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A SYSTEMS APPROACH TO ORGANISATIONAL CHANGE
LEADING TO WORLD-CLASS COMMUNICATIONS SERVICES

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JUNE 2000

Submitted to the University of Cape Town in partial fulfillment of the requirements for the degree of Masters of Science in Engineering Management.

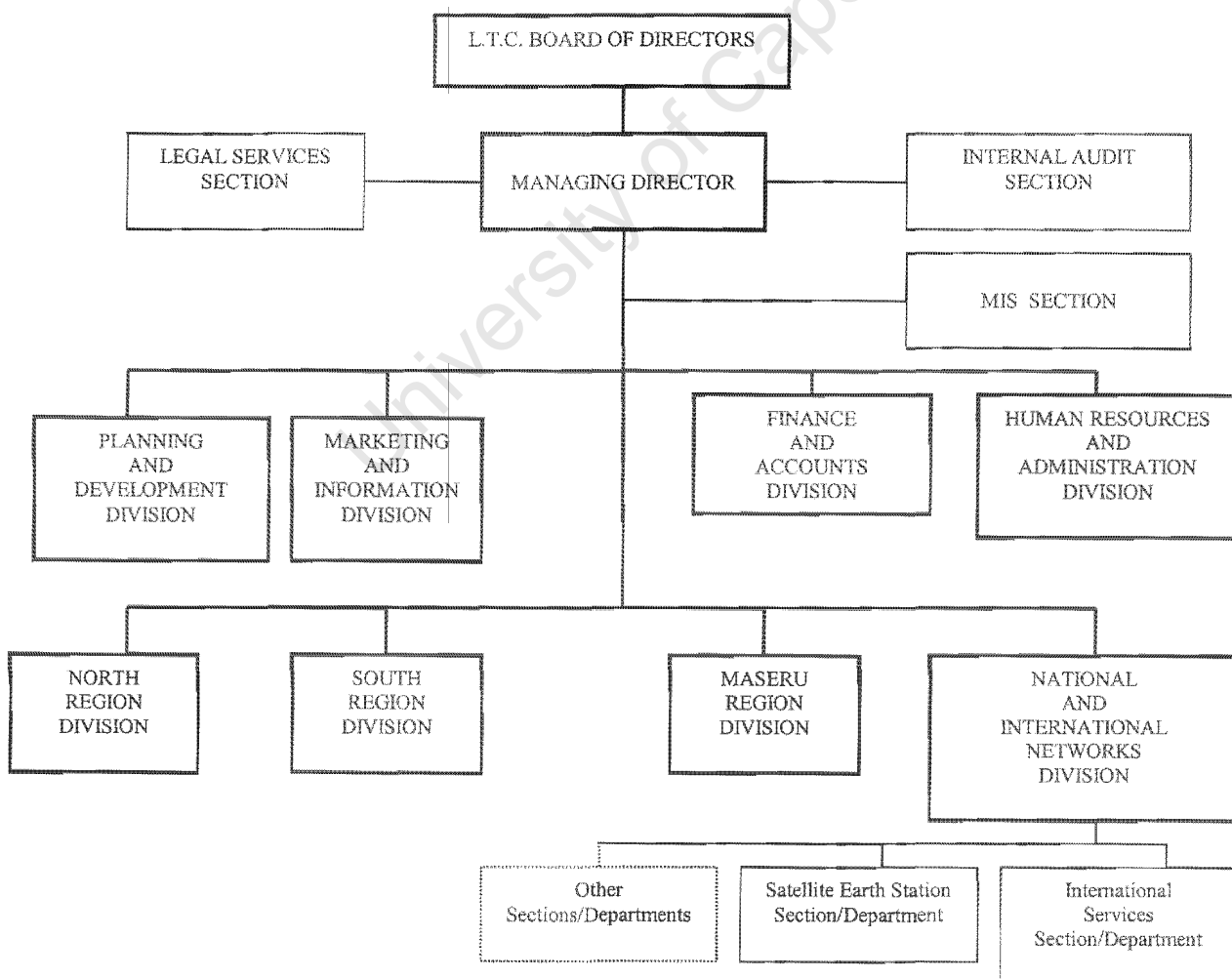
About the Author

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The author is a qualified engineer by profession and has been employed by Lesotho Telecommunications Corporation (L.T.C.) since 1989. The author works as a Manager of International Services Section/Department of the National and International Networks (or shortly Networks) Division.

Lesotho Telecommunications Corporation was established by the Lesotho Telecommunications Act of 1979 as an entity solely responsible for exclusive provision, supply, operation and maintenance of all telecommunications services and facilities. L.T.C. was until the recent sale of 70% shareholding to a strategic partner, a 100% Government owned parastatal that was organised and run under the Laws of the Kingdom of Lesotho. The reasons stated by the Government for the speedy privatisation of L.T.C. include mismanagement, financial irregularities, bankruptcy and its inability to generate profits and maintain viability.

L.T.C. organisational structure, which may change when the strategic partner takes office is as shown below:



I, Koalepe Constantinus Makatsela, submit this thesis for the degree of Masters of Science in Engineering Management. I claim that this is my original work and that it has not been submitted in this or in any similar form for a degree at any university.

Signed by candidate

K. C. T. MAKATSELA

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Abstract

The author has researched and reported on the systems approach to effective management and organisation that lead to world-class communications service provision – Lesotho Telecommunications Corporation's Satellite Earth Station is used as a case study. Changes to management and organisation systems were introduced in order to achieve the above. The report argues that change is inevitable and managers can only manage it and ensure that it happens smoothly.

Interviews, questionnaires, group discussions, staff meetings, presentations and existing literature were used as valuable sources of information in this research study. Multiple perspectives and views from experts and industrialists in the field of telecommunications and management consultancy were incorporated in order to cover a wider scope of the economy and society.

Data and information collected was analysed and discussed in order to establish need for change, promote change, design and implement systems intervention strategy. Both organisational learning and organisational development models were developed to enhance smooth transition.

The research was carried out within the limitations and time constraints of this research study. Changes were proposed and implemented at the Satellite Earth Station Section/Department and significant improvements were realised.

The results of this research can be used, with authority, by enterprises and organisations, both private and public, aiming at improving effectiveness of management and organisation within their work environment through meaningful change. The participating organisation would most definitely find this report worth it. Those wishing to pursue the research topic further and more globally can also use the results of this research study.

Acknowledgements

Special thanks are extended to the following:

Prof. Tom Ryan of the University of Cape Town for his magnificent advice and guidance and unending support.

The Lesotho Telecommunications Corporation staff, especially those at the Ha Sofonia Satellite Earth Station who participated whole-heartedly and patiently in all activities that made this research a success.

My wife Julia and my son Patrick for their marvellous support, encouragement, patience and for being excellent and considerate partners and companions during sleepless nights of the research period.

Constantinus Koalepe Makatsela

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June 2000

1.0 INTRODUCTION

In this chapter, fundamental factors that necessitate change are highlighted and introduced. This is achieved by looking at driving forces from both contextual and transactional sectors of the environment. The research study deals with change that leads to improvements. It is vital that issues that necessitate organisational change are introduced. This chapter further introduces the philosophical framework upon which the research study is based.

Both private and public sectors of the economy involve in business to provide reliable and quality service and eventually generate revenues. Enterprises, in their quest to fulfil this primary objective, need effective management and organisation that would lead to long-term customer focus, profitability, business success, socio-economic benefits and viability.

Today, financial institutions provide for more and more tighter and stricter lending conditions. The reason is that the present business environment is rather complex, riskier and more competitive than before requiring organisations to be dynamic and adaptive. Thus, there is no room for complacency and success is required the first time around. Effective management and organisation of enterprises and institutions is requisite for achieving business objectives.

Great advances in modern technology, tighter budgets coupled with stricter customer specifications and demands in high quality products and services have rendered effective management and organisation a primary consideration for all enterprises. So, all organisations regardless of size, geographical location, type and aim of business undergo change. Organisations change, quite apart from the deliberate changes, in the course of continual improvement of their business strategy [34]. In fact, organisations around the world use W. E. Deming's continuous quality improvement as their strategy to bring about dramatic changes in their operations so as to stay competitive in a world of

instant communication and technological advancement. Change may be in many forms, induced by both internal and external factors or driving forces [46] and for various reasons. However, restraining forces also play a role in the organisation desire to change as shown in Figure 1.0

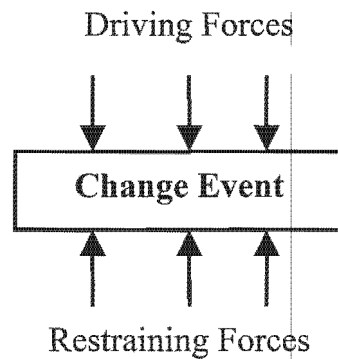


Figure 1.0 A Force Field Diagram for Change [ibid.]

Organisations that do not volunteer to change and adapt to the dynamics of the environment are forced to do so by the forces of economy and business environment, otherwise they are forced out of business. Conservative organisations strive to survive and eventually die a natural death. The issues of change have been articulated by many experts and theorist before.

A sizeable amount of literature covering organisation change and related topics or issues exists today. The in-depth theoretical analysis of the subject, which has been dealt with at great length by many theorists and experts like Argyris C, Buchanan D, Lawler E, Checkland P, Ackoff R, Carnall C and many others, is beyond the scope and intent of this research thesis. The research has been carried out within the social, economic and technological context of Lesotho.

In order that the problems of the earth station are understood, diagnosed and addressed using proper and concrete intervention strategy, it is important to understand the earth station dynamics and how this department relates and interacts with other players in the environment. The system dynamics and

interrelationship with other organisations including competitors are shown in Figure 2.0.

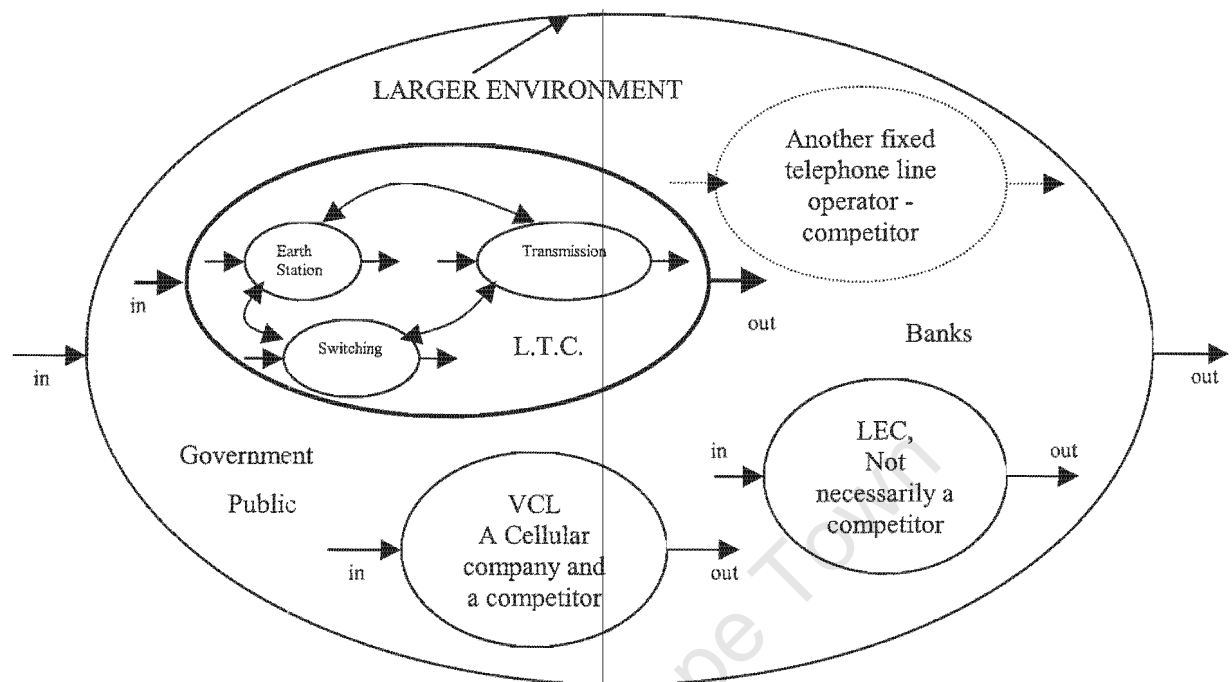


Figure 2.0 System Interrelationships and Environment Dynamics

This study is aimed at researching on systems approach to effective management and organisation using Lesotho Telecommunications Corporation (L.T.C.) as a case study. However, time constraints, limitations and scope of the study limit the research to only one department within L.T.C., namely, the Satellite Earth Station or simply Earth Station and the research does not cover L.T.C. as a whole. The primary aim or objective of the research study was to introduce change and attain continual improvements in management and organisation in the satellite earth station. Continual improvement forms the basis of Deming's PDSA (Plan-Do-Study-Act) cycle philosophy and Richard S. Williams (1998) defines it as a process that constantly seeks and brings about better and improved ways of working in both short and long-term. The earth station department through this research study that is based on W. E. Deming and Reg Revans philosophical frameworks is turned into what Deming defines as a learning organisation capable of initiating and sustaining long-term

quest for quality service. The author uses the two philosophies to define, explain and interpret the “observed world”. Organisational learning model is developed in order to achieve this. The organisational development model, encompassing change or transition management and other concepts that form core of this model, is also developed using the pragmatic philosophy of Deming and Reg Revans learning. The models provide working values, thus providing data or information for decision-making, knowledge attainment and structural guidelines.

1.1 Assumptions and Limitations

1.1.1 Assumptions

The primary assumption of this thesis is that management and organisational change is both desirable and possible.

Secondly, the organisation used as a case study and resources in the workplace would exist for at least the duration of the research.

Thirdly, the environment in and condition under which the organisation as a system exists and operates remain virtually unchanged for the duration of the research. This includes the ongoing privatisation process of Lesotho Telecommunications Corporation.

1.1.2 Limitations

A detailed and in-depth theoretical study of management and organisational change has not been included. The focus is rather on the elements of organisational change that are aimed at obtaining continual improvements in management and organisation of the earth station department. This is to limit the scope of the dissertation to only one department and does not imply that other departments like Transmission, Switching, Sales etc are less important or should be excluded from any change process. The contrary is believed to be

true; a holistic view and approach of an organisation must be considered in real, dynamic environment.

1.2 The Dissertation Structure

Stafford Beer's work that lies at the basis of viable system model provides one perspective in management and organisation systems, the perspective that has been built into a method intended to make organisations viable. It explains how viable organisations are able to maintain their viability through self-organisation and thus survive in problematic, complex and chaotic situations [61]. The consequences of this explanation can provide a way of looking at the method of management and organisation systems that Deming often articulated using scientific methods and laws of natural science, and enable them to be seen systemically – as a whole rather than as a fragmented set. These views provide continual improvement leading to effective and systems approach to organisation and management, and it is the ultimate focus of this thesis. To reach that point, however, the reader is first taken along a gentle road in the systems world [ibid.].

In order to do this, the discourse is split into five separate parts or sections and attempts to answer common questions like the following:

How do we diagnose a sick system? What diagnosis methods or techniques do we use to ensure diagnosis and treatment of the actual disease and not the symptoms? [19, 24] How do we assess and analyse organisational effectiveness?

What methods do we use to transform the system or organisation into an effective, viable, systemic and learning organisation? What medication, treatment and or injection do we prescribe to revitalise and rejuvenate the ailing organisation?

Why do change initiatives often do not work? How do we try again and succeed? How do organisations learn? What changes can we introduce and to what extent? How do workers at all levels of employment perceive the changes?

How can we best represent the new organisation and how is momentum for self-organisation maintained?

