TECHNICAL REQUIREMENTS & SPECIFICATION DETAILS

FOR A WIDE AREA – MULTIPLE PROTOCOL –

CENTRALLY CONTROLLED –

DISTRIBUTED COMMUNICATION SYSTEM –

INCORPORATING SYNCHRONOUS PAGING NETWORK

This generic specification is for the replacement of the existing legacy system as ESKOM with a modern upgradeable system.

# Capability/ Reliability

Note: [Addressing the capability of the Tenderers, the distributor if any, and the manufacturer and future security plus site references and international adoption of the technology/ solutions provided, plus other requirements.]

## Capability Requirements

* + 1. The successful Tenderers will be a locally based authorised dealer and the developed/ supplied technology must be represented in South Africa by the respective distributor.

## Internationally adopted technology

* + 1. Tenderers will provide a list of all sites where technology has been deployed and demonstrate that the technology has been adopted widely by industries of both national and international government and private sector organisations.

## Ongoing Support and Development

* + 1. The Tenderers will provide information available on the amounts, if any that are invested in R&D and product development and ongoing enhancement, and also indicate if ongoing support and upgrades will be available and if there are any annual costs associated with this typical annual licensing & support.

## Maintenance

* + 1. On-site Maintenance must be available in a contracted arrangement with on site / remote login SLA and the Tenderers shall include the costs of these and the typical terms of these in the sale agreement.

## Global Site References

* + 1. Tenderers will provide a list of references where the technology has been deployed in the sites of the nature mentioned above.
    2. The solution provided by the Tenderers shall have a proven central communication system for messaging with high volumes, such that the reliability of the system shall have been proven by other systems installed using the same central system locally and/ or internationally. Multiple references are sought (3 – 5) indicating authentic message volumes which may be proved.

## Migration Considerations

* + 1. Tenderers will provide a Seamless Migration plan for moving from Outdated or Legacy systems to the proposed solution.
    2. Seamless Migration of service during the cut-over stage must be as a result of:
  + Experience of the System Integrator in these types of projects involving Mission Critical Systems that can not go down.
  + The Technical Design of the New Messaging System endeavors to completely avoid interruptions of service.
  + Particular attention to user Training and Change Control.
    - Users operating the Legacy System will not be affected during Cut-over.
    - During cut over only users that are changing over to the New System will be affected which will be according to a planned cut-over and for a short period of time.
    - Proper Project Planning and Training of the user minimizing significant changes to the mode of operation until comfortable with the new System.

# Central System

*Note:*

[Addressing the overall functional requirements of the main system and how it will be required to operate/ be capable of and deliver service to all the clients across the regions in which they exist]

In the response to the tender, Tenderers shall indicate what functionality can be provided under each of these and provide more detailed information and explanation of how these requirements will be addressed in addition to responding to the commercial aspects of the tender.

## Main Communication Functional Requirements

* + 1. The main user message entry and despatch shall be on a simple to use Windows messaging client which shall communicate on TCP/IP with the central server(s).
    2. The user client shall be operable by Microsoft Windows explorer such that it is not necessary to install a messaging client on any user PCs.
    3. Access to the messaging client shall be possible via a WAN or local intranet in each hospital.
    4. Groups and Groups Tree structures must be supported, such that nested messaging is possible. The Tenderers shall explain the solutions capabilities in regard to this clearly with diagrams.
    5. Where more than one device is being messaged e.g. Pager and SMS, groups should be independent of device. It should be possible to add users to a single group, each user must be messaged automatically on their specific device/s.
    6. Rotating group functionality is required to balance loads of work issue where required.
    7. Escalations and with automatically allocated escalations numbers are required. It shall be possible to cancel escalations via the user entry and via a telephone without human assistance and if escalations can be handled in additional ways, the Tenderers shall describe these more fully.
    8. Scheduling of communication routing through a weekly calendar must be possible.

