorize Mobitex Technology support personnel to have access to the software as well as access to a complete set of system documentation, including node specifications.
- The Customer should allow Mobitex Technology support personnel access to the system by authorizing the use of passwords.
- The Customer is also responsible for making backups of all software.
- It is also requested that a representative from Customer with sufficient network knowledge is present on-site during the upgrade.

5.5 On-site Support

FAF 901 472

This Mobitex Technology service will, through on-site support, assist the Customer in the operation of the network. The Customer will be able to build up his own competence and create routines for the daily operation of his Mobitex Network.

Contents

The Customer will have direct access to on-site consultation services of qualified Mobitex Technology support personnel, who will assist him during normal working hours in the operation of the Mobitex system. The Mobitex Technology support personnel will instruct the Customers personnel how to establish and run routines for running the Mobitex network during normal operation, Trouble Report handling towards Mobitex Technology, system management, backup of data, creation of different accounts and how to create different kind of databases. This service is usually very much appreciated during the first months after the start of a commercial operation, but may fit in at any time when the Mobitex operator seeks professional assistance.

The Customer's network control centre (NCC) is the logical place of operation, although short site visits may occur.

Mobitex Technology will distribute, to relevant personnel within the Customer's organization, information concerning maintenance, as well as operational instructions and proposals for further improvements based on Mobitex Technology's global experience and in close contact with the Mobitex Technology support organization.

Benefits

- Operational support services provide guidance, so that serious problems can be avoided or solved as quickly as possible. It will contribute to keep a high performance level of the Mobitex network in the important start-up phase of the network.
- An improved flow of information on technical subjects within the Customer's organization.
- The Customer's organization will become familiar with new functions and products, quickly and easily.
- A close collaboration between the Customer and the Mobitex Technology organization.
- A convenient, cost-efficient way of increasing system performance and achieving network optimization via proper operation of the network from the NCC.
- Guidelines being set early, thanks to the involvement of Mobitex Technology operational support personnel in the day-to-day operational activity.

- The Customer's organization will be better trained and prepared to manage future products and enhancements.

Requirements

- The Customer provides an office and necessary equipment/ services like phone with international access, e-mail and fax for the Mobitex Technology personnel performing the service.
- The Customer's operations personnel shall have completed the recommended Mobitex training, according to the "Mobitex Network Training" path for technical personnel (see "Mobitex Training Catalogue").

5.6 Remote Network Diagnostics

FAF 901 434

In critical situations or whenever requested by the Customer Mobitex Technology's support personnel can connect to Customer's system through a remote connection to the NCC Alpha server and provide System Support.

Contents

In critical situations or whenever requested by Customer TAC can connect to Customer's system through a remote connection to the NCC Alpha server and provide System Support.

The Customer and Mobitex Technology will together prepare what kind of support activities, measurements and analyses that shall be performed. The service can provide both preventive and corrective maintenance tasks.

Examples of services that can be done:

NCC Maintenance, such as check alarms and configuration, configure action routines and scripts, analyze traffic.

VMS Maintenance, such as backup procedures, check disk usage and clean-up procedures, upgrade system with patches, configure mail service.

Node Maintenance, such as network redundancy configuration, analyzes and tuning of line connections, check default parameter set-up, create scripts to collect statistics, analyze traffic and roaming.

Radio Maintenance, such as set-up measurements to monitor radio link quality and radio capacity utilization.

Benefits

Mobitex Technology has long experience from several Customers, software releases and network configurations with deep knowledge about performance statistics and troubleshooting.

The Remote Network Diagnostics service can be done both as preventive maintenance and as corrective maintenance.

Requirements

All assistance provided by must be performed on a dedicated account for Mobitex Technology on the Customer's NCC server.

The Customer is responsible for the setup of the remote connection at the Customer's site.