Every chapter is introduced by discussing and or explaining a current situation and a complication or problem to the situation that eventually leads to the section question.

The arguments and answers to the questions are inductive and discuss key parts leading to a similar and concrete conclusion.

In conclusion, the chapter has succeeded in highlighting the driving forces behind change. Deming and Revans philosophical frameworks, upon which the study is based, have been briefly touched upon. The limitations of the study and assumptions to be made during the research study are also included. However, detailed methodology on application of Deming and Revans philosophical frameworks does not form part of this thesis. Also not included in this chapter are the reasons for choosing and using only Deming and Revans philosophical frameworks.

The question to determine if there is a need for change and the techniques used for establishing such a need form a subject of the next chapter.

2.0 ORGANISATIONAL DIAGNOSIS

The previous chapter has introduced change, its driving and restraining forces as well as the philosophical framework to be used during this research study.

In this chapter, the sickness of the organisation in question, namely, the satellite earth station department, is diagnosed with full participation and involvement of all staff members. The SWOT analysis, interviews, group discussions and questionnaires are some of the techniques applied or used to achieve the diagnosis of the ills of the organisation. Organisational diagnosis is carried out in order to know exactly what the problems are with the earth station department. The importance of treating and curing the disease and not treating the symptoms cannot be overemphasised.

Organisations and institutions exist and live in a turbulent environment and often experience variations in their operations and business during their lifetime. The speed of change fuelled by major changes in technology performance and the increasing globalisation of markets creating a world market has made or at times forced many organisations subject their business activities to a radical rethink. At times, change is incremental, in small steps aimed at achieving continual improvements in the operation of business processes. It is vital that change takes place because a need arose, thus avoiding what Deming and W. A. Shewhart call tampering. The internal analysis of organisation and its relation with its environment is necessary for assessing organisational effectiveness. This, as Carnall puts it, allows the organisation to identify the organisation's capabilities and resources, how well it is exploiting them, and how effectively it is adapting to changing environment pressures. The pragmatic Deming explains this as diagnosing a sick organisation. It is important, as Deming says to discover the diseases of organisations, the diseases that frustrate the good work of managers and workers alike [32].

How do we diagnose the organisation – satellite earth station? How do we discover or identify the actual disease and not the symptoms? In fact, how to tell when the organisation becomes “ill” and something needs to be done.

Several techniques and methodologies exist that can be used for diagnosing a sick system. Discussions, interviews, SWOT analysis, questionnaires and personal opinions (though very much subjective) are other methods that are useful in the diagnosis process.

2.1 The Causes of Change

Rosh Ashby's (1958) *law of requisite variety* stipulates that, for a system (individuals and organisation) to preserve its integrity and survive, its rate of learning must at least match the rate of change in its environment [12, 17]. Paton and McCalman (1992) argue that any organisation that ignores the concept of change does so at its own peril, which will come sooner rather than later. The issues that face the modern organisations in terms of internal and external criteria are such that the business has to deal with what Schwartz (1986) terms a “visible evolution”.

What makes an organisation want to change? How to diagnose the organisation? There are a number of specific, even obvious, factors, which according to Deming and Shewhart cause variations in operations, and thus necessitate transition from the status quo. The most obvious of these relate to changes in the external environment that drive alteration. Changes and or continual improvements must according to Deming and Shewhart, be in small steps to avoid a system or organisation oscillating for longer than necessary for quick return to a state of statistical control. However, to attribute change entirely to the environment would be a denial of extreme magnitude as this would mean or imply that organisations were merely bobbing about on a turbulent sea of change, unable to influence or exercise direction. Definitely this is not the case and as Paton et al (1992) and Thorn (1991) emphasise,

changes within an organisation take place both in response to business and economic needs.

Several techniques exist and are applicable in the system diagnosis process. As David and Sarah Kerridge explain and emphasise, a unified and systems approach to change and improvement that is not confined to one method or just one process at a time, but embraces the whole organisation is essential. These techniques include the SWOT¹ analysis, interviews, group discussions and questionnaires – using CATWOE² philosophy. The SWOT analysis process (identification of important features of the earth station department with a view to improve where necessary) took the following summarised steps:

- (1) write down any aspect of the earth station department or its business environment that seems good or bad (5 – 10 minutes).
- (2) call out each aspect that you have while the facilitator writes them on the board. No questions are entertained except for clarification.
- (3) identify related aspects and put them together. Those aspects not falling under any group are placed as separate points.
- (4) discussion/critique of the points now entertained. Further ideas that may have been omitted can now be raised and included.

Crucial issues pertaining to the satellite earth station department are as shown in the table below:

Results – Table 1.0

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Good quality traffic	Weak L.T.C. management	Minimum social welfare	Weak management
Good earth station personnel	No proper tools	Good equipment	Resistance to change
Trainable technicians	Untrained staff	Better managed	Lack of confidence - staff
	Under-utilised equipment	Traffic monitoring system	Poor remuneration
	Lack of space		Remote physical location
	Lack of training facilities		No proper tools
	Poor fault reporting system		
	No financial reporting mechanism		
	Lack of customer focus		
	Old and unused organisation chart		

¹ SWOT acronym for Strengths, Weaknesses, Opportunities, Threats

² CATWOE acronym for Customers, Actors, Transformation, Worldview, Organisation, Environment

Analysing the results in Table 1.0 and in Appendix A, too many weaknesses exist in the system - earth station department. These weaknesses are structural, hygienic and symptoms of other dysfunctions in the system. Van der Heijden (1997) argues that realising these issues enables discussion on strategy that helps in effectively utilising organisation's strengths, turning weaknesses into strengths, exploiting opportunities and turning threats into business opportunities by introducing intervention strategies where necessary.

2.2 System Relationships Map: The Key to Success - Earth Station Operations

Section 2.1 discussed the factors (Table 1.0 and Appendix A) that impact, influence and determine the direction of the satellite earth station department. The intention of the system relationships map is to display the interactions and interrelationships that characterise the system – earth station.

The head issues or aspects in Table 1.0 were clustered and consolidated under general headings. Thus, placing all related aspects/factors relating to strengths, weaknesses, opportunities and threats under general and summary headings. The general and summary headings obtained are: *management, staff, training, equipment, physical location, organisation structure, available space, finance and customer focus*. These general headings were used to develop the earth station's system relationships diagram whose final form is as shown in Figure 3.0. The detailed step-by-step process of developing the diagram is not shown. However, it should be mentioned that the participants systematically identified, analysed, and classified the cause and effect relationships that exist among all the aspects so that key drivers and outcomes become the core of an effective solution to the problems.

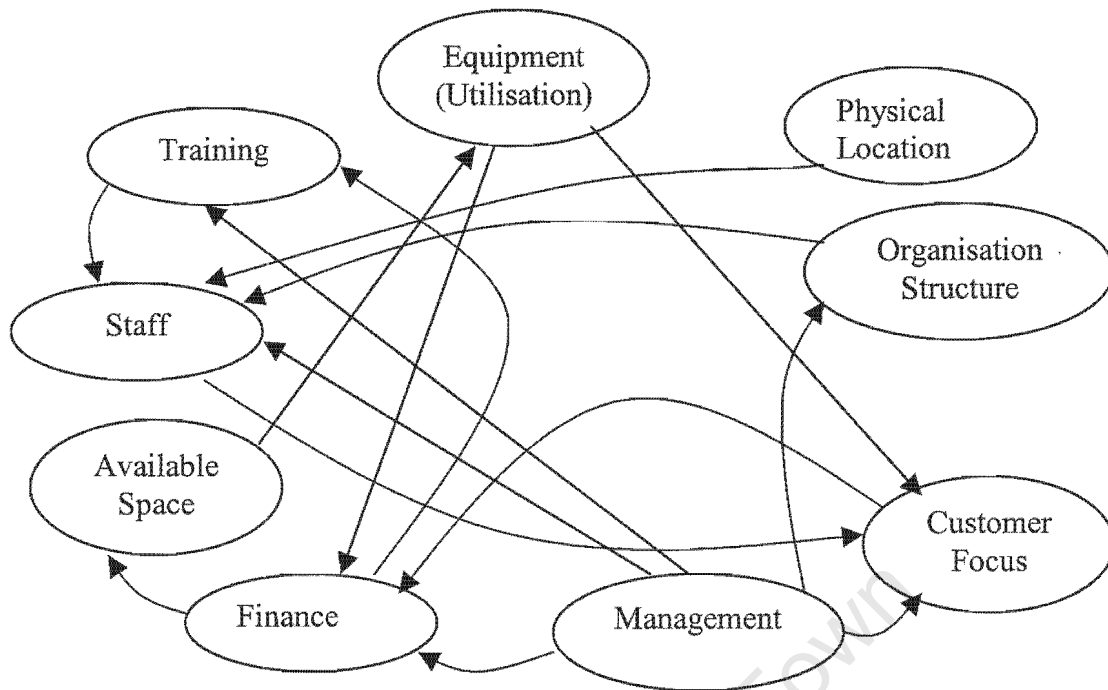


Figure 3.0 Earth Station Relationships Map

To fully understand the nature of a particular change situation, the relationships that exist between those parts affected by change must be considered. By developing a relationships map, one may begin to appreciate the systems interface and complexities that are at work in the change environment.

Management (identified as root cause), Customer focus, Finance, and Staff are the most pressing issues or aspects of the organisation.

The system relationships map in Figure 3.0 represents a purposeful system, namely the earth station department. Within the bounds of this organisation, the parts form a richly interactive group that has been bound together holistically through purpose [61]. The parts operate synergistically to achieve the objective of the whole earth station organisation. The arrows only show the direction of impact and or influence one part/aspect has on the other.

The complex change situation that emerged from the diagram indicated, as Paton et al put it, that although management, customer focus, finance and staff matters are at the core of the problem, organisational structure change would according to Deming alleviate or reduce chaos. Reducing chaos in management and organisation of activities means fewer crises, and reducing variation in operations and business processes means better quality of service and hence customer satisfaction. Effective management utilises available technology to enhance customer focus and revenue creation, thus creating value for stakeholders. The value and possibly wealth created are further used in technological developments, staff training and other benefits that would continually improve and enhance performance. Visionary management and leadership regularly and continually update the organisation structure to keep up with the evolving customer and business environment requirements.

The earth station operations and understanding thereof became clearer from the diagram. Having explained the system – the earth station department within its transactional environment and further identifying its sickness, it becomes necessary and important to look at the system in relation to its contextual environment. This forms the subject of the next section.

2.3 The Influence Diagram

The previous Section 2.2 discussed the relationships between the parts of the system without going beyond the boundaries of the system – earth station department. As Van der Heijden explains, any successful change should address the contextual environment factors separately from internal issues. Contextual environment has major impact and influence in the direction the organisations take.

CATWOE philosophy and scenario planning principles are applied in a brainstorming exercise aiming at identifying the “nice to know” [58] in the business (external) environment. Some of the following steps were taken:

- (1) Brainstorm about 20-30 insights ideas that influence the earth station business either as threats, constraints or weaknesses.

The resulting list of insights is as follows:

- VCL's competition
- Tariffs
- Privatisation
- Deregulation
- Right-sizing
- Strikes
- Trade unions
- Human relations
- Work conditions
- Donor's long term plans
- Brain drain
- Equipment and stock items
- Faulty spares/items
- Suppliers' confidence to L.T.C.
- Equipment life span
- Research and development
- Appointments by political affiliations
- Political stability of a country

- (2) Cluster/group all related insights together forming about 5-7 groups.

- (3) Provide/suggest general heading per group.

- Competitor's strength (Competition)
- Government Legislation
- Industrial Actions
- Donors – ADB/IMF
- Suppliers
- Technological Developments
- Political Influence/Stability

- (4) Identify key stakeholders.

- Government
- Customers/Public including staff
- Donors

- (5) Add key stakeholders and headings of the insights together as listed in steps (4) and (3) respectively.

- (6) Draw an influence diagram using the items in (5) above.

The issues were consolidated under general headings as shown in step (3) and only key stakeholders (though parts of a larger system) that play part and are affected were brought into play.

Having considered the factors in the contextual environment that impact and determine the direction of the earth station, the influence diagram is produced as shown in Figure 4.0. This diagram displays how each part affects and influences the others. The diagram represents the earth station relationships map with systems in the external environment. And as Paton et al argue, the

map is produced at an early stage in the change process to assist in determining the key players and driving forces, and establishing the linkages between them. And as Deming succinctly summarised it, the behaviour of a complete system and the complexity thereof result from the number of interconnections rather than the number of components. The earth station section is by no means an exception from this notion.

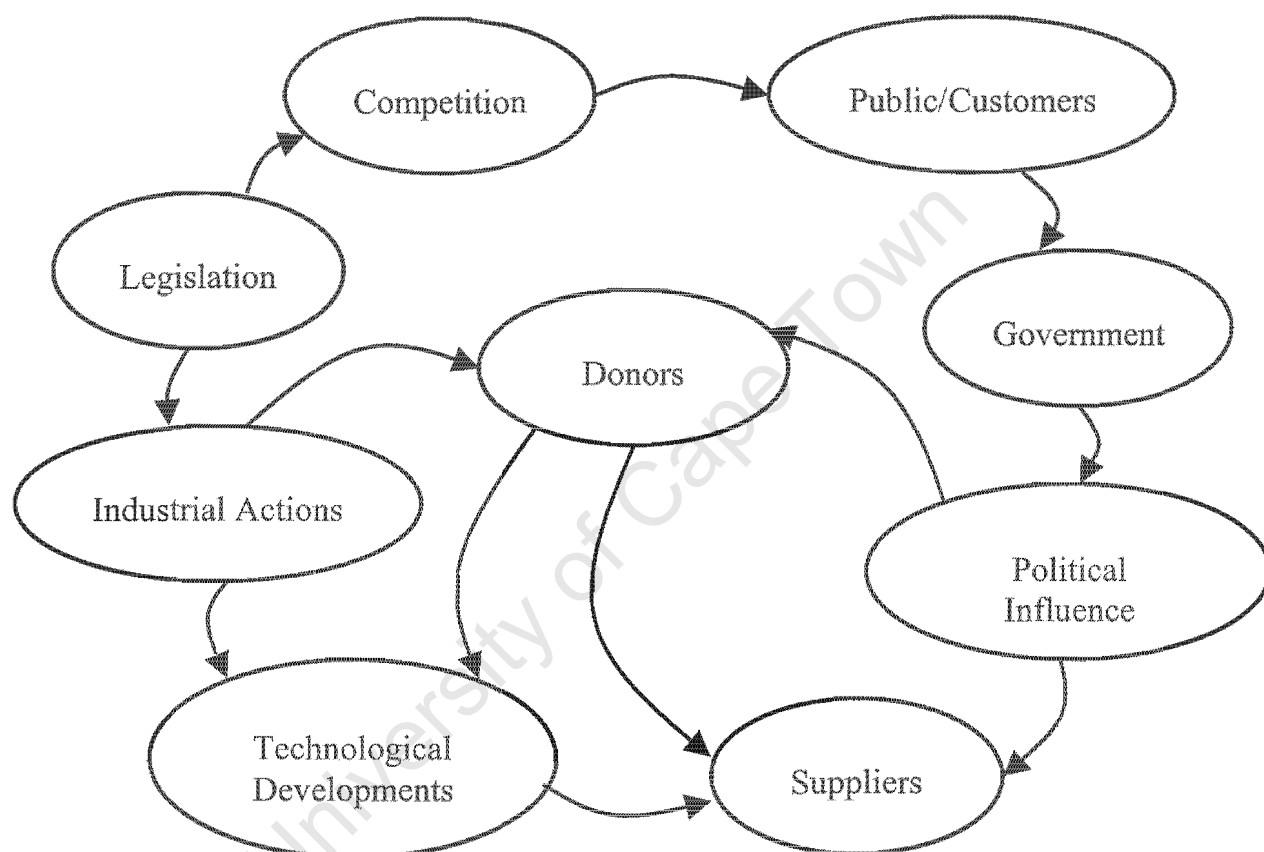


Figure 4.0 The Influence Diagram

The system, earth station department, has little respect or regard for stakeholders. The research further found that employees especially unionised members involve in destabilising acts like industrial actions that bring about what Deming and Clemson term system variation and system oscillations respectively. Employing scientific methods like statistical control to bring the system under control and eventually to a state of stability, according to Shewhart, reduces system variations.