* + 1. It is required that message users may divert their communications on the system and that this be managed from the user entry screen and if possible by other means, then the Tenderers shall give full details of extended / additional capability in managing diversions and other facilities relating to staff message diversion.
    2. Pre-scheduled user availability must be provided.
    3. Enabling/ disabling recipients from receiving messages via a PABX call shall be possible.

## User Interface Requirements

* + 1. Users shall have access to ways of entering text in messages quickly where such messages are often used. The facility must be provided as a simple and quick method and shall be customisable per user but also have overall system settings configured for all users.
    2. It shall be possible to stamp Time, Date &Message Sequence numbering on all messages delivered from the system, Such facilities shall also be customisable to be default or chosen at message entry.
    3. Despatch selection of multiple recipients, groups, escalation triggers, and / or schedules must be able to be done by simply for despatching a single once-off message to recipients, without first having to create a group, or having to send the message multiple times.
    4. Priority messaging selectable by default or at despatch time.
    5. Message Handling/ Routing Exception capability for Weekdays (individually) Weekends and public holidays is required.

## Advanced User Interface Requirements

* + 1. It is required that one touch messaging from points located on any PC in the organisation be possible and that this communication be on the existing IP networks and interface to the message engine(s) via TCP/IP – for distributed for quick message despatch.
    2. General Alarm Interface integration as standard feature of the product is required (though it may be a licensed interface) but it must not be a separate application such that functionality is seamless for all communication generated from this environment.
    3. General Alarm Message Management – the system must have the ability to provide advanced integrated staff work-force management by despatching staff to deal with events/ incidents through the General Alarm Interface system(s) in place by being able to interface to them, as required.
    4. The General Alarm Interface system component must record staff performance and response times to calls in relation to events/ incidents that staff respond to and must be configurable to each of the different site/ department and layouts and zones, staff skill sets to respond to different calls. Integration of all the sites/ departments which may deploy this feature shall be seamless using the same solution and all messages shall still be despatched by the central system.

## Data Interface Requirements

* + 1. All users in each site/ department shall have access to PBX based messaging via their local PBX/ extensions in the hospital.
    2. The Messaging interface via PBX shall have an Incorporated IVR.
    3. The system shall also be capably of handling the PBX signalling and use the DID Extensions in the messaging integration, and also provide quick dial message delivery for certain codes.
    4. The server shall have SMS capability via SMPP, such that volumes of messages may be delivered by this protocol.
    5. The solution must be capable of managing a multiple SIM card gateway as a single interface, such that a number of modules may be used to create SMS dual redundancy. The Tenderers shall explain
    6. There shall be support of third party interfacing compliance for all systems, such that the system has highly configurable interfaces that can accommodate these protocols.
    7. Security system integration shall be possible such that the solution can include this as a natural part without needing a separate application or system, so that it simply interfaces to the central systems or its remote access points.
    8. It shall be possible to perform remote control of devices through multiple protocols, including SMS, Email, System user client, PABX/ PSTN, such that the central system may also be used as a 2-way monitoring and control solution including the communication and confirmation associated with this.
    9. It shall be possible for users to also originate numeric or pre-defined text messages from a Telkom or cellular phone from anywhere. Voice prompts to guide user and notify of message status.
    10. Protocol Support for current and future requirements must be:
* TNPP
* SMPP
* TAP
* WCTP
* TETRA
* GSM
* PSTN
* DECT
* MAJOR TEL SYS MANUFACTURERS
* SMTP
* Others to be specified

## Protocol Capabilities

* + 1. PABX Interface IVR Prompts must be customisable – and re-recordable enabling changes to the voice prompts on the system.
    2. Email Forwarding facility, - the system must be able to use email to send messages and use include the sender, subject and or body of the mail in the outgoing message. This must be accomplished by the system without the ability or use of an outside email client such as Outlook or Lotus Notes. (These may also be the clients receiving the mail.)
    3. Mail filtering and secure SMTP logon to send mail must be included in the capabilities of the system to send email.
    4. The facility must be able to operate in conjunction with existing mail systems such that normal mail works without change. This requires that the system must operate in regard to email as an add-on system without affecting the current mail systems in place.
    5. DECT enhanced escalation management and control of alarms, including 2 way communications between the handset and the central system such that escalations and alarms may be received and acknowledged or declined from a DECT handset.

