

# CASE STUDY

## Harmony Gold

### BACKGROUND

Harmony Gold Mining Company is the 5th largest gold producer in the world. The group's operations are located primarily on the Witwatersrand Basin in South Africa, encompassing ten underground operations, an open-pit mine and surface operations that cover four provinces, Gauteng, North West Province, Mpumalanga and the Free State. The company also operates an open-pit mine in Papua New Guinea.

Comsol began installing Point-to-Point wireless links for Harmony Gold in 1999 specifically to assist where new mine sites were being built or where fibre was difficult or impossible to lay. Point-to-MultiPoint solutions were added to the standard Point-to-Point links as more mine sites were included in the burgeoning network. Due to the success of the wireless network and in delivering cost effective data to multiple sites, Harmony Gold started using wireless links to deliver traditional switched circuit voice services to mine sites.

Once the wireless network within most mine sites had been built, Comsol started urging Harmony Gold to look at using wireless technology to connect mine sites in different geographical locations, resulting in the construction of an inter provincial WAN network.

By 2008, major Harmony Gold locations such as Evander, Randfontein, Welkom and Kalgold in the North West Province were all connected to the same private network using exclusively wireless technology. Old Telkom Diginet lines previously used to connect these sites were cancelled due to the stability and reliability of the Harmony wireless network.

**The Harmony wireless network currently services approximately 130 mine sites, offering speeds of up to 150Mbps true "full duplex" capacity.**

### THE SOLUTION

Comsol built a triangulated ISM backbone network between Harmony Gold's key sites being James Park (Randfontein), IMS (Welkom) and Evander, offering 200Mbps aggregate capacity between all sites, with a 40Mbps aggregate circuit running from Randfontein to Mafikeng (Kalgold).

Primary routes connect Randfontein to Welkom and Randfontein to Evander, with a redundant fail over route from Welkom to Evander. Due to the remoteness of Harmony Gold's Kalgold site, route redundancy could not be offered without undergoing the expensive and time-consuming exercise of building several new masts along the way.

As Kalgold is a relatively small site, redundancy is not a major concern and Harmony Gold utilises standard GSM services as a back up to the primary route. Metro-Ethernet speed ISM last mile circuits were and are deployed between the aggregation nodes and the end-user nodes. MultiPoint access cells are deployed at large sites with multiple operations.

Harmony Gold's Welkom operations consist of over 30 sites, all connected via Metro-Ethernet speed ISM last mile circuits which terminate at their main DR site in Welkom.

### CONTACTS

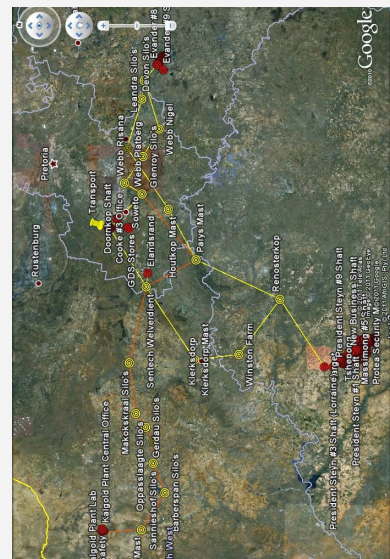
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### CRITICAL DATES

- 2008: Harmony Gold's triangulated 200Mbps Aggregate Back Bone was built between Evander, Randfontein and IMS (Welkom);
- 2009: Harmony Gold added their 200Mbps Aggregate Back Bone from Randfontein to Kalgold;
- 2010: Harmony Gold's whole Welkom network, comprising of over 30 sites, was redesigned to offer full redundancy, load balancing and to combat interference.



Harmony network



Renosterkop mast



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### CHIEF BENEFITS OF THE PROJECT

Comsol, through its large product portfolio, expert design team and High Site procurement capabilities, has been able to offer high capacity and reliable service to areas where most telecommunication service providers have failed to supply the mediums to enable the use of business critical systems to Harmony Gold.

Entities such as Harmony Gold were used to receiving second rate communication services when operating in remote areas. Comsol has designed all circuits uniformly, no matter where they terminate, to offer the best link and system availability possible within ISM band. The proliferation of faster and more reliable services deployed by Comsol within the Harmony Gold environment has allowed them to deploy systems and processes previously only available in head office environments. Remote users are now able to make calls, e-mail, video conference, use operational systems and access their database material off-site where they previously had to use commercially inefficient GSM services to make calls and drive to the nearest established company branch office to update databases, have meetings and place orders on vendors.

Operating and supplying services in these remote areas have attracted the attention of other large mining companies like Barplats and African Rainbow Minerals, which has been an unexpected boom for Comsol and subsequently raised its profile in the industry.

Chief benefits include:

- “Build-Own-Operate” rollout enables Harmony Gold to easily budget for requirements
- Standard and uniform products as well as monitoring systems allow for ease of unit replacements and spares holding
- Quick turnaround times allow for rapid integration of new users into the network
- Multiple services like data, voice and video can operate along with SAP/CRM databases. In addition, other critical business applications are available to all sites
- High bandwidth capacity enables the above applications to run simultaneously, allowing for time saving and efficient labour
- Mission critical operations such as blasting and security can be monitored and scheduled without interruption, saving hundreds of thousands of Rands in lost time and missed blasts

### FUTURE GROWTH

Comsol is currently in negotiations with Harmony Gold to convert their existing ISM band network into a fully licensed, Managed Service WAN solution, which will relinquish Harmony Gold of the responsibility of managing a network of this scale, as well as offer the numerous other benefits of utilising a licensed band network, such as:

- No interference
- Fixed line costs
- Guaranteed link availability
- Guaranteed capacity
- Low latency
- Telco class power infrastructure

### CONTACTS

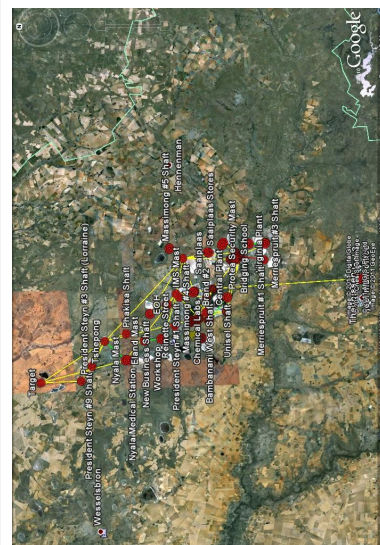
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### CHALLENGES

- The major challenge facing the deployment of the back bone circuits to the remote areas is the vast distances that need to be covered between them. Harmony Gold's key sites requiring back bone connectivity are situated some 500km apart, with operations in Welkom, Randfontein, Evander and Mafikeng.. Comsol has, however, through its incumbent high-site contracts and the construction of towers, been able to complete circuits utilising the minimal amount of links possible, resulting in efficient routes offering minimal points of failure.
- Due to the proliferation of WISP's (Wireless ISP's) in metropolitan areas, it has been challenging to establish circuits offering true QoS within the saturated ISM bands. Considering the high ISM band saturation levels, Comsol has thus far provided Harmony Gold with a satisfactory service, however Comsol is urging Harmony Gold to look at replacing their existing ISM band network with a fully licensed WAN Managed Service network.



Harmony Gold—Free State network