The government legislation is perceived by many staff members as poor and inhumane regarding restructuring and right-sizing programmes. This legislation is believed to have caused an escalation of the previously unthinkable industrial actions that have direct and negative impact on the donor organisations and communities. For many years, the organisation has been heavily dependent on the donor aid for technological developments and supplier attraction. Enhanced technological developments, which have been on hold for several years now, should have attracted suppliers and investors to bring the latest technologies. Lack of communications facilities and technological infrastructure has negative impact on the economy of the country as a whole. The government Privatisation Bill is complete and along with the Bill, monopoly and state protection that the organisation enjoyed for decades is coming to an end. Fierce and ruthless competition dawns upon the organisation and as the law of the jungle states, "survival is only for the fittest". The aim of privatisation and market liberalisation is to have less government or political influence on the telecommunications business, thus encouraging more donors and investors.

Obviously, an organisation operating as already explained is termed a sick system by Deming and is normally characterised by confusion, conflict, complexity, and chaos and cost [32]. It is no wonder that such an organisation finds it difficult if not impossible to cope, survive and remain viable amidst the dynamic and often harsh realities of the business environment.

In ending, this chapter has established the core causes of the problems that hinder efficiency and effectiveness of the earth station department. The system map showing earth station internal dynamics has been shown. The relationship that exists between influencing factors and stakeholders has also been shown. The chapter, however, does not show the step-by-step procedures or steps followed in using different diagnosis techniques nor does it say why certain techniques have been preferred as opposed to others. Detailed steps on how each problem is addressed are also not given. The privatisation process that has

been unpopular among staff members has been highlighted, but no suggestions given as to how best it could have been carried out.

The deficiencies of the system – earth station department have been diagnosed in relation to both its transactional and contextual environments. Having achieved this, the intervention strategies to bring about systems improvements to the earth station department are discussed in the next chapter.

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3.0 INTERVENTION STRATEGIES: *Systems Intervention*

The previous chapter has identified the core problems of the system in focus – satellite earth station department and has shown how these issues are related to each other.

In this chapter, systems intervention strategies are designed, built and implemented in order to bring about improvements to the department. The intervention strategies are designed and constructed using scenario planning exercise [58]. In addition to designing and building intervention strategies, the scenario planning exercise is further applied and used in assisting employees cope with the trauma and effects of the right-sizing process and its consequent retrenchments. Deming's PDSA cycle is used and followed in implementing each intervention strategy. Reg Revans' learning philosophy becomes an important tool during the implementation stage.

The nature of change influences the organisation's reaction to it, and eventually the intervention strategy required. The previous chapters provided information and systems models that assist in locating the "change point" on the change spectrum [46]. The diagnosis process as Deming defines it clearly demonstrated and explained the weak-points of the earth station department as an organisation. What techniques are used to transform the "old and sick system" into an effective and learning organisation or institution?

The Deming's PDSA (Plan-Do-Study-Act) cycle is used in the intervention process to continuously improve the results or performance indicators. This is achieved by first identifying business processes, continually improving those processes using PDSA cycle in order to achieve better and better results.

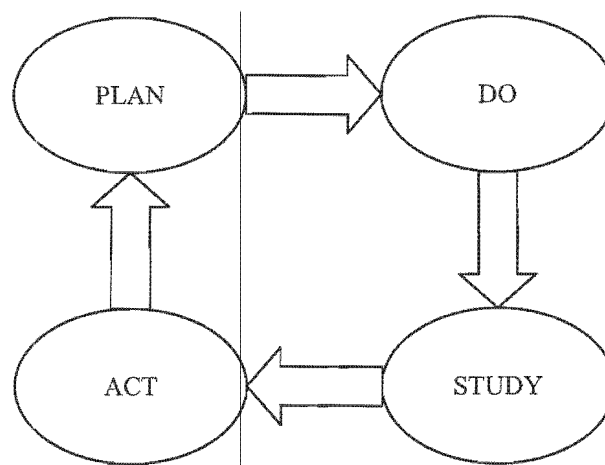


Figure 5.0 Deming's PDSA Cycle

The PDSA cycle can be applied to a wide range of activities as a guideline to achieve optimum results by continually tuning and fine-tuning the methods or procedures and the output or results of an organisation. This forms a basis for learning too.

Paton et al argue that there are three phases leading to a solution to a problem. The intervention process therefore has three basic building blocks of ***definition, design and implementation***. Diagrammatically, this is as shown in Figure 6.0

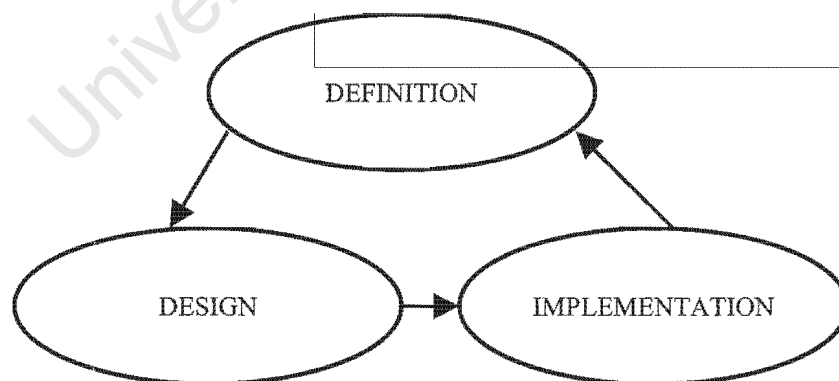


Figure 6.0 Systems Intervention Process

Any aspect of the earth station that needs improvement goes through the three phases. In the first phase, the objectives and goals of the system are defined and

clarified. The performance indicators, measurement points and data capturing methods are explained. Responsibility for improving certain aspects is allocated or assigned to staff members. The parameters that measure success or failure of the intervention process are clarified. Systems diagnosis and analysis provide identification of sickness and treatment of the diagnosed disease [19]. The second phase (Design) involves determination of solution options and evaluation of the solution with regards to addressing and resolving the problem. The third phase implements the solution. Appraisal and continuous monitoring of the outputs are also provided at this phase. It is vital that this is done so that necessary adjustments are made to get even better results.

Thus, one would argue that systems intervention and its success could be measured against quantifiable and well-defined performance indicators.

Although change is usually inevitable, it seldom takes place without problems. In order to minimise the impact and influence of change, Deming proposes and recommends small and step-by-step changes to an existing process. This ensures that the organisation quickly returns to a state of statistical control. Large changes like complete re-organisation have huge impact and an organisation may take a long time to recover and settle down.

A number of activities took place within the satellite earth station in order to bring about change and thus improve the situation.

3.1 Scenario Planning Exercise

3.1.1 Strategy Building and Discussion

The scenario planning exercise was used to enhance the understanding of the earth station and prepare this organisation for the future in the prevailing uncertainties of privatisation and liberalisation of telecommunications markets. The brainstorming exercise, a requisite component of scenarios, was a learning process providing questioning insight. The results of the brainstorming exercise

in Section 2.3 are used and the following steps are taken to demonstrate how the scenarios were built up and strategies developed (using only few aspects):

(1) obtain two aspects (driving forces) that have high impact and low predictability. The results are:

- Legislation
- Industrial action
- Political influence

(2) draw a 2x2 matrix showing scenarios S1, S2, S3 and S4.

Political Influence	Hi	S3	S4
	Lo	S1	S2
		Lo	Hi
		Industrial Actions	

The four scenarios were developed from the matrix. They are:

S1: Good governance (good legislation) with low politically motivated decisions resulting in low industrial actions. Good labour relations are embedded in the governing legislation to protect workers' rights.

S2: Politically nothing is done to correct the deteriorating situations where employees are ill-treated and go on destabilising strikes.

S3: Well disciplined workforce despite political interference.

S4: Political interference that does not build good labour relations. Employees do not agree with political decisions or Government legislation resulting in protests and strikes.

(3) produce a graphical representation of the scenarios, showing the Starting Condition, the Push, the Implication and the Outcome. Remarkable person is brought in for open criticism and opinion.

(4) test each scenario for cost benefit (financial performance), robustness (risk across a range of uncertainty), strategic fit and organisational fit.

(5) details of the options and all possible scenarios looking at all aspects are not given here.

During brainstorming exercise, discussions and arguments that follow, the participants' knowledge of their organisation – earth station department was largely demonstrated and on display. Discussions that followed and the actual development of the Influence Diagram shown in Figure 4.0 enormously enhanced participants' understanding of the earth station unit and how it should best operate. The scenario planning exercise was further applied in giving people courage and ensuring that organisational changes introduced by the Government through Privatisation Unit would not damage the staff's efforts to improve the situation at the earth station. This part was unsurpassed in psychology and power, providing unparalleled motivation for creativity, innovation and commitment to improvement efforts.

In an effort to attain cushion towards the uncertainties of the future, several scenarios were looked at and analysed. Without much emphasis on the question of polarity, the scenarios were based on two crucial issues, namely, political interference/influence and industrial actions. The 1996 restructuring exercise that was much opposed by employees ended up with strikes that have never been seen in the history of labour relations of Lesotho. Ultimately, 80% of qualified and technical staff was dismissed in 1997, the decision that was a year later reversed by the courts of law.

Continuous discussions, re-arranging and changing of some concepts involved an intuitive application of Deming's PDSA cycle. Development of the scenarios and eventually strategies involved both Revans' questioning insight and Deming's PDSA cycle at great length.

Based on the scenarios developed and all related options, the strategies as to how to deal with each scenario if it unfolds were also developed. The following strategies, resulting from prolonged discussions, adjustments, corrections, phrasing and re-phrasing of sentences to ensure inclusiveness and wholesome were finally confirmed as:

- (a) Improve effectiveness of communication, participation, involvement and teamwork – the essential and basic ingredients of all operations that lead to the success of the earth station department and
- (b) Create and maintain profit potential and viability of earth station department and L.T.C. as a whole through appropriate investment (in profit generating projects), continuous education and customer focus.

Despite the vast amount of literature and expertise on scenario planning, managing change and organisational designs, not all things normally go smoothly. Why do change initiatives often fail? Several factors often contribute to the failure of even the most promising and eloquently delivered change initiatives. The test of strength, character and attitude is the ability to start again and eventually succeed. The two strategies above embrace some of the most fundamental issues pertaining to success or failure of the change initiatives. A brief discussion of these issues, which are strongly advocated and embraced by the strategies, and how they were employed at the earth station, is given below.

3.1.1.1 Communication

Communication, information flow and the channels used for it in the earth station department like in any organisation are its life-blood and are essential for its survival. Gerber et al note that the communication methods and channels used in organisations usually determine the effectiveness of communication between various groups such as supervisors and subordinates, employee groups and the employer, customers and service providers, satellite earth station and other international earth stations or organisations. Staff participation and involvement in all activities become fruitful if communication is improved and enhanced.

Communication and information flow at the earth station as in the whole of L.T.C. is very poor and deficient. Employees are always left in the dark as regards many issues that not only affect them and their performance, but also

developments that are planned or taking place. Poor communication causes mistrust and ends up with conflicts. This gives a glimpse of light towards answering a question asked so many times, namely, “why change often doesn’t work?”

At the earth station department, effective communication is not only promoted, but also strongly encouraged at all levels since open communication and information flow are key ingredients of success of any change initiatives. Written and oral communication skill is an essential and necessary prerequisite or requirement for the daily activities. As Williams notes, many jobs in the workplace require individual to make formal oral or written presentations. Communication and handing-over of faults during shift operation is core to new earth station maintenance policy. In fact, Gerber expresses this nicely by saying, “it is not what you say, but how you say it” that matters. The flow of information down, up and across the earth station department is increased. Unlike before, all messages are always plugged on the notice board. The white marker board is also purchased, erected and effectively used to relay important messages and notices. Information flow and open communication, as Ackoff puts it, give staff members a better grasp of what is going on without necessarily explaining why. Communication itself and the methods used are important in the success of change process and all activities of the earth station section. Communication is not only limited to work related issues, but extends far beyond to include social, economic and technological aspects of life. This creates an environment of friendship and brotherhood that is essential for quality work life.

A holistic approach has been taken in an effort to improve communication. It has been realised that effective communication results in greater productivity through work that is more effective and greater co-operation in the satellite earth station department. Improving communication and information dissemination effect proper and informed decision-making.

Several benefits become apparently accrue due to the improved communication in the earth station and these include:

- Improved commitment to the job – the improved and ongoing supply of information helps to build trust and motivates staff members. Motivation and trust improve and enhance commitment of all workers and cause them to strive to achieve goals of the earth station unit, and ultimately those of L.T.C.
- The earth station disciplinary system in line with L.T.C. disciplinary rules is more effective – staff members accept the authority of management and regard the newly developed procedures as a means employed or utilised by management to eliminate inappropriate practices in the work place. The earth station disciplinary code has been designed and developed by the workers for themselves and later modified and authorised by the Director of Networks Division (D5).
- Grapevine distortion is reduced – grapevine distortion as Paton et al argue is normally inevitable in informal communication. However, regular formal communication serves to reduce such distortion and variation because staff members come to expect an official version instead of giving credence to rumours. Deming's Rule of the Funnel suggests ways to reduce variation, thus improving the information on which to act [32].
- Staff members are involved in change – As Deming puts it, people at all levels should be engaged in determining the flow of work. Change and continual improvement of business processes succeeds only if staff members buy into the need for such a change or improvement and the opportunity to make it. It is human nature to resist change. Advance communication of a proposed or impending change at the earth station section allowed time for all staff members to evaluate it and prepare for it. As Paton et al assert, staff members are then more willing to co-operate in the change process and they feel they own the process. They work hard and hope to celebrate success at the end of a long and gruesome battle.

Regular and repeated communications are issued through multi-media, providing a two-way feedback. As Senge (1995) puts it, a face-to-face, two-way communication has been developed deep into the earth station system, and a norm established of responsibly surfacing and naming the truth as completely as possible. Regular communications, as Carnall complements, avoid misunderstanding, build commitment and recognition of goals and long-term plans for the survival and viability of the earth station department.

3.1.1.2 Participation and Teamwork

Possibly, one of the most fundamental steps in achieving a successful introduction and implementation of change is that of obtaining a shared perception amongst those affected, concerning their views of the issues and implications associated with the change [46]. Neglecting employees' participation and contributions in any change situation constitutes a recipe for failure. Employees' participation in discussions and decision-making as Williams agrees promotes understanding throughout the satellite earth station department. In any change situation, it is of cardinal importance to get the right people involved.

The earth station staff members have for a very long time been working and operating as individuals with diverse objectives and goals. This is a common practice experienced in many organisations. In fact organisations often promote individualism and discourage teamwork [20]. In extreme cases and very often, people were made sworn enemies by the system and then secretly asked to act as boss's spy on each other. They were rewarded for reporting and providing information to the Chief Engineer (boss). Promotions and rewards (other than normal salary increment) were based on favouritism and not on performance. This demoralised staff members and created adversaries among people. Junior staff was not allowed to participate in activities and decision-making process despite concerted efforts by staff members to seek change of attitude (Appendix B). Appendix B is a draft agreement between staff and the Board of

Directors of L.T.C. regarding some crucial issues including participation that led to industrial action in 1997.