## System Central & Distributed Architecture

* + 1. A Distributed architecture design is required which is to incorporate embedded remote systems with IP interfacing.
    2. A Single central message despatch for centralised message recording/ logs is required.
    3. For larger sites a local system which enables dual-redundancy and the ability for the messaging clients on the site to send messages, originated at the local system which are then communicated in bulk to the central system for despatch is required.
    4. Remote PBX interfacing for each decentralised PBX per site is required and the system must still utilise the recipients of and despatch messages from the central system, though the calls to initiate messages may be made on local site PBX extensions.
    5. It shall be possible for users to also originate messages directly via the central system if the need arises such that dual redundancy of PBX messaging is provided.
    6. It shall be possible for users to also originate numeric messages from a Telkom or cellular phone from anywhere. Voice prompts to guide user and notify of message status

## System / Data Access Requirements

* + 1. The Central system shall have a full user access and detailed discrete user permission facility with a record on who has access to areas of the system such that it is a full featured secure login per user.
    2. The system shall have unique multi-user capability and provide that each user may have a separate login with individualised permissions and a record in the central system database of the multi user access utilised.
    3. Complete audit trail logs shall be possible with the system.
    4. Full data history and integrity shall be provided in an SQL database area of the system.
    5. Security shall be integrated into application as standard component, and the rights of users shall be propagated immediately on change such that users can be effectively controlled.
    6. The system shall have the capability to extend reporting capability by add-on functionality.
    7. External Third-party reporting capability for complete customisation shall be possible and available from the Tenderers if required.

## Interface Capability – Third Party Systems

* + 1. The solution provided shall support integration into building management systems, and as examples, those which have been interfaced on other sites shall be provided here as reference, with the detail of the system.
    2. Existing interface capability for Fire alarm systems with the Intercommunication protocols, which is not just contact interfacing is required. The Tenderers shall detail for which systems interfaces exist.
    3. Existing interface capability for IT Network Monitoring systems with the Intercommunication protocols. The Tenderers shall detail for which systems interfaces exist.
    4. Possible interface capability for other process control/ maintenance and SCADA systems with the Intercommunication protocols, which is not just contact interfacing is required. The Tenderers shall detail possible means of attaining this even if existing interfaces do not exist.

## System Monitoring Functional Requirements

* + 1. System monitoring and alarm management and functionality under this section must be included as standard incorporated functionality (though it may be an interface or functional license). This requirement is such that provision of this functionality shall not be provided by a separate system and so be an add-on to the solution.
    2. Duress Alarm direct integration must be possible allowing immediate alarm messaging from existing systems or activation points which may be utilised in the future. Such functionality must also be able to be monitored through escalation to ensure response by all is achieved, and further there should be visual indication possible of such events and who has received communication of these and what level the escalation is on.
    3. For High Priority messages it must be possible for the user to confirm receipt of the message even if was received via a pager.
    4. System monitoring shall be possible to groups and/ or escalations/ schedules.
    5. The solution must be able to interface to the IT network / systems and provide the ability to monitoring of key processes/ systems of such a nature.
    6. Monitoring of Alarms and other events shall be manageable with activation, duration and cancellation and seamless alarm messaging and reporting from the same system.
    7. Alarm / event activation shall be possible by location / Type and Identifier, with unique handling of each for activation, cancellation and recipients to have messages despatched to them.

## Technical General Requirements

* + 1. The Solution shall have certification for operating systems compliance on Microsoft Windows Operating Systems. The Server(s) in the solution shall be operable on Microsoft Vista, VM-ware, Microsoft XP Pro, at least. Clients shall be operable on all of the above and Windows 2000, Windows NT, Windows 98.

