

IGEM Young Persons Paper Competition
Presentation to the Wales District Section
Control Systems Separation – Telemetry Arrangements
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Background

The sales of 4 Gas Distribution Networks marked the start of a major structural change in the UK gas industry. Network Sales saw the creation of 3 new Network Operators who took operational control of their gas supply networks on the day of sales completion on 1st June 2005.

To support the network sales process, there were a number of enduring and transitional services that National Grid provided to the new Network Operators to safely manage the handover of control.

Some services, such as emergency call handling will endure, whereas others such as the use of Front Office systems were timebound, with the Network Operators having a target date to exit the arrangement.

This presentation is about SOMSA, the System Operator Managed Service Agreement. SOMSA is a transitional service in which National Grid continues to manage the flow of gas through the sold and retained Distribution Networks until each Network Operator can safely exit the arrangement.

My presentation describes the background to SOMSA, it will describe the intentions of the Gas Distribution Networks to develop their own control centre capability in order to exit the arrangement, and the presentation describes my role in managing the telemetry separation aspects of the SOMSA Exit Programme.

SOMSA Exit

When National Grid sold four Gas Distribution Networks in June 2005 a number of agreements were entered into with the new network owners to enable National Grid to provide services to them for a period after the Networks changed ownership. One of these areas is for the provision of a 'System Control function'. The control of the High Pressure gas distribution networks and associated storage sites on a 24/7 basis is a complex activity, requiring considerable investment in systems and the development of a professional competent workforce. During the timescales of Network Sales it would not have been possible for the network buyers to develop the full System Control capability, and

therefore National Grid continues to provide that system operation capability through a contract called SOMSA (the System Operator Managed Service Agreement).

SOMSA is a transitional service and therefore Network Operators are expected to exit from the arrangement when they are able to develop, and gain safety case approval, for their own control centres. The process of SOMSA exit has started, with Scotia Gas Networks indicating that they wish to exit in the summer of 2008 and Northern Gas Networks and Wales and the West Utilities wishing to exit in the Spring and Autumn of 2009 respectively.

Making this happen will be a significant challenge, and to support the process National Grid is working with the Network Operators by developing systems solutions which enable all four Networks to eventually operate independently of each other.

Systems Challenge

The systems challenges include the complete replacement of the current SCADA (Supervisory Control and Data Acquisition) System (known as the Gas Transportation Management System - GTMS); the upgrade of gas demand forecasting tools; the separation of all of the Non-Scada applications, such as a system called SC2004 which manages processes including interruption, Calorific Value management, weather data validation etc.; the provision of copies of local data applications such as Lotus Notes databases; and, the provision of transitional and enduring telemetry solutions to provide Network Operators with their own secure telemetry feed.

Business Challenges

Notwithstanding the above, the new Network Operators need to find locations for their control centres, recruit and develop a competent workforce and have thoroughly tested all of their systems, processes and procedures before control can pass to their control centre.

All Network Operators also need to gain Health and Safety Executive acceptance of revised safety cases describing the new arrangements, and in particular how the process is to be safely migrated from National Grid to each Network.

Collaborative Approach

The Network Operators have agreed to work together and with National Grid to manage an orderly transition, and the overall process of SOMSA exit is being managed under the SOMSA Exit Programme. This programme of work requires multiple systems and business changes. It is a complex challenge that has the potential to be high risk if not approached in the correct manner. The parties involved understand the risks and have agreed to work collaboratively to achieve SOMSA Exit thus providing the most cost effective, efficient and least risk platform for achieving the industry goals. The collaborative strategy is to achieve SOMSA exit by all Network Operators before October 2010.

My Role in the Overall Programme.

As lead Project Engineer managing the telemetry issues raised by the SOMSA exit process, my role was to solve the telemetry challenge resulting from SOMSA exit. This involved an investigation into the various options available to provide an independent and secure telemetry feed to each Network, then, having developed the overall approach, lead the project to deliver the work necessary to implement the telemetry solution.

Telemetry Separation

The National Grid systems currently operates with one main and one standby control centre based in the Midlands. This system controls the gas distribution equipment across the entire UK via a single, state of the art satellite based telemetry network. This network communicates with gas sites e.g. offtakes, holder sites etc. through outstations, which in turn are accessed either directly by satellite, or radio communications at hilltops situated across the country. The satellite network operates on behalf

of National Grid and the new Network Operators, bringing telemetry signals to the back to the control system.

The telemetry challenge lies in modifying this network so that the new Network Operators have access to a secure and discrete telemetry feed in anticipation of their Exit date. This telemetry feed is required to enable them to fully test their gas control system when it's commissioned into their own control centres, and subsequently, to go on and control and monitor their assets following SOMSA Exit. The technical solution to this challenge lies in Satellite sharing, i.e. separating the telemetry signals carried on the current Satellite and then allowing each network to connect securely into their own signal from the Satellite. My presentation describes how this will be achieved.

The major changes to the network to achieve Satellite sharing take place at National Grid's Satellite Downstation in the Midlands, resulting in 4 Virtual Private Networks (VPNs); one shared between National Grid's Transmission and Distribution Networks and one for each of the new Network Operators; Scotia Gas Networks, Northern Gas Networks and Wales and the West Utilities. The VPNs can then be routed in such a way that the new Network Operators can only communicate with sites belonging to them. This ensures that no Network Operator has visibility of, or access to, telemetry data belonging to another gas network.

Establishing the Virtual Private Networks requires additional satellite hardware to be installed at the main Downstation in the Midlands, and the backup Downstation in Germany. Once the additional hardware is installed, the Downstation is then reconfigured in a manner that logically separates the communication paths of sites belonging to different gas networks. The presentation that supports this paper details how this reconfiguration results in VPNs and what options were considered before the final design was approved.

This solution was developed in collaboration with the new Network Operators, who approved the project in February 2007. Work on modifying the satellite infrastructure is due to start in March, with the

project expected to complete by the end of September 2007. This timeline supports the SOMSA Exit Programme and achieves telemetry separation in time for the commissioning of the replacement control system in to National Grid.

Summary

The sale of 4 Gas Distribution Networks in 2005 marked the start of a number of fresh and exiting challenges for the UK Gas Distribution industry. The SOMSA Exit programme is one such challenge, bringing with it a host of potential high risk system and business changes. Only by approaching this challenge in a controlled and collaborative manner can the exit process be managed safely.

Whilst recognising that Satellite Sharing is a complex and highly challenging project that is being deployed on to a live system, it is one workstream in a suite of projects required to ensure Control System Separation occurs across the gas distribution industry by October 2010.

My role in the SOMSA Exit Programme has provided me with a fantastic opportunity to put my interests in telemetry communications to good use. The requirement to understand National Grid's current satellite infrastructure and investigate ways in which this network can be modified to provide security across gas networks has been invaluable in starting my career as a Project Engineer. With Satellite sharing identified, and developed as a solution to the SOMSA Exit telemetry requirements, the next challenge is to manage the deployment of the design into National Grid by September 2007.