The need for change has long been overdue and was discussed at great length. Participation and involvement of everybody is desired and it is the only key to the much-desired success. Change or transition is very much supported by many members of staff, who lived and worked under the good expatriates' administration. The nature and purpose of change were explained and the implications were discussed in an open and frank atmosphere well in time. Everybody's ideas were sought, fostered and taken on board as a means of gaining and maintaining participation and involvement. Ackoff supports this point by saying, "when people are given the opportunity to participate in decisions and activities that are among the most onerous to them, contrary to what one might expect, they tend to participate constructively and without ill will". Participation and involvement in all earth station activities throughout the transition process was not much of a problem. The main problem was to maintain momentum going. The new organisation (Chapter 4.0) promotes participation, teambuilding and delegation of responsibilities to the newly formed operating groups or teams. Participation, which is a form of self-determination, is according to Ackoff, a major source of satisfaction and therefore of improved performance. The research study found that financial reward, much as being desired for satisfying basic needs, is not more important than moral support, motivation and job satisfaction, which are pillars in performance improvement.

Effective teamwork and the facilitation of group activities that are essential for the success of the change process became the norm at the earth station. Teamwork orientates the individual's goals, needs and perspectives of team members to the goals, needs, priorities and perspectives of the organisation – the earth station such that synergy is attained. Surprisingly, this was to the delight of many employees. Deming's philosophy promotes teamwork so that

different experts work together and with people on the job. There is a belief as Michael Hammer and James Champy (1993) state, that when a whole process becomes the work of a team, process management and organisation becomes part of the team's job. Success and accomplishments of teams are highly celebrated. Pushing decisions about work down to the people actually doing work means that manager's traditional roles are diminished. The new organisation as already mentioned provides for a team of at least two people per department on a rotating basis. This ensures interactive decision-making and widening of a range of specialised knowledge and skills required by the earth station department to run efficiently and effectively.

3.1.1.3 Profit Potential and Viability

The satellite earth station department has been, like all other sections of L.T.C., neglected for a very long time. The 1996 restructuring process froze all investment activities within L.T.C. as a whole irrespective of size, nature and amount of money involved. People have stood by and watched the equipment ages and replacement or upgrade activities not done. Many things have deteriorated and gone very bad. Performance of all resources – equipment and people has been the worst. The quality of service has terribly declined. These and many other factors have largely contributed to Lesotho's poor telephone termination averaging at 30% monthly. Telephone penetration is also among the poorest in the world – less than 2% of the available market is consumed. The employee/telephone ratio is also not encouraging, it stands at about 28 telephone lines per staff member, and this is one of the poorest productivity rates in the world. In some developing countries, this figure stands at 50 telephone lines per employee, while developed countries register hundreds of lines per staff member.

Customers ultimately refuse to pay for the level of service they regard as poor, unreliable and in most cases not there when needed most. The profits declined and the whole financial situation of the parent organisation shifts. The earth

station department and L.T.C. as a whole suffered substantial losses in terms of revenue, reputation, customers, creditors, financiers and many equipment suppliers. Bohlin and Stromberg consultants even declared L.T.C. as being “financially insolvent” in 1996.

All staff members have endorsed and supported the idea of creating and maintaining profit potential of the earth station unit as part of the new initiative. As part of the research and the earth station revitalisation exercise, a few projects were discussed and agreed upon. It was decided that all the projects should be termed maintenance, and not investments (which were on hold). Of course as Ackoff says, “today most subordinates understand and know how to do their jobs better than their bosses do”. This is a blessing in disguise as these projects and their success and management would not have been feasible at all.

A few, but crucial projects were initiated and undertaken. These include:

- (i) The purchase of UPS system to replace the ancient one that regularly failed and disrupted service. The UPS system has already been installed (by Siemens SA) and is working. It cost about R 82 000.00.
- (ii) Improvement of maintenance and transmission media. This was not very costly, but required some resources. Maintenance of transmission media and microwave links has not been done for years now for various reasons ranging from internal instability, lack of supervision and test equipment. This should be an ongoing and long-term activity that requires effective organisation and management.
- (iii) The purchase of INTELSAT³ DAMA⁴ equipment for both international and national (domestic) telecommunications services has been effected. Training on DAMA was scheduled for and undertaken from the 21–25 February 2000 (USA) and from 8–12 May 2000 (Lesotho). Installation

³ INTELSAT means International Satellite Organisation

⁴ DAMA means Demand Assigned Multiple Access as defined by INTELSAT

and commissioning of this equipment was scheduled for and carried out during the month of March 2000.

- (iv) Internet connectivity – this improvement project has already been finalised and the Ha Sofonia Earth Station is now on Internet. However, a larger project has been secured and is to be financed by British Telecom International (BTI). This will create Internet backbone and infrastructure necessary for L.T.C. to be Internet Service Provider (ISP). The Internet connection is planned to be satellite based and made to the UK or USA Internet suppliers.
- (v) The installation of local Public Call Office for the local people. This has been a much-sought facility by the local community for two decades now. This provides telephone services to the community at this remote location and brings revenues to L.T.C. This further contributes to social and economic development of the local communities.

The improvement to the equipment and network resulting from the projects and activities undertaken, some of which are mentioned above should be maintained. The satellite earth station continual improvement is an ongoing process and is hoped and planned to continue well after this research. The author will continue to monitor and ensure progress and thus keeping momentum of the process.

3.1.1.4 A Learning Organisation

Part of the satellite earth station intervention strategy is to develop and enhance continuous education and learning. As already mentioned earlier and contrary to what the situation is now, the aim or objective is to make this department a learning organisation. Max Boisot and Michel Fiol (1995) argue that any learning situation involves in some degree the acquisition of knowledge or its utilisation. They further define learning to learn as the ability to devise strategies for the acquisition of knowledge that are appropriate to the circumstances in which such learning is to be applied. Reg Revans developed

the learning equation that forms the fundamental part of personal and organisational learning strategies. Deming on the other hand explains learning and strategies for learning using the pure science philosophy and or natural laws. Deming's cycle of improvement has three phases:

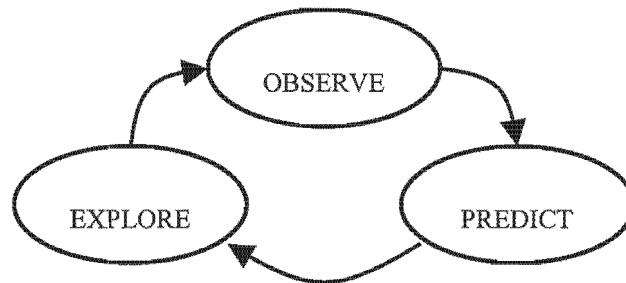


Figure 7.0 Deming's Cycle of Improvement

What Deming puts forward, which can be applied in any situation is to obtain as widely as possible all concrete facts about the present situation. Based on the facts, explain the facts and develop a rule for predicting the future. The rule is then applied and situations where it fails or predicts wrongly or makes no prediction are checked. Application of the rule to new and old situations in itself constitutes learning. One finds and learns situations where the rule works successfully, where it fails and where it predicts wrongly. In the process of exploring the operating avenues, one learns and develops skills and tactics of problem solving. Creativity, innovation and confidence are built. Deming had no remarkable interest to Thomas Kuhn's study. However, one would argue that implicitly they agree that a new theory had to be found if the old one no longer predicts the future or it shows some limitations when applied. Kuhn called this stage a paradigm shifting process. Deming on the other hand argues that every time the rule is proved wrong or a "new" situation is found, new information on the basis of which predictions are improved becomes available. This continual improvement cycle (Figure 7.0) continues and predictions are tuned and fine-tuned in the process. As new situations, rules, and predictions surface, individuals learn and eventually contribute to organisational learning. Argyris says an organisation learns when it acquires information – knowledge,

understanding, know-how, techniques or practices of any kind by whatever means available. Many of the improvements as Kerridge puts it are small refinements, which do not change the basic idea. However, the theory behind Deming's cycle of improvement holds even for radical changes or improvements.

At the earth station and in deed the whole of L.T.C., new insights that are gained by staff members are not converted to action. Members of staff are sent to academic and technical courses, but the acquired information and knowledge is not utilised at all. In some cases, people are sent to training activities that are completely irrelevant to their work, and even so, they are not deployed to relevant positions. There are cases, as Argyris [3] also emphasises, in which individuals' inquiry leads to understanding and action but remains outside of the stream of organisational activities and thus produces no change in organisational theory-in-use. No change in theory-in-use means that there is no movement along Deming's cycle of improvement, and as a result, no learning is taking place. The German expatriates administered the satellite earth station section for a long time. And the new understanding associated with change and learning that was held only in their expertise got lost when they left. The departure of the expatriates led to everything – activities and operations of the earth station department slackening, staff members losing enthusiasm and becoming sloppy in task performance. The whole organisation deteriorated and became a representation and manifestation of the “animal farm” story.

Another important constraint to learning [11] is both individual and organisational culture. Resistance to change is a general and natural phenomenon. That is why change management has recently become an important subject in the social sciences. Although, according to Albert Einstein, culture like knowledge is relative, many organisations throughout a wide spectrum of applications and fields display similar cultural and social behavioural patterns. Personal characteristics, values, motives, genetic factors,

attitudes, emotional reactivity, abilities, self-image and intelligence develop over time and are hard to change overnight. People have been used to the way things are and do not necessarily see the need for a change. Charles Handy puts this more succinctly by saying, “We are all the prisoners of our past. It is hard to think of things except in the way we have always thought of them”. Change brings with it the fear of the unknown and people often want to avoid going into the unknown. Culture has a major effect in shaping human personalities. It is vital therefore that for both individual and organisational learning to take place, individual and organisation culture must take a shift.

How do organisations learn? What is a learning organisation and how is it obtained? How did the earth station staff shift in their culture? The satellite earth station staff is by no means an exception to the social behavioural patterns as explained earlier. The facilitator (author), Earth Station Manager and Earth Station Supervisor gave an introductory presentation in relation to their experiences during their visits to other international earth stations. Among the few earth stations fully discussed are VIKRAM Earth Station (India), ETAM Earth Station (USA), Goonhilly Earth Station (UK) and Fuchsstadt Earth Station (Germany). The INTELSAT Earth Station Maintenance videos were also watched and enhanced the sharing of experience. Many participants marvelled the near-perfection level of performance by the named earth stations. The participants after the presentation believed that virtually nothing is done right at the Ha Sofonia earth station. This fuelled their desire to change; though doubtful and uncertain that such improvements as displayed during the presentation could be attainable in their lifetime.

In addition to the experience and knowledge imported, it was agreed to initiate and continue the internal training that existed here during the German expatriates’ administration as a means of promoting education and learning. Educational activities are aimed at developing knowledge, moral values and understanding of workers such that their effective and combined learning leads

to organisational learning. People are, as Richard Teerlink⁵ agrees, the only long-term competitive advantage and lifelong learning is the way to fully develop that advantage. In a world of rapid change, the Ha Sofonia earth station unit like other institutions relies more and more on creative thinking and innovation. This as Kerridge echoes out means that the organisation needs a wider and wider range of specialised knowledge and skills to run effectively. The earth station's rate of learning must, according to Ross Ashby's *Law of Requisite Variety*, at least match the rate of change in the environment.

All the staff members participated in developing the schedule for internal training. Staff members initiated specific topics on the basis of their technical and academic training needs. The author and the facilitator, the earth station manager, earth station supervisor and senior technicians developed training materials. The senior staff members were assigned certain topics on which to run the training activities. The internal training activities are going on smoothly and not only to the delight of the benefiting staff, but also the Director.

In-service courses and equipment training are fundamental ingredients of a success story in a technology-based organisation. Several institutions like AFRALTI, CTO etc have been approached and consulted and training schedules have already been obtained. Hands-on equipment training has also been initiated. Earth station staff members have already been sent to Multi-Country Telecommunications Training Centre in Malawi. Hughes Network Systems (HNS) – USA has trained four engineers and technicians of the earth station section at HNS plant in Maryland, USA and also at Maseru, Lesotho.

All attendants of external training produce training reports and bring training materials. The reports and recommendations thereof are studied. The earth station department has initiated and is about to implement the Internet infrastructure over satellite that is backed up by British Telecom International

⁵ Richard F. Teerlink is President and C.E.O., Harley Davidson, INC, (USA)

(BTI). This will add value to the available information and expand staff members' exposure to the most current social, economic and technological information.

The earth station staff and their organisation are proud to be part of the changes and fit Handy's definition as "those who are always learning are those who can ride the waves of change and who see a changing world as full of opportunities not damages".

Deming's Theory of Profound Knowledge is largely about creating a process that allows workers to build a theory of how their work area – earth station department operates. Improving on, this process takes each staff member closer and closer towards a complete understanding of the earth station department. Deming is believed to have liked workers to be trained so that through training and experience they become their own authority, master and look to themselves for methods of creating knowledge [23]. Deming wanted workers to become their own authority by being perceptive observers, learning from experience, understanding variation, understanding systems, taking control of their work environment, and continually improving the system – earth station department. The earth station staff members are committed to learning and making their department a learning organisation, capable of extracting vast knowledge from workers.

Organisational Learning Model

Being a learning organisation is not enough. The earth station department must learn more efficiently than its competitors [25]. But the question is how? The organisational learning model provides a framework for achieving this.

The theory at the heart of changing is fundamentally the theory of learning. As Handy (1989, 1990) says, "the times are changing and we must change with them. Yes but how?" The earth station organisation needs to design, develop

and possess skills, methods and strategies necessary to learn and change with times. The organisational learning model provides a framework for organisational learning, which includes all the methods and strategies adopted by an organisation to collectively and continuously deal with the problems of survival and problems associated with growth and development in the ever-changing environment [4, 20].

The earth station department as an organisation that learns and wants its people to learn must follow certain guiding techniques to achieve this. These techniques are encompassed in the organisational learning model. The model looks at ways of implementing and sustaining organisational changes through organisational learning. The ultimate aim of this model is to develop and possibly maintain the status of a learning organisation in which the organisation learns from all possible sources including employees.

The organisational learning model has three pillars, namely, *the learning framework*, *the styles of learning*, and *the lubricants of change*. These pillars are as shown in Figure 8.0.

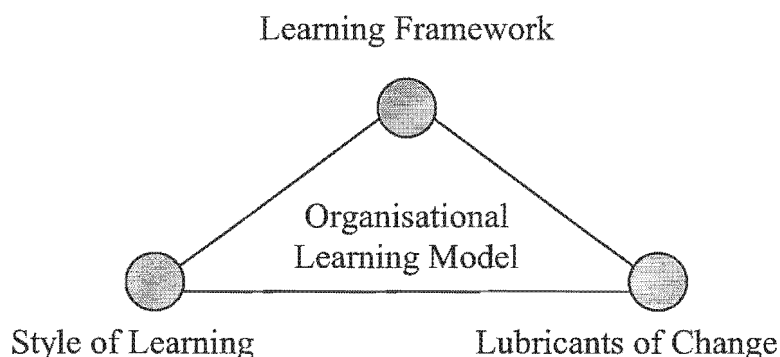


Figure 8.0 Organisational Learning Model

The pillars of the organisational learning model are briefly discussed below.

- Pillar One: the learning framework

It is worth mentioning that the existing literature is split when it comes to identifying and describing the stages through which an organisation has to go in the process of learning. Nevis (1995) mentioned three stages in a linear, cascade manner as acquisition, sharing and utilisation of knowledge. This was discredited by Handy (1990) as being linear in that it ignores the fact that learning is collective and continuous. Handy further proposes probably the best learning framework contained in what he (Handy) calls a *wheel of learning* as shown in Figure 9.0. Handy's wheel of learning starts with a question about the problem to be solved or the situation at the earth station to be changed.