## Current Emerging Technology Supported

* + 1. The Tenderers shall mention which emerging technologies and interfaces, specifically with reference to Electricity Generation and Distribution as well as those of interest/ usable by the organisation in conjunction with the system contemplated here, that are now available, as part of demonstration of ongoing product enhancement and future technology support.
    2. The Central Server(s) shall use Microsoft SQL 2000 or higher and shall be capable of operating on a clustered server environment.
    3. Database access to the SQL data of the system shall be possible.
    4. Third party SQL reporting capability such as Crystal Reports / others shall be possible such that these may be sourced from third parties if required in the future.

## Reporting Capabilities Required

* + 1. The solution shall have integrated reporting and stats as a part of the solution (which may be separately licensed) but should not require the sourcing or integration of outside/ third party reporting solutions to gain access to message history and other reporting which would be expected as standard for such systems.
    2. The solution shall have the ability to produce graphical stats for some of the reporting capabilities of the system.

# Networked & Remote Equipment

Note: [Addressing the solution component requirements which are distributed / remote from the central system addressed in 2. above, and deals with all the functional requirements of the equipment and its interfacing / connections and operation in conjunction with the central system(s).]

## User Interfacing

* + 1. The solution shall provide the ability for users of the system from any site remote from the central site location to log onto the system and perform messaging.
    2. Such access to perform this messaging shall be provided by a Windows Explorer user interface.
    3. It shall be possible to utilise the normal Central system client remotely too to gain access to the full functionality the user has, from any location on the network or by remote login or dial in access in addition to the Windows Explorer client.

## Telephone Interfacing Architecture

* + 1. The central and decentralised PBX interfaces of each site/ department requiring access are required to have messaging facilities, and the system shall be able to provide this from those sites that required this.
    2. DECT functionality shall be possible from those sites/ departments that required this and it shall be possible for the central system to despatch the messages to any DECT extension in any hospital that has such a network.
    3. The local DECT system shall be integrated to the system such that escalation across sites with different DECT systems shall be possible.

## System Architecture

* + 1. Architecture of the system shall be three tiered to provide stability and data integrity such that the database the system service and the clients and web clients form the architecture.
    2. Distributed user client architecture is required to optimise communication load internally to a reception/ switchboard allowing users to despatch messages through multiple means (as specified) into the system directly.

## Synchronous Network Architecture

* + 1. The Synchronous Paging Network shall be supplied and operate in accordance with the following operability Network Description:

**Network Description**

* + 1. The synchronous network architecture refers to a method of paging that consists of multiple transmitters across a wide geographical area where transmitter signals overlap. This type of paging architecture is also referred to as Simulcast Paging. In such a network pagers can receive signals from one or more transmitters simultaneously in certain areas where transmitter coverage overlaps. These overlapping areas are referred to as simulcast zones.
    2. Systems architecture of Synchronous or Simulcast paging networks differ from single site networks in that paging receivers in the simulcast or overlapping zones need to receive frequency accurate paging signals at the same time and in the same phase. Should this not be the case, the paging signals from two or more transmitters can effectively cancel each other out or interfere with each other causing missed and/or corrupted messages.
    3. Synchronous networks incorporate highly accurate GPS reference timing to lock the paging frequency and provide a highly accurate reference from which to control transmission interval delays to synchronize the reception of paging signals in simulcast zones.
    4. Typical system topography is illustrated in the two diagrams below. Networks consist of a single Central Simulcast site, which will be at the Control Centre at KOEBERG, for each simulcast area along with multiple simulcast transmission sites. Messages are dispatched from the Central Simulcast site by either link transmitter or a range of IP data connection. Once received by the Simulcast Transmission Sites the messages are formatted for transmission and delayed a precise amount of time to compensate for latency in the distribution network and precise delivery times for messages arriving in the simulcast zones.
    5. The synchronous network sites shall be connected to the Central Site via TCP/IP and shall utilize the IP connectivity that is available at the remote site, which will connect it to the central site.