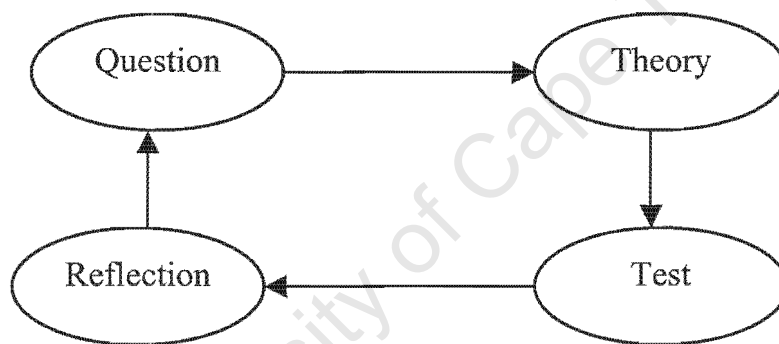


Figure 9.0 Handy's *Wheel of Learning*

It then follows with a speculative answer or explanation that suggests a certain theory, which is perceived to be a solution to the problem. The theory is then tested whether it works or not. If it does not work, another theory is speculated and tested providing double loop learning [5]. Reflection stage provides questions and answers as to why the theory or explanation turned out to be true. For example, the earth station staff was excited to realise that their explanation that management has been the core of the problems truly turned out to be the case using the principles of SWOT analysis and other techniques. Once the theory turned out to be true, it is internalised and accepted and can be applied in similar situations in the future. Normally, a question comes up during

reflection and the cycle continues. This type of learning framework is also applied to question and answer stages of internal training and many learning activities at the earth station department. More importantly, this has been applied during DAMA training activities that the author also attended at the earth station. Tests, using the actual equipment, were made to rectify “theories” or misconceptions. An answer to a question normally brought more questions.

- Pillar Two: the style of learning

Associated with learning and more important to it is the methods used to achieve learning and acquire knowledge. Argyris (1978) identifies three learning styles, namely, single loop, double loop and *deutero* learning. In a single loop learning style, the workers and hence their organisation respond to environmental changes by detecting and correcting errors without rethinking or changing the existing strategies. For instance, the junior technicians normally carry out this during their adjustments of equipment parameters that might have drifted, using the existing maintenance principles. Many of the maintenance principles apply this form of learning except in cases where the engineers would have interest in finding out the cause of the drifting. However, equipment wanders naturally and the operating parameters and points of optimum performance are normally fixed.

Double loop learning on the other hand allows for having dissonance and questioning the existing strategies in order to improve by rethinking the existing strategies and norms [ibid.]. The basis of the earth station improvement efforts is to rethink and overhaul the way in which this section operates. This involves rethinking the working structures and patterns so as to avoid stagnation and institutional paralysis [37].

Deutero learning is defined by Argyris as learning how to learn.

- Pillar Three: the lubricants of change

“The wheel of learning, I have emphasized, is difficult to start and hard to keep moving. Most of us don’t succeed most of the time. We get stuck at one or other segment and only a crisis or calamity can then move us on”.

Charles Handy, 1985

Central to the concept of change is the theory of learning. The creation of an atmosphere conducive for learning is very important for effective learning to take place. Putting the enabling conditions (lubricants of change) for learning in a work place is one of the responsibilities of the Earth Station Manager together with the earth station management team. These “necessary conditions of comfortable change”, as Handy calls them, should and are planned to be as permanent as change itself at the earth station department. These conditions have been created and enhanced at the earth station through introducing changes in organisation and management styles. Examples of enabling conditions achieved at the earth station, many of which have been discussed in previous chapters and sections, include open communication, systemic view, respect and care for all, structures for learning, participation and or involvement and experimentation, information flow, empowerment, responsibilities, removal of hierarchy etc. Many of these have been addressed by the newly developed flat earth station structure and the model enhances and sustains them.

3.1.1.5 Customer Focus

Assessment of organisational effectiveness that focussed on an internal analysis of the organisation, namely, earth station department, to identify its strengths and weaknesses as already discussed in the previous chapters and sections (Chapter 2.0, Section 2.1) discovered that customer focus is very poor or minimal.

As Ackoff strongly puts it, the concept of customer focus has been enlarged over time and, as it has, the field on which quality has focussed has become larger. Organisations have both internal and external customer policies. Internal customers form a string of recursive supplier-consumer relationship among the internal units to a particular organisation. External customers form an array of individuals or organisations of varying sizes. The satellite earth station department is not an exception to this.

Customer focus has been a serious problem to L.T.C. as a whole for a very long time. Satellite earth station department cannot succeed alone. This unit is one part of a large system (L.T.C.). Lesotho Telecommunications Corporation's failure to focus on core business is cited as one of the causes of customer neglect. L.T.C. once had a large furniture manufacturing plant (Appendix C). It is difficult to perceive a telecommunications entity going into the furniture-making adventure. The expensive equipment installed in the carpentry workshop was sold at very, very low prices in the late 1990s when L.T.C. finances dwindled as donor communities become more accountable, strict and cost-based. Amidst the adventurous diversity of business from telecommunications into furniture market, telephone customers were crying and complaining about poor or virtually non-existent service as ever. Loyal customers went unattended to and ignored (Appendix D). The monopolistic nature of telecommunications business environment in Lesotho which, the organisation falsely regarded as immortality certificate, also contributed negatively towards customer focus. The work that is performed by the earth station department does not meet customer expectations. Many employees do not have a slightest idea of their unit's customer base. It is not surprising also that the concept of internal customer is the remotest in their thinking or their vocabulary.

The concept of customer in its broadest sense was introduced to all participants and all staff members. Customer demands and expectations must be met as a

matter of priority in order to secure prolonged existence and long-term viability of this organisation, and this is embedded in the earth station mission statement (Appendix D1). The meeting identified departments/sections within L.T.C. with which regular (daily) contacts are made. The work at the earth station depends mostly on these departments. These departments fall within customer relations (supplier-consumer) philosophy. The participants developed an interesting model representing the supplier - consumer relation with other crucial parts of L.T.C. as shown in Figure 10.0. The earth station department has direct interaction with the departments as shown by the lined and double-headed arrows. The dotted arrows show the interactions of departments with L.T.C. and its top management represented by directors of particular divisions. There are, however some departments like Billing with which the earth station department has no direct interaction.

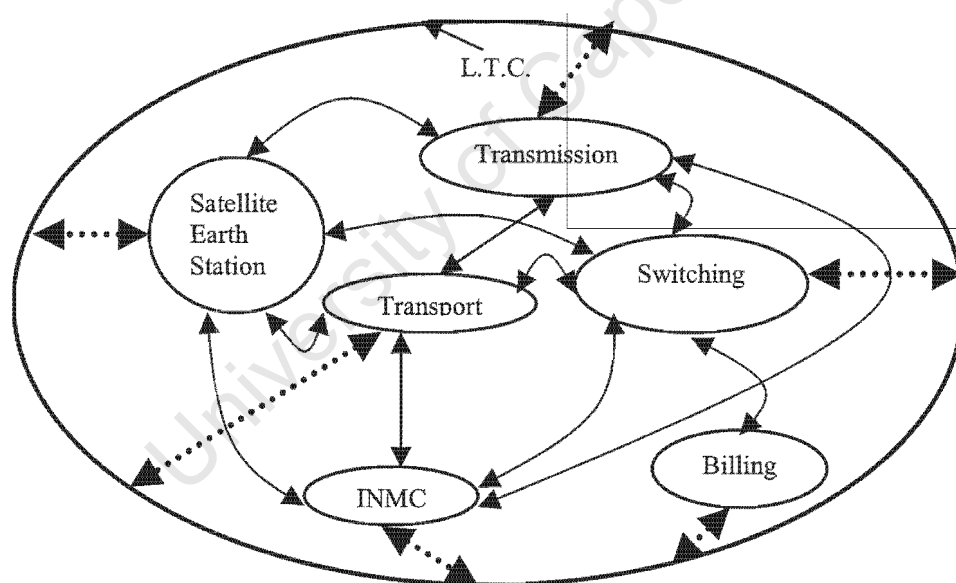


Figure 10.0 Supplier – Consumer Relations of Earth Station

However, the earth station is responsible for international traffic via satellite and the eventual billing of this traffic is done in the Billing department. The Billing department receives inputs from Switching and Computer centre (not shown in Figure 10.0 for simplicity), both of which liaise with the earth station in the processing and successful passage of traffic abroad.

Long-term relationships of loyalty, friendship and trust must be built with all the customers. In the past, there had been a number of daunting problems of inter-working and service delivery suffered. Attempts were made through inter-departmental discussions to improve loyalty, trust, and inter-working, thus instilling a new spirit of co-operation, tolerance and friendship. Successes were made in this regard though not hundred percent. People are demoralised, passive and shocked by retrenchments. They feel demotivated and unwilling to put an extra effort. As Deming points out, the earth station department should treat delivery of every service as a one-of-a-kind event with only one chance for optimum success. Every customer is the best and should be impressed.

Despite the problems that exist with regards to low morale and poor motivation that results in lack of urge and need to excel, the earth station staff members are determined and willing to experience the success of the improvement efforts. The staff members have already invested reasonable resources expressed in terms of energy, time and money to these change programmes. This puts more pressure on the other departments/sections to follow suit or to show desire to participate where necessary.

3.1.2 Morale Building

The scenario planning exercise was also used for morale building. The effects of the recent right-sizing exercise and the consequent retrenchments have traumatised many people. Staff motivation and morale at the earth station department are at the trough. People have been neglected for a very long time. Promotions and recognition have taken miraculous turns and could not be convincingly explained. Work organisation has become haphazard and voluntary such that it becomes “nobody’s job”. In addition to the already existing problems that have resulted in low morale and non-performance, the revitalisation programmes have in the past failed dismally. The workers are ruled by despair and hopelessness indicating or resulting in what Van der Heijden called a “worried organisation in which people gossip along the

corridors, but do not take any initiative to change or propose a change to the status quo". The current process of right-sizing the parent organisation, L.T.C., as already mentioned has caused panic among all workers irrespective of qualifications and technical skills. Many people have already been retrenched leaving L.T.C. with about 45% of the original staff complement. People have lost long-term friends thorough retrenchments and relocation of remaining staff. The Entrepreneurship Training Programme (ETP) has not lived up to the expectations. Severed staff members feel that L.T.C., the Government and IMF have failed to offer any assistance towards coping with the retrenchments and the effects thereof. The rhetoric by the Government and L.T.C. top management that the ETP would come is perceived as counterproductive, aggravating the ills they are supposed to cure.

All organisations face the possibility of decline and many face the possibility of termination, says Kimberly. The decline is caused by different environmental conditions. The decline means less profits, hence organisations are forced to cut costs and raise savings in the expense of workers. Many companies like L.T.C. that according to the Deming Philosophy, do not "understand variation" opt for short-lived solutions like laying-off workers that are immediate and visible and hoped to bring quick returns. The resulting widespread poverty and misery ripens conditions for social revolt, leading to instability, the least conducive environment for socio-economic growth and development [22]. The organisation decline further throws the morale of the staff members into the deep and the entire organisation further in the quagmire of hopelessness and non-performance. Organisations become entangled in a vicious cycle of non-performance, fire-fighting remedial measures and financial crises that bring further instability and decline.

In an attempt to resolve this current situation and improve the micro, macro-economic, and social dimensions of the earth station department, a questionnaire was administered and workshops organised and run. The aim of

the questionnaire was to obtain information relating to expressed opinions of respondents regarding the current situation or the prevailing conditions. The responses from the questionnaires - Appendix E, analysis of the results and group discussions contributed significantly towards the success of the workshops. The results of the responses from the said questionnaires are given in Table 2.0.

Results - Table 2.0

Question No.	Not happy	Happy	Do not know		
1	60	0	0		
	Angry/unhappy	Relieved	Don't know		
2	50	10	0		
	Sufficient	Just Right	Too Little		
3	0	0	60		
	Positive	Non-existent	Negative		
4	0	20	40		
	Happy	Unhappy	Don't know		
5	0	10	50		
6	(a)	(b)	(C)	(d)	(e)
	10	60	30	0	0

Analysis of the results shows that all respondents are unhappy with the process of right-sizing L.T.C. A large number of the respondents would be angry and unhappy to be retrenched in view of the fact that the severance package is regarded as too little to compensate the loss of employment. Assistance offered by the responsible structures towards coping with retrenchments is regarded as negative and non-existent. A large number of interviewees believe L.T.C. and hence its departments including the earth station should focus on core business. The points raised above provide reasonable evidence for the need to intervene and offer assistance.

Workshops were intended for all staff members. The retrenched staff members need to cope with initial shocks and traumatic effects of the L.T.C. right-sizing process. They are exposed to the complexity of the magnitude and the scale they have never experienced. The remaining staff members need motivation and morale boosting to get out of the present state of idleness, despair and non-

performance. It is fundamental to the Deming Philosophy that most people always want to do a good job unless the system – organisation demotivates them [32]. The measures taken to change or improve the situation should as Gonçalves (1996) also agrees, look beyond the current cushioning measures and aim at devising strategies that ensure sustainable growth and development that would alleviate social or workers deprivation.

The Government of Lesotho's Privatisation Unit and IMF have arranged and financed Entrepreneurship Training Programmes (ETP) as part of the Privatisation Bill. ETP is aimed at assisting and developing the skills of the employees in forming their own companies that can be contracted by L.T.C. or forming their own business. The severed staff members have diverse skills in the telecommunications business, which need proper utilisation. The expertise in their disposal range from cleaning services, security guards, repairs to terminal equipment, maintenance of external plant, financial accounts and management to name a few. The workshops encouraged the staff members to make full use of the ETP. However and very unfortunately the ETP in Lesotho like in many countries looks more uncertain and unlikely than ever. The staff members are also advised to look beyond the shock and anger, but take the opportunities that are offered. Financial administrators, consultants and business experts were also called in to give free guidance and advice.

Severance package that many people regard as disappointingly small should be put to good use and can do wonders if invested wisely, carefully and appropriately. People were encouraged to invest in money generating projects. Quite often and not surprising though, people do not realise and appreciate their strengths and capabilities in managing their own affairs. According to Broedling (1996), many people think of creativity and innovation as the exclusive territory of the gifted few. In some cases people do not know where and how to start a business. The fear of failure dominates all the good thoughts and thus prevents them from adventuring. However, a good place to start is in

recognising that innovation and creativity exist in all people. All it is necessary is to unleash the huge potential one possesses. However, people should remember that problems are part of life and a problem situation must be regarded as a challenge and an opportunity in disguise. In fact, Robbins (1998) quoting Henry Ford, nicely summarises this by saying, "failure is only the opportunity to begin again more intelligently". "Small, handy and easily managed projects are often a good starting point", said one expert. Businesses grow and develop with time and as owner's skills and expertise in running and managing that business also develop. Any expansion in future should be undertaken cautiously with clear focus, consideration and anticipation of potential problems. Some severed staff members already have businesses that existed long time ago before the retrenchments. The fear of unemployment should be turned into a much devotion to the business. Being self-employed simply means more time to spend on own business, hence effectiveness and efficiency in operating it. The retrenched staff members are made aware that business must be able to maintain itself without being bailed out by the owner. "Dedication, perseverance and hardworking are key qualities for success", said one advisor.

The feeling of being unwanted, the trauma and the psychological impact on human lives necessitate coaching, advice and psychoanalysis. The uncertainty about the future and the current non-existence of job opportunities aggravated by the political turmoil that followed the 1998 General Elections in Lesotho make people feel desperate, frustrated and hopeless. These are the sort of feelings that need to be forced out of people's minds. The severed staff was further advised to look into the future with positive attitudes. The retrenchments are, according to John Crook⁶, justified by operational requirements to align L.T.C. with the international standards in the telecommunications industry. These measures are aimed at achieving

⁶ John Crook is a Consultant and Owner of John Crook Consulting Company based in New Zealand

organisational effectiveness and efficiency that would eventually lead to more jobs being created.

Some employees have been shifted to new positions and feel frustrated and tortured. Long-term friends have been retrenched and lost. The uncertainty and possibility of further retrenchments is still hanging in people's minds and frightening to contemplate. On all accounts, the remaining staff members are advised accordingly. In view of the existing uncertainty, the remaining staff was further advised to increase their output. However, Deming (1986) believes, as summarised in the 14 points articulated in the *Out of the Crisis* masterpiece, that managers have the responsibility for improving work systems such that performance problems are removed. Employees should make themselves productive and worth-keeping workers. In fact, performance related remuneration is introduced as the earth station section, and in deed the whole of L.T.C., becomes cost-based. The present wave of retrenchments has no formula and no standard selection criteria. Only performance can justify and guarantee one's employment.

Many posts were advertised and people were encouraged to re-apply. Some employees refused to re-apply expressing their view and disgust that retrenchments were purely a selective victimisation of people.

In general, severed staff members were advised and guided into the "complexity" they are to face. The advice came from group discussions and experts presentations. The remaining staff members were also encouraged to remain alert while improving on effectiveness and productivity.

3.2 Systems Intervention Model

The previous chapters and sections have examined both the nature of change and the means of coping with its inherent complexity. It is now necessary to develop some means of handling, in a structured manner, the analysis and

implementation of a change situation [46]. An intervention may, as Paton and McCalman also agree, be regarded as the procedural methodology for successfully intervening in the working processes of earth station department, with the purpose of bringing about an effective change in that system – earth station department. The objective is to ultimately develop or have a stable new environment that incorporates all the desired changes. The procedural methodology of achieving this new stable environment can be formulated into proactive *systems intervention strategy model*.

The systems intervention strategy model [61] is a cyclic methodology that operates very clearly in unstructured and uncertain situations by first generating learning and understanding about a set of changes for the earth station department or any system. Systems intervention models all share a basic three-phase approach [ibid.] that is cyclical and sequentially time-dependent. The model as shown in Figure 11.0 is applied to any situation that needs some changing in the way things are run and organised.

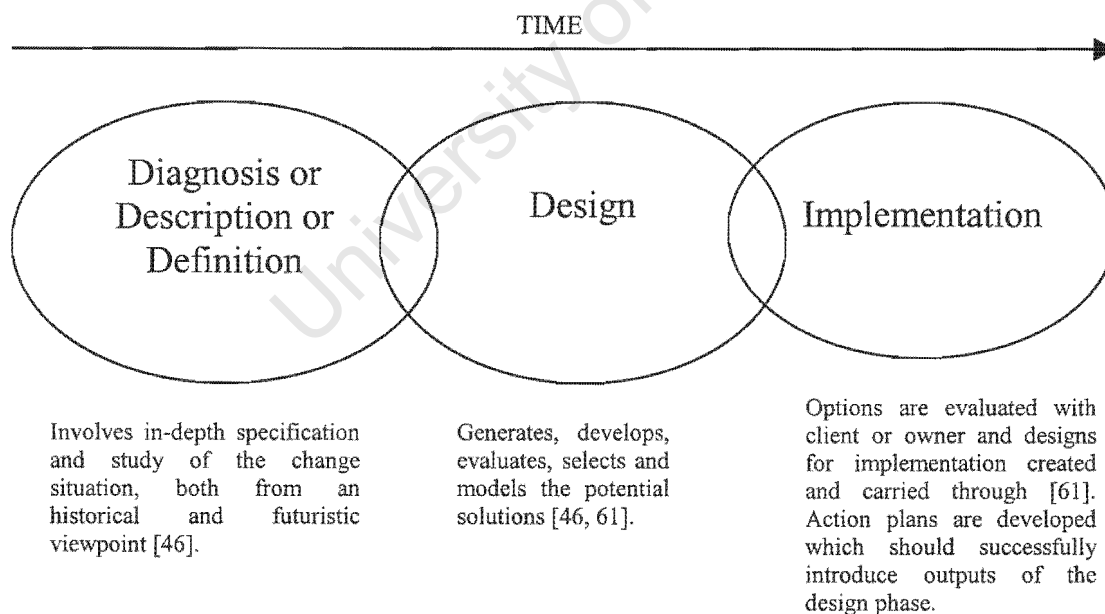


Figure 11.0 Phases of Systems Intervention Strategy Model

Broadly, the investigative procedure associated with the model is as follows [46, 61]:

- (1) Objective clarification
- (2) Data capture and performance indicators
- (3) Systems diagnosis
- (4) Systems analysis
- (5) Determination of solution options
- (6) Evaluation of solution options
- (7) Implementation of solution
- (8) Appraisal and monitoring and feedback

The actual terminology used to describe component parts of the model and the emphasis placed upon various elements within each phase may differ from person to person, but the underlying framework remains unchanged [46]. In this research study, the model was applied in improving many aspects but not necessarily in the order of steps shown in the investigative procedure. For example in Table 1.0, “No proper tools” is identified as a weakness that should be improved upon as follows:

- (1) clearly state and define the problem with reference to the past and future
 - no proper tools for all works at the earth station department
 - the objective is to have up-to-date tools that are relevant and suitable for use in all equipment units
- (2) state the methods of collecting data from the organisation performance indicators
 - interviews and discussions with the former and present earth station staff
 - check the list of tools that was supplied when the earth station was launched
- (3) analyse the data in order to exactly locate the root of problem
 - tools were mostly stolen by the former Earth Station Manager and some of the staff members
- (4) propose solution(s) to the problem

- budget for the tools and eventually purchase them when the budget is approved
 - increase tools logging during borrowing
 - increase staff awareness and responsibility towards securing tools
- (5) evaluate the solution(s) and the possible consequences of implementing the solution
- budget approved, but staff buying into the idea of securing tools is vital
 - Earth Station Supervisor to check and monitor tools borrowing and track the tools at all times
- (6) implement the solution
- tools are purchased
- (7) appraise, monitor, provide feedback and review results
- forms for logging tools are designed, borrowed tools are tracked and any problems discussed in general meetings

This is just a demonstration of an application of the model to only one aspect of the earth station. However, many aspects have been similarly improved upon.

The systems intervention model Figure 11.0 emphasises the linkages between phases. In particular the need to strongly consider implementation issues within the design and evaluation phase to ensure acceptance of the change at a later stage is stressed. Each stage is linked to the next stage or phase.

Chapters 2.0 and 3.0 have analysed the situation (system diagnosis), designed intervention strategies (solution options) to remedy the problem situation and implemented the intervention strategies in an effort to bring about an improvement to the situation at the earth station department. That is, three major components have been covered: identifying the core issue, diagramming and analysing the problem, and designing the actual intervention to improve, which by its very nature interactive, challenging and non-linear to provide Deming and Revans learning processes. A number of dynamic environmental

factors [ibid.] that influence the way the earth station department works have been discussed. Most of the weaknesses within the earth station department are likely to reoccur unless a more permanent solution is introduced. Seemingly, advantages brought about by the strengths and opportunities are not optimally utilised. Cognisant of these issues and many others, the need was identified to re-organise the earth station department.

To end this chapter, systems intervention strategies have been designed, built and successfully implemented. These strategies have been applied to a wide range of situations that need changing and improving upon. For example, retrenched and remaining staff members are provided with advice and assistance towards coping with the trauma and stress resulting from the privatisation process. Monumental changes and improvements have been realised and achieved in training, teamwork, equipment fault diagnosis and clearance, work attitude, communications and performance to name a few. However, it has not been possible to quantify the qualitative successes made at the satellite earth station department. Systems intervention model is developed to serve as a guide when problems necessitate intervention. The model has not been extensively tested in real world and its practical limitations are not known.

Furthermore, systems models were developed to provide relevant frameworks for dealing with chronic problems. However, systems intervention falls short of providing a permanent solution to the weaknesses and deficiencies. It becomes important therefore to develop a more permanent framework.

Chapter 4.0 looks at re-organisation or restructuring of earth station department necessitated by operational requirements and an urge to develop a dynamic, adaptive, customer-oriented and viable organisation that would remain robust in the midst of business turbulences.

4.0 SATELLITE EARTH STATION RE-ORGANISATION

In Chapter 3.0, systems intervention strategies have been designed, built and implemented. The current chapter looks at the re-organisation of the satellite earth station department aimed at developing and achieving a more robust and dynamic organisation structure. The re-organisation is performed in order to address the core problems of this department, which mainly stem from poor and obsolete structure. The re-organisation is achieved by applying both the Stafford Beer's (1985) viable system model and Peter Checkland's (1951) formal system model.

4.1 Introduction

The current earth station department structure (Appendix F) is both ancient and obsolete, and incapable of meeting customer demands, serving today's dynamic business interests and caring for its people. Many of the problems have grown up with the organisation during and after the nationalisation policy of the mid-80s, in which Lesotho's citizens were to replace all expatriates. The departure of the expatriates has seen confused accountabilities, territorial disputes, empire building, lack of teamwork and competition, demotivated people and anti-senior management sentiments resulting in unceremonial dismissal of L.T.C. top management team in 1996, and many other problems. The Earth Station Manager's post too has been vacant since 1995 when the incumbent was promoted to the L.T.C. top management. The earth station department has therefore remained without the crucial decision-maker, discipline enforcer, workers motivator and far more importantly the over-seer of all earth station activities. The Earth Station Manager together with the staff, according to Minnich et al (1966), forms the "decision centre" necessary for extremely important decisions affecting organisation's profits, growth and long-term viability.

Many of these problems and many others in the earth station department can be traced back to the structure of an organisation. The parent organisation has on a

number of occasions contracted highly-paid consultants to assist in the process of re-structuring. The results were total chaos and confusion worse than before the re-organisation process. Amidst the current state of chaos and confusion, the Government's Privatisation Unit found it necessary to seek strategic partnership to be engaged in the telecommunications business in Lesotho. Workers have been laid off and the remaining few are requested to work harder and turn L.T.C around [18] and hence the earth station unit.

Traditional ways of pushing people to work harder, personally solving a few pressing problems, or replacing a few managers do not deeply and genuinely address the root cause of chronic and serious problems. Organisational issues like structural adjustment necessitated by operational requirements should not be addressed "as time permits" [40].

Previous chapters and sections of this report have identified a number of issues or problem areas. The above-mentioned or discussed problems too cannot be addressed by cultural statements, methods or technologies. The only effective answer is restructuring or re-organisation [ibid.] in which process a new structure is designed or an old one is updated to clearly show and display patterns of interactions and interrelationships among key components [54] of the organisation. The inevitable changes that the earth station department undergo are seen as both effective and efficient in rooting this organisation off the chronic structure and management problems. The ultimate goal is to have a healthy and viable organisation in which everyone can succeed.

The Stafford Beer's Viable System Model (VSM) was introduced to the team as an important building block in organisation structure design. The VSM structure was discussed and resemblance to the existing earth station structure was discussed and explained in terms of functions, duties, roles and lines of authority and responsibility within each department. Many deficiencies on the present earth station structure that was developed in 1984 were identified. The

existing earth station department structure has not been in operation for some time now and was viewed as a “white elephant” that is occasionally applied when it suits management interests. Naturally, everybody does any job that is assigned to him/her especially in the current state of lack of job descriptions. Allocation of labour, according to Ackoff, necessitates a need to organise hence apportion the work and resources accordingly for performance and fulfilment of specified and described jobs.

The Formal System Model (FSM) was also introduced with the hope of using it to re-design the earth station department. The three sub-systems that constitute the FSM were discussed and examples from L.T.C. were used to demonstrate. For example, Finance Division and Human Resource Division are, under normal circumstances, responsible for financial and people performance-monitoring respectively and reporting to relevant departments.

In each of the VSM blocks, the three FSM sub-systems are superimposed to form a top layer as shown in Figure 12.0. This ensures that each block of the VSM has in-built to it the transformation-effecting, performance-monitoring and decision-making sub-systems. For example, VSM system one (S1) must, in addition to all its functions and responsibilities, have the transformation-effecting, performance-monitoring and decision-making capabilities. The FSM sub-systems in essence become part of each of the VSM block. The idea is to ensure effectiveness in all the functions and responsibilities bestowed upon each department.

In each of the five systems S1 – S5 (not all shown) that characterise the VSM, the three FSM sub-systems are superimposed as shown in Figure 12.0.

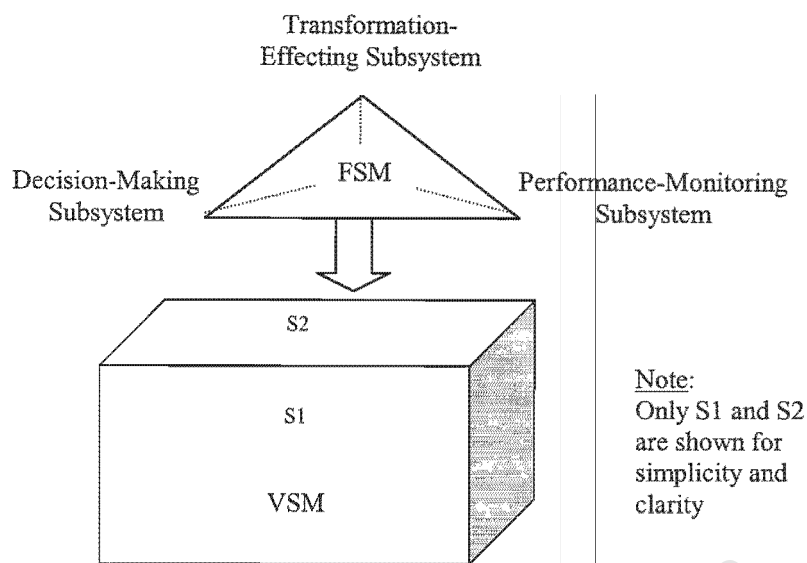


Figure 12.0 FSM Intergration into VSM

Based on the concepts of VSM, FSM, INTELSAT videos and personal experiences from staff members, the new earth station structure is developed. This structure is flat and directs maximum amount of organisational muscle towards customer satisfaction. It also promotes among others teamwork, less bureaucracy, information flow, transparency and proper placement of workers within the allocated areas of responsibility.

4.2 Satellite Earth Station Organisational Requirements

The deficiencies and ineffectiveness of the earth station structure which was designed to do a good job in the past decades and now no longer equipped to address the challenges of today's business environment, have already been mentioned.

Liberalisation of telecommunications markets and the introduction of competition have become worldwide trends and ineffective organisation structures have no role. The global information society, in which economic and social activities increasingly depend on access to and use of

telecommunications and information services, is being created. The dramatic and inevitable changes that force organisations like earth station department to be customer-driven [38] make it necessary to review the earth station department structure and mission, the core of which was established 20 years ago, in order to align its functions and operations with the global trends in the telecommunications industry. The earth station section must always move forward if it is not to be left behind and in the dark.

In order to match the speed of change and maintain the earth station department's central position in the world of satellite communication, a mechanism or model is required and should be established for continuing review of the satellite earth station department structure and mission for the 21st century and beyond. The envisaged organisation development model should ensure dynamism and lead to long-term viability of the earth station department in the rapidly changing business environment. Thus, the improvements at this place must continue beyond this research study.