Where no IP connectivity exists, it must be supplied.

**Central Site**

Paging data

GPS Receiver

Paging Encoder

Sync ref

Link Transmitter

RF or IP Link

**A Simulcast Transmission Site**

RF or IP Link

GPS Receiver

Paging Encoder

Paging Transmitter

Sync ref

Sync ref

Link

RX/TX

* + 1. The systems architecture must support common paging protocols including:
* POCSAG (512, 1200, 2400)
  + 1. The architecture must support a mixture of synchronous (simulcast) and asynchronous (single zone) paging.
    2. The paging encoder must support the following connections and protocols.
* TNPP
* TAP
* TCP/IP
* GPS synchronized simulcast – microsecond accuracy
* POCSAG encoding
  + 1. The paging transmitter must meet the following minimum functionality:
* POCSAG transmission
* Configurable transmit power (25 to 100 watts)
* External GPS derived reference compatible
* Phase and frequency-locked transmission (external reference)
* Active programmable simulcast delay settings
* Programmable frequency offset

## Central Control and Operational Requirements

* + 1. Remote client access and full function capability is required.

* + 1. Integration/ multi site communication must be via IP using standard/ current IP interconnection of hospital sites.
    2. The solution must not use new/ monthly additional cost communication lines where existing IP network WAN exists.
    3. The solution must have a low IP Network traffic impact, such that bandwidth shall not be adversely affected.
    4. The paging aspect of the solution shall be comprised a composite paging solution consisting of main synchronous network with TNPP over IP/ Radio Link to provide synchronised paging and IP connected asynchronous paging.
    5. TNPP and other paging protocols shall principally be over IP.

## System Control Functionality

* + 1. Open standard protocols shall be supported
    2. To provide control and messaging, email Integration is required enabling seamless operation in conjunction with standard email – messages to email, email to messages, Escalations, groups, schedules triggered via email from a normal mail client (such as Outlook or Lotus Notes) and shall be processed by the central system to deliver the functionality.
    3. Multiple-site integration capability shall be possible such that sites may communication between one another is required.
    4. The solution shall be able to be remote controlled/ monitored and managed such that the capability for remote local support and global support can be provided.
    5. Enhanced facilities for controlling access and overriding / opening/ closing/ switching on / off systems at pre-determined times.

# Network and Interfacing Specific Requirements

## The following transmitter sites must be utilized and all antennas and cables must be supplied and mounted professionally on masts or wall mounting brackets to be supplied if not available at sites:

* + 1. Synchronous Area 1
       - 1. SA1 High Site 1
         2. SA1 High Site 2
         3. SA1 High Site 3
    2. Synchronous Area 2
       - 1. SA2 High Site 1
         2. SA2 High Site 2
         3. SA2 High Site 3
    3. Non-Synchronous Areas
       - 1. N S High Site 1
         2. N S High Site 2
         3. N S High Site 3

## Paging Terminals - The following hospitals must be equipped with paging terminals/ central system access:

* + 1. CONTROL CENTRE 1 x \_\_ TERMINALS
    2. CONTROL CENTRE 2 x \_\_ TERMINALS
    3. CONTROL CENTRE 3 x \_\_ TERMINALS
    4. CONTROL CENTRE 4 x \_\_ TERMINALS

## Additional Interconnection requirements:

* + 1. Paging terminals must be linked to main server by existing IP connectivity and where no IP connectivity exist it must be supplied

## The following institutions must be capable of using a paging terminal via a Telkom dial-up connection or PGWC WAN:

* + 1. REMOTE SITE 1 x \_\_ TERMINALS
    2. REMOTE SITE 2 x \_\_ TERMINALS
    3. REMOTE SITE 3 x \_\_ TERMINALS
    4. Provision must be made on the server to accommodate additional dial-up paging terminals – number to be specified.