Driven by liberalisation, increasing competition, technological advances and ever-increasing demand for new and differentiated quality services at low costs, the next century (21st century) will herald unprecedented changes in the satellite communication market. And the Ha Sofonia satellite earth station department must develop and possess capacity to handle and adapt to the variety inherent to these changes of seismic proportions. This can only be achieved if the earth station structure is both dynamic and adaptive to the changes in the business environment.

Modern business organisations like the satellite earth station department operating amidst the above-discussed and other forceful environmental and business requirements or factors should live up to the challenges by building "flexible, entrepreneurial organisational structure" [40].

The satellite earth station staff and the author sat down and discussed the modernisation of the earth station as a whole by changing the structure. The staff members gear for the real challenge of steam and determination for the upcoming long, adventurous and onerous journey. It has to be emphasised that the new structure would not, in any way, affect L.T.C. own designed earth station structure. The new structure would only compliment the existing structure since both the author and the earth station staff members have no authority to change L.T.C. organisational design. This new structure is only designed to allow and enable the author and the staff of this unit to improve the situation. Recommendations for approval and adoption by top management would be initiated once success is eminent.

4.3 New Organisation Structure

Several issues that were crippling the economy and well-being of the earth station department have already been mentioned. Operational requirements of this department relating to its primary objective of providing world-class satellite communication services in the harsh realities of today's business environment have also been discussed.

A completely new and systemic approach to organisation structure design was taken, drawing lessons from the disastrous re-organisation of L.T.C. in 1996 in which case a great reversal of fortunes took place, profits plummeted drastically and probably never to be regained till today. The re-organisation was aimed at achieving far-reaching and radical changes in the earth station structure and work organisation in general to address the fundamental causes of the problems, pulling all resources and experiences together into the design. Business processes were identified and improved upon or redesigned to achieve effectiveness and efficiency.

Section 3.1.1.4 discussed some of the experiences abroad and the knowledge obtained and imported from the referred world-class international earth

stations. INTELSAT videos on Earth Station Operations and Maintenance were watched and used to compliment and enhance this knowledge. The videos show, in some details, the principles and methods of effectively and efficiently running and operating earth stations. According to INTELSAT, satellite earth stations have two important functions namely, Administrative and Technical functions.

Another milestone during this research was when successfully convincing the Director that the post of the Earth Station Manager needs to be filled up urgently. Unfortunately it took too long, but eventually Mr. Lephoi Ntsoebea⁷ was appointed as the Earth Station Manager in February 2000.

What basis was used in changing the earth station structure? Many problems have already been discussed which stem from the way this department is structured and organised. The structure is ancient and obsolete as well. In designing the new Ha Sofonia satellite earth station structure, the following steps were taken:

- (1) study and discuss the organisation structural design framework - VSM and FSM
- (2) study and discuss the present structure, noting deficiencies
- (3) watch INTELSAT videos on earth station operations and maintenance, making necessary notes
- (4) identify and list all functions and activities expected out of an ideal earth station. The following were identified:

- | | |
|--|--|
| • Operations and maintenance | • Discipline |
| • Service delivery | • Staff performance |
| • Cleaning | • Performance of earth station (including equipment) |
| • Security | • Supervision of overall earth station activities |
| • Finance/budgets | • Documentation and filing |
| • International correspondence/foreign affairs | • Mail delivery |
| • Welfare (social) | • Training |
| • Safety | |

Most of these functions are not performed or are partially performed. It becomes important and necessary to reorganise.

⁷ Mr. Ntsoebea, a graduate of N.U.L (May 1989) and UCT (Dec 1998), Earth Station Supervisor - 1999

- (5) provide, based on VSM, FSM, INTELSAT videos and personal experience, functions and responsibilities that the Ha Sofonia earth station is ideally expected to fulfil in order to run effectively and efficiently
- (6) arrange functions, responsibilities and duties under general headings

- Earth Station Manager: supervision of overall activities of earth station, discipline
- Resource Development: training, finance/budgets, performance of earth station (equipment)
- Foreign Affairs: international relations and correspondence, projects, safety
- Internal Affairs: security, welfare, cleaning, documentation and filing
- Operations and Maintenance: all operations and maintenance of equipment, spares

The re-organisation exercise ultimately raised the formerly centralised organisation (Appendix F) to the status of four semi-autonomous departments [1]. The four departments, headed by the Earth Station Manager, are *Foreign Affairs*, *Internal Affairs*, *Operations & Maintenance* and *Resource Development*. Each department was assigned a task of formulating procedures, regulations and rules necessary for it to perform its function. These guidelines would be discussed and approved, if appropriate and correct, in the general departmental meeting. These procedures, regulations and rules are guidelines outlining performance of duties and distribution of responsibilities during implementation of intervention strategies aimed at improving the situation.

These duties are then grouped under general headings such that, where possible, similar or related issues are under one general heading. The general headings (now departments) that are to be discussed in details later are:

(1) Earth Station Manager

Some of the responsibilities include the following:

- Supervision of overall activities of the earth station department
- Discipline/staff performance
- Representing earth station in the top management meetings
- Earth station budgets and finance management

(2) Resource Development

This department deals with, among others, the following:

- Training
- Earth station performance (both staff and equipment)

(3) Foreign Affairs

- International relations and correspondence
- Projects
- Safety

(4) Internal Affairs and

Responsible for among others, the following issues:

- Welfare
- Security
- Cleaning
- Documentation and filing system
- Entertainment, sports and recreation

(5) Operations & Maintenance

This unit is responsible for operations and maintenance of among other the following equipment:

- RF wideband
- Control & Supervisory and Backhaul
- Ground communications equipment
- Power and air-conditioning
- Test equipment and testing facilities
- Antenna, antenna feed and antenna subsystems

The basic idea at the earth station department was to produce an organisation structure that promotes and facilitates teamwork, communication, less bureaucracy (few layers), innovation and creativity, employee motivation, customer focus, and many other management and organisation improvement issues that enhance desire to become world-class satellite communications service provider. The new Ha Sofonia Satellite Earth Station structure is as shown in Figure 13.0

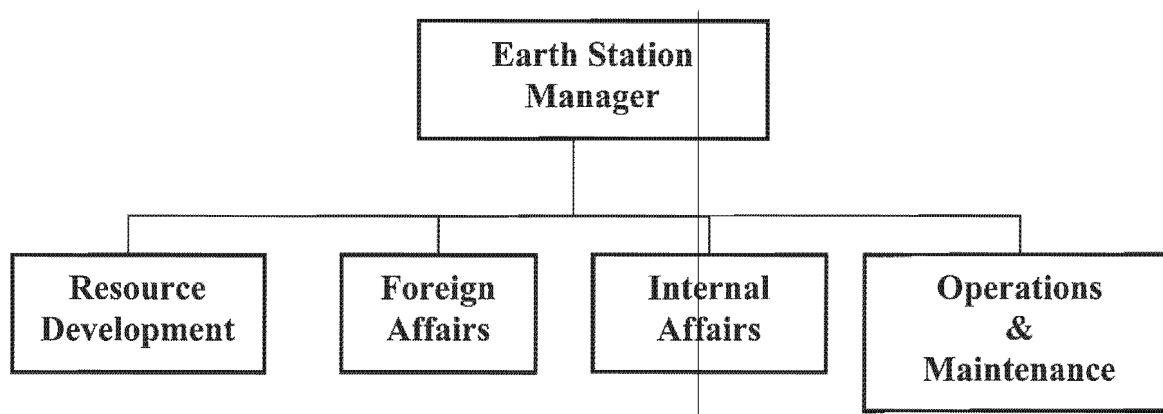


Figure 13.0 New Earth Station Organisation Structure

The task of properly placing people to man the new organisation structure began as soon as the structure is completed and departments are formed. Each department was manned by two people on a rotating basis. Using teams normally produces outstanding payoffs since good teams produce more complete solutions, better planned implementation and greater organisational commitment. Peoples' rotation is intended for personal development, exposing each member to a large variety of activities of an unstructured and certainly non-training variety through which team members learn. Operations and Maintenance was manned by three staff members because of the amount of work involved in this department. This department, without belittling other departments, is the core of the business as it deals with technology. However, all departments are equally important and compliment each other. The best technology, for example, without good people is useless. Each departmental team is asked to formulate, as already mentioned, the procedures and rules that guide and govern its department. The new procedures and rules were corrected, modified if necessary and approved by a general meeting. In general meetings, each department is represented and expected to present progress report on the work of their respective departments. Problems are raised and solutions sought during these meetings, which cut across departmental boundaries. These regular interactions promote and enhance cooperation, and not competition which unlike cooperation, does not always lead to the best performance.

The next sections define and discuss the departments and the duties performed in each including procedures, rules and regulations that were emanated.

4.3.1 Earth Station Manager

Deming philosophy creates the right conditions for scientific methods to work effectively in management circles. By the same analogy, the earth station manager is supposed to be responsible for creating the right conditions for workers to work effectively and comfortably. The earth station manager is the overall-seer of all activities of the department. This according to Ackoff means the earth station manager has the responsibility for the performance of the whole earth station department. As already mentioned, from the beginning of the research study until towards the end, there was no earth station manager. The earth station department suffered as a result of this prolonged power vacuum. Supervision was minimal. Unruly behaviour that required some disciplinary measures could not be attended to. Staff performance went unchecked. Morale was very low and a motivator was really necessary and needed. The earth station manager represents Lesotho Telecommunications Corporation in most of the international conferences and or meetings that discuss and plan the satellite communications issues. Most of these conferences were not attended and other international bodies and organisations did not hear the Ha Sofonia earth station's voice. INTELSAT space segment plans and allocations were often made to the disadvantage of this department and in deed L.T.C. as a whole. The earth station manager communicates all the requirements and plans of the earth station department to the top management during management meetings. In essence, these and many other activities that range from social, economic and technological nature received little or no attention for years. However, the earth station supervisor once appointed as supervisor in January 1999 worked very hard to establish and maintain the earth station homeostasis. Thus, most of all crucial issues were normally attended to even though with less authority and accountability.

According to Shewhart, change in management and other complex systems is the rule, and not the exception. Thus, the concept of variations is important and becomes an integral part of human life. As part of this research study, concerted efforts were made to reduce variation and the resulting confusion and chaos by proposing appointment of the earth station manager. Problems and disadvantages brought about by the absence of the earth station manager were presented to the Director. Recommendations were made and the Director understood and appreciated the concern and implications for prolonging the already long overdue a vacuum. It took time, but in the end, success was achieved as the new earth station manager was appointed (Appendix G). Although Deming and Shewhart believe that no system is completely stable, the belief that is totally embraced by the author, the appointment mentioned was hoped to bring the earth station into some stability for longer periods. This would enable staff members and the researcher (author) to learn and develop this department. The appointment would in addition to many other benefits, bring consistency in performance at the earth station department.

Theoretically, it is hoped that the appointment of the earth station manager, which has been vacant since 1995, would benefit this department. The earth station manager, giving the earth station supervisor a good chance to concentrate on technical functions, would address all administrative functions and duties. Specifically, the earth station manager [1] in addition to being responsible for performance of the whole department:

- (1) sets guidelines for and principles of the operations of all the subordinate departments
- (2) invests in the development of the subordinate units
- (3) maintains discipline and code of conduct as stipulated by earth station rules and regulations, all in line with L.T.C. Personnel Regulations
- (4) conducts financial, quality and security audit reports of the departments below
- (5) checks attendance records, leave applications, appraisal systems etc

A large portion of the research was undertaken during the period that there was no earth station manager. The earth station supervisor who participated wholeheartedly in the research activities and all improvement efforts is now the new earth station manager. The internal appointment has significantly reduced discontinuity in all issues and activities that were planned for the earth station department. The appointee is admired and loved by the employees. He commands an outstanding support, respect, passion and co-operation among all staff members. Some obvious results are already been obtained consequent to the appointment.

One is made to believe and agree with Deming that every change that makes an organisation less chaotic is an improvement. Of course, a journey of a thousand miles starts with a single step.

The earth station staff has succeeded in getting the appointment of the earth station manager. According to the pragmatic view advocated and embraced by Deming, only pure mathematics provides certainty. It is this view or notion that allows one to observe and wish well for the earth station department's efforts to improve and maintain viability in the long-term.

4.3.2 Resource Development

Both human and material resources are fundamental to the existence and operation of any organisation. The two most important resources the earth station has are people (human) and equipment (material). The Resource Development department is responsible for all resources of the earth station. Labour (manpower) is the only resource, in any organisation and in deed the earth station department that according to Van Dyk reacts when acted upon. Other resources and of course with the exception of human resources are static and derive their dynamic character from human resources.

The available resources, which are in abundance, are not strategically allocated and are heavily under-utilised. The earth station has, however, accumulated over the years a wealth of resources of almost every kind – human talent, technical skills, well known brands of equipment, high degree of closeness as a family, many of which have been developed by expatriates and have remained and grown with the organisation.

The earth station department has about ten technicians. Five of these technicians man the roster while others work on a normal shift, trying to address daily activities. The available personnel, contrary to what is happening, should be fully occupied everyday. This would justify their allocation and enhance productivity. Many of these people idle at work because the system has demotivated and demoralised them. The organisation structure has failed to place them accordingly. Lack of job descriptions has led people into not knowing what to do, when and how to do it. People just take instructions given by the immediate supervisor. The organisational culture needs to change, eradicating the “but we’ve always done it this way” attitudes. All issues likely to suppress change must be eliminated and earth station management needs to motivate and encourage staff.

Equipment as already mentioned in previous sections is highly under-utilised. Purchase of costly equipment units like the earth station has been budgeted for. The projected internal rate of return of the equipment should have justified the investment. The equipment is normally expected to payback its outlay after a certain period of time. This definitely necessitates full and optimal utilisation of equipment. Network or equipment optimisation brings profits and leads to viability in the long-term.

Training and development is vital to the optimal usage of both human and material resources.

Resource Development department is, further, responsible for preparing or making budgets, including monitoring usage of all finances of the earth station department. This includes purchasing and control of inventory and spare parts.

The procedures, rules, regulations, forms and general guidelines in line with L.T.C. policy have been designed for all units and responsibilities that fall within the Resource Development department. The organisational structure of the department is as shown in Figure 14.0. As can be seen, three subsections or units constitute the Resource Development department.

Resource Development team specifically carries out among other duties, the following:

- (1) design earth station training strategy that has to be revised regularly and also formulation of a suitable structure for this purpose.
- (2) formulate budgetary requirements for training and development and put forward the relevant recommendations to the earth station manager.
- (3) promote the efficiency and effectiveness of training.
- (4) equip the earth station staff with the skills, values and attitudes that are required to support the development of the earth station department and in deed in the process contribute to L.T.C. development.
- (5) optimise the trainability of employees, with special reference to satellite technology, reading and writing skills, numeracy, job skills as well as further training of workers.
- (6) design a qualification structure for training.
- (7) create effective mechanism for liaison between earth station training and L.T.C. Training School facilities.
- (8) promote the development of competent professional trainers among senior staff engineers, technicians and capable staff.
- (9) monitor and enhance performance of all resources.

These are few duties and many others would arise as progress is made and loopholes, if any, are observed and closed.

The three sub-sections that form the Resource Development department are as shown in Figure 14.0.