# Detailed Specifications Required:

# Central Server Technical Capability Specification\*\*

| ***Feature*** | ***Ability*** |
| --- | --- |
| ***Recipient capacity*** | 1,000,000 Recipients Including: Pagers, mobile phones, DECT Handsets, email etc. (as detailed below) |
| ***Group capacity*** | 10,000 Groups |
| ***Department capacity*** | 10,000 Departments |
| ***Concurrent clients*** | 10,000 Clients (per server) |
| ***Serial Port capacity*** | 64 x RS232C Serial Ports |
| ***System Architecture*** | Client/Server, TCP/IP Communications |
| ***Message Despatch Interfaces*** | IP Based Full Administration/ Normal Client,  Web Based Client, PBX, Alarming, SMS, Email, IP Soft Call-Points, SQL, Direct interface ports (IP, Serial, RS485 – For all external / Third party systems) |
| ***PBX Port capacity*** | 64 Ports |
| ***PBX Direct Interface*** | 2 Wire Analogue Extension |
| ***PBX Distributed Interface*** | 2 Wire Analogue Extensions on remote embedded firmware systems communicating on IP to Server |
| ***PBX Messages*** | 100 User defined messages per server/ remote system |
| ***Alarm handling capacity*** | 64,000 Alarm Inputs (opto-coupled or contacts) |
| ***Alarm interface handling*** | Wired / Wireless RS485 networked/ VHF |
| ***Escalation capacity*** | 10,000 call escalations, unlimited escalation steps |
| ***Roster capacity*** | 10,000 individual roster schedules, unlimited shifts |
| ***Scheduled communication*** | 100,000 reminder messages |
| ***High Level Interfaces*** | 64 High Level Interfaces via TCP/IP or RS232 |
| ***Email Outbound*** | Simple Mail Transfer Protocol (SMTP) with Secure Server logon support |
| ***Email Inbound*** | Simple Mail Transfer Protocol (SMTP) |
| ***Security configuration*** | Individually configurable on a per user basis  Individual Feature Add/ Edit/ Delete restrictions |
| ***Security rights management*** | Individually configurable on a per user basis  With Tree structure user rights management |
| ***Paging Encoding Protocols*** | POCSAG CCIR #584 at 512/1200 bps  Telelocator Alphanumeric Protocol (TAP, IXO, PET) |
| ***Paging Network*** | POCSAG CCIR #584 at 512/1200 bps via dual: synchronised network transmitters over TNPP (paging communication packet distribution over IP with synchronous timing interfacing) and;  asynchronous paging feed over IP also using TNPP or custom PG formats;  both allowing priority paging and function tone selection. |
| ***Communication Interface Protocols*** | All Supported over Serial and TCP/IP  TNPP, TAP (IXO, PET), COMP, TETRA, SMPP, SNPP, SMTP, WCTP, Third-Party Custom interfacing |
| ***Other Systems Interface Protocols*** | Alcatel, Ericsson, Kirk, Tadiran, Specralink, Cisco  Telelocator Alphanumeric Protocol (TAP, IXO, PET) |
| ***DECT Protocols*** | Kirk DECT SMS (Short and Long message formats) (BASEPage only) |
| ***Fire / Security / BMS Interfaces*** | * Ampac CIE-BMS/EWS * FFE Series 9000/10000 * Simplex 4100 * Vector Macro view * Citect * Honeywell BMS * Modbus * Wormald MXL/XL3 * Free Text Interface (User programmable) |
| ***Nursecall Interfaces*** | * Ademco (Smartlink) * CallGuard (Austco) * Custom Systems * DigiAlert (Communication Systems) * Dukane * Gladstone (Inteltec) * Jeron * Merlon (Statewide Communications) * Penisula Call Systems * Responder IV (Rauland-Borg) * Sedco (Inteltec) * Tek-Tone * Tunstall * Vitalcall * Wescom * Wireless * Vitalcall * Zettler |

**\*\*All Options should be individually licensable enabling the server functionality to be scalable**