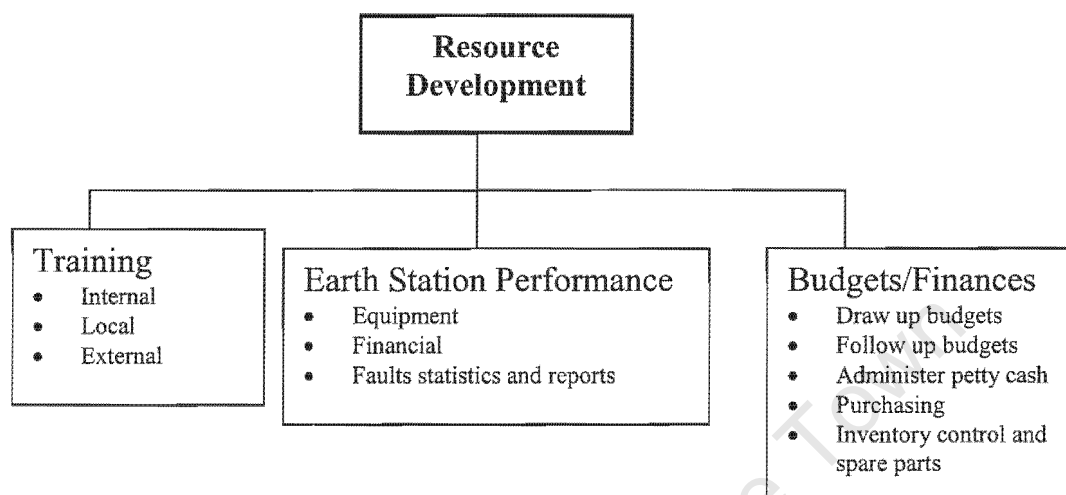


Figure 14.0 Resource Development Departmental Structure

The sub-units that form the Resource Development unit are briefly discussed in the following sections.

4.3.2.1 Training and Development of Human Resources

Able and motivated employees are the earth station department's greatest assets, and as P. S. Nel puts it, these qualities do not come naturally, and effective training and development are necessary to achieve the required level of competence. The development of human resources through training, workshops, and conferences is vital to the success and long-term viability of the earth station department.

In the context of the earth station department, efficient and effective management and utilisation of human resources cannot be overemphasised. All other resources derive their dynamism from human resources as already

mentioned. Thus, human resources play a key role in the performance of the organisation. The earth station department has a shortage of highly skilled and professional manpower. However, it has to be emphasised that the workers are very qualified and need training and development in the specialised fields of satellite technologies. The existing imbalance between skilled and unskilled personnel also contribute to very low productivity ratio which in return inhibits natural economic growth and hence employment opportunities in the industry. The recent retrenchments are just a piece of an iceberg in this sea of economic hurdles. As successful human resource management and utilisation envisaged by the new Resource Development department plays a key role in rectifying this situation, it should be given its rightful place in the management of the organisation - earth station department. Human resource management as Gerber, Nel and Van Dyk explain, proactively provides, maintains and develops individual and group efficiency and effectiveness in order to improve individual and group performance output. Training of personnel is therefore of utmost importance especially in view of the rapidly changing technology. Having realised the importance of human resources, the earth station staff and the author have appointed a team of two people to lay foundation for human resource training and development, management and utilisation. The team, like all other teams, would rotate once the guidelines are completed and approved.

In a relatively short term of office, the office of Resource Development carried out a number of activities.

The Resource Development team is vested with responsibility for training and development to ensure that the staff members, as the earth station competitive advantage, are competent and motivated. In achieving this, the team has developed guidelines for this department encompassing all issues related to human resources. Training and development as realised makes a significant contribution towards enhancing the quality of life at the earth station department. The team has initiated internal training, which is in progress as

already mentioned in the previous sections. Internal training is mainly organised and run by the senior earth station staff members in close collaboration with the trainee and or junior staff members. Training materials are made available to the trainees and mock examinations are prepared for and taken by trainees. These examinations are taken very seriously as they reflect individual's eagerness to learn and develop and their results may be considered when making nominations for further training activities. Individual's attitude, reaction behaviours and performance is monitored and appraised accordingly. Local training has already been sought even though no people have been sent to any local institutions. The requirements for local training are only computer and management related. It is worth mentioning again here that L.T.C. has suspended all training activities. However, as part of this research study, the earth station manager and the author were able to justify and secure some finances for training requirements. Excessive pressure justified by statistical data of faults and an eminent need for change were one of the simplest tactics used. This included demonstration pertaining to financial implications (possible revenue collection and the amount of money lost) if the current situation continues. International institutions offer external training that mainly involves hands-on equipment training. Four technicians were nominated and sent to Multi-Country Telecommunications Training Centre (MCTC) in Malawi for technical and telecommunications courses (Appendix H). The above-mentioned training and development activities are according to P. S. Nel designed to make every earth station worker more valuable to the department by extending his/her skills and knowledge, modifying his/her attitudes towards his/her job and adjusting his/her patterns of behaviour in the organisation. The training activities equip the earth station staff with applied skills for immediate application to a specific job.

As part of the improvement efforts and contractual obligations for equipment purchased from HNS, four technicians and engineers were also sent to Maryland, USA for a one-week equipment training (Appendix I). This hands-

on training activity equipped the four technicians and engineers with skills, knowledge and installation experience for the newly purchased DAMA Traffic Terminal. The training was scheduled and undertaken before equipment shipment and installation so that the trainees could participate in the installation, testing, configuring and commissioning of this equipment. The trainees and earth station “experts” on DAMA apply knowledge, skills and positive attitudes in order to achieve the objectives of the Ha Sofonia earth station department.

The inter-country training and co-operation promotes technology transfer, cultural tolerance and enhance experience. These activities form an integral part of human resource development that is vital for advancement of the telecommunications network necessary for economic growth and development.

4.3.2.2 Earth Station Performance

During expatriates’ administration in the mid-80s, general performance of the earth station department was monitored and regularly reported to the Director. General performance in this context means equipment, financial and personnel performance. The initiative died a natural death after the departure of the expatriates and the introduction of nationalisation policy of the late-80s. However, the status quo cannot be allowed to continue any longer.

Concerted efforts were made by both the earth station staff assisted by the facilitator (author) to improve and enhance the general performance of the earth station section. The Resource Development team is charged with the responsibility of earth station performance. The earth station is a technology-driven enterprise. It is crucial that equipment performs up to the expected standards and levels and consequently generate profits. Generated profits are proposed to be directly reflected on to the earth station staff benefits, thus rewarding and motivating the staff members. The equipment performance is now monitored and necessary adjustments are made in order to achieve

optimum performance and resource utilisation, and hence improved earth station output. The newly purchased and installed DAMA traffic terminal is intended to drastically reduce operating costs and INTELSAT space segment charges that were inherent to its predecessor technology – single channel per carrier (SCPC). The SCPC technology, which was naturally more costly to operate than DAMA, was obsolete and its spare parts were no longer available. Repair and maintenance costs escalated and service-disrupting outages became a norm. The DAMA terminal is therefore going to help the earth station save a lot of money. This is a more reliable and latest technology that is flexible and able to carry a number of countries. The new technology of the 1990s replaces the ancient technology of the 1970s to enhance performance and improve service quality, reliability and availability, all of which means customer satisfaction.

As part of the improvement efforts and general desire to optimise equipment usage, the author was asked to carry out feasibility study and report to the Director regarding the possibility of redeploying the former BBC antenna and its related subsystems. The report (Appendix J) shows that earth station and indeed L.T.C. could benefit and improve revenue collection if the said BBC equipment that is now idling could be used to access the Indian Ocean Region (IOR). The L.T.C. Planning Division, the only custodian of major projects, took over and initiated the redeployment. Progress on this project is regularly monitored by the newly appointed Earth Station Manager. Success of this project would redeem the L.T.C of heavy transit fees paid out monthly to large transit centres like Telkom SA, BTI, and AT&T. Eventually revenues would be made from savings in transit fees and settlements of direct international traffic to countries in the IOR like China, Taiwan, Pakistan, India and many others that are not directly accessible at the moment.

The earth station department in the past used to know its expenditures, revenues and profits generated. The earth station department is generating a lot

of money from international traffic. However, this department is not aware of how much it generates and what portion it gets in order to re-invest and improve performance and staff benefits. This was practised during the German expatriates administration and later died a natural death after expatriates' departure. As part of change introduced, financial performance is regularly monitored and reports published. The reports show expenditures, revenues and profits generated. Prediction or budgets are also made based on the traffic in minutes that is carried by the earth station to the outside world. The reports graphically display or show how the earth station financially performs, what portion does L.T.C allocate to this section, how the obtained revenues are consumed and so on.

Collection of faults statistics is another fundamental and vital exercise that measures performance. Statistics of all faults and outages was always logged down nicely and graphically displayed during the expatriates' administration and some few years after the nationalisation policy of the late-80s. Monthly reports detailing the nature of fault, duration, how it was cleared, spare parts used, and technician clearing the fault etc were the norm. The outage reports were always communicated to the affected distant correspondent organisation. These reports were further helping in appraising technicians on the basis of faults cleared. The local or national administrators showed little or no interest and this statistics became irrelevant. It is however, worth mentioning that faults logging is still carried out even today though in a rather haphazard, purposeless and disjointed manner. The reason may be directly related to the fact that people do not see any value in collecting something that is never used.

In an effort to change, the importance of faults statistics and fault or outage reports that highlight the earth station equipment performance was emphasised. The statistics directly puts the earth station department management and staff in a clear picture of network and equipment performance. Statistical charts are used to represent facts or information in a clear, visible and understandable

manner. Network failure and unavailability of service when customers need it most is a serious let-down. Preventive maintenance is stepped up and drastic changes have been implemented to reduce faults and outages. In deed, unlike before, all faults are cleared within a day or two while service is normally restored within minutes. Faults and outages result from human error, equipment fault, natural causes like storms and many others. Efforts have been made to minimise outages resulting from human error, which unfortunately account for more than 70% of earth station faults. Training and development activities as already discussed are hoped to increase staff's skills and competence levels in handling equipment. Routine checks of equipment operation is improved and enhanced. Usage of logbooks as faults recording facility is improved, thus ending its current misuse as attendance record used for logging names of operators. All faults are recorded and reports produced monthly. The collected fault statistics is entered into a personal computer and processed accordingly.

Many factors come into play when considering performance of the earth station as already discussed. The earth station department performance depends solely on both the interactions of its parts, and its interactions with other departments within L.T.C. and its environment.

Procedures on earth station performance in general, covering human, financial and equipment have been completed. Appropriate forms have been improved or re-designed to provide necessary details or information. Completed forms are checked by the earth station manager each morning and afternoon.

4.3.2.3 Budgets/Finances of Earth Station Department

During expatriates administration, the earth station department used to draw its own budget, follow up and monitor usage of the budget, keep and regulate its own petty cash, initiate requests for purchase, obtain a portion of L.T.C. international revenue, control inventory and spare parts and few others. The

power vacuum that the larger system – L.T.C. has created, mismanagement and misuse of the facilities led to the collapse of these crucial activities.

Prior to the change initiatives, the earth station was still drawing up its own budget. However, and very unfortunately, there was no follow-up and monitoring. Purchasing was not in any way related to the budget. Purchasing was rather haphazard, uncoordinated and non-correlated to the budget. Purchase of unbudgeted and unplanned materials was still normal. The earth station no longer keeps petty cash. In the past, the Earth Station Manager used to misappropriate and divert the petty cash to personal matters. The Director then removed this facility from the custody of the earth station. However, petty cash request forms are still used to obtain petty cash from the Director's office. No efforts were made to change this arrangement because everybody seems content with it. After all, petty cash is always available as and when requested.

As part of the new initiative, the earth station annual budget is drawn, regulated, monitored and followed up by the Resource Development unit. Budgets would no longer be diverted from the intended plan. Balances from previous budgets are to be carried over into the next financial year. Petty cash requisitions for purchase of small items and the actual purchasing process are the responsibilities of the Resource Development unit. Only time will tell as this is the first year of improvement efforts and no tangible results can be cited in this respect. However, the Earth Station Manager (assisted by the author) promised to keep momentum.

A seminar on purchasing procedures and proper use of account classes and codes was organised by L.T.C. Finance Division. All senior staff members who are allowed to initiate purchasing were afforded a chance to participate. Purchasing procedures established in 1989, but new and strange to the participants were clearly explained and discussed in an interactive manner. This was a learning curve to many people who participated. These procedures

included steps taken to request stock items from L.T.C. own central stores. These procedures further include steps taken to obtain non-stock items. Participation and involvement in this seminar or workshop gave earth station staff exposure to some of the unknown purchasing rules. The earth station staff members initiate purchasing of non-stock items or request stock items from central stores on a regular basis.

The purchasing of spare parts and control of inventory are the duties performed by the Resource Development unit. In line with L.T.C. purchasing procedures, this unit controls, regulates and maintains inventory for the earth station section. Labelling and placing of identification tags on all spare parts modules, which was not done previously, has been undertaken. The storeroom was cleaned and organised. The responsibility for initiating purchasing of all materials on behalf of all other units/departments in the earth station lies solely with the Resource Development department. It is vital and mandatory therefore that all departments constituting the earth station department work closely.

The Resource Development department is the sole custodian of earth station resources and development thereof. This department produces schedules for internal training and obtains information on both local and external training. It further ensures that the available human resources are competent, capable, skilful and productive. Material resources like equipment are optimally utilised to enhance performance. Performance of duties and tasks by staff is monitored and managed and recommendations made and submitted to the earth station management. All these are done in appreciation that resources are key to the existence, success and viability of any organisation. Much work still remains even though concerted efforts made have dramatically transformed the workplace.

4.3.3 Foreign Affairs

Exploration of the external environment and the future of the earth station department are, according to Clemson (1984), a full time job since this department is not a closed system. Although this organisation has little influence to the outside world, information and knowledge about the events or behavioural patterns in the contextual environment is crucial as this environment has important “repercussions for the organisation” (ibid.). Today’s liberalised and competitive markets and changing technologies with huge influence brought about by the information age of internet, e-mail, e-commerce etc is such that “the rest of the outside world is irrelevant” is the inconceivable thing of the past.

Prior to the improvement efforts, no resources were dedicated to the issues of external affairs. It was everybody’s responsibility, and accountability was rather difficult to establish and maintain. The linkages that represent interactions and interrelationships between earth station department and other L.T.C. departments were not given any meaningful consideration. Flow of work and information from other sections was not well co-ordinated. Correspondence did not normally receive immediate and due attention. Filing and responding to external correspondence was nobody’s business and was left for voluntary people. In most cases, the earth station manager had to assign workers the tasks of attending to external or foreign matters randomly and haphazardly. Establishment of smooth working relations with other departments and international satellite earth stations was never given attention it deserves and as such was never dreamt of.

Projects at earth station were also not well organised and managed. Local staff, unlike now, could not participate in installation and commissioning of new equipment, which was the territory of the foreign experts only. Documents relating to each project were never properly filed by that particular project.

Health and safety, one of the earth station's previously remotest and never-thought-of aspects, relate to issues of health and safety associated with work environment. Health and safety is normally a human resource department function. At the earth station department, it was allocated to the department of the Foreign Affairs only to avoid imbalances in duties performed by each department. Some occupational injuries and illnesses are, according to Gerber et al, the result of emotional and behavioural factors, and are directly linked with physical work environment. The characteristics of the work environment associated with injuries are safety risks. On the other hand, characteristics in the work environment associated with occupational diseases are health risks.

The Foreign Affairs department is allocated a team of two people who would rotate as soon as operating procedures are completed. This management team is specifically responsible for among other things the following:

- (1) "enforce" adherence to and observation of safety rules
- (2) protection of both human and material resources
- (3) minimising of exposure to health and safety hazards – labelling and marking of danger areas and items
- (4) overseeing of minor and major projects
- (5) keeping of projects files
- (6) international liaison office for the whole earth station department
- (7) receiving and filing of international correspondence
- (8) ensuring that international correspondence is responded to dully and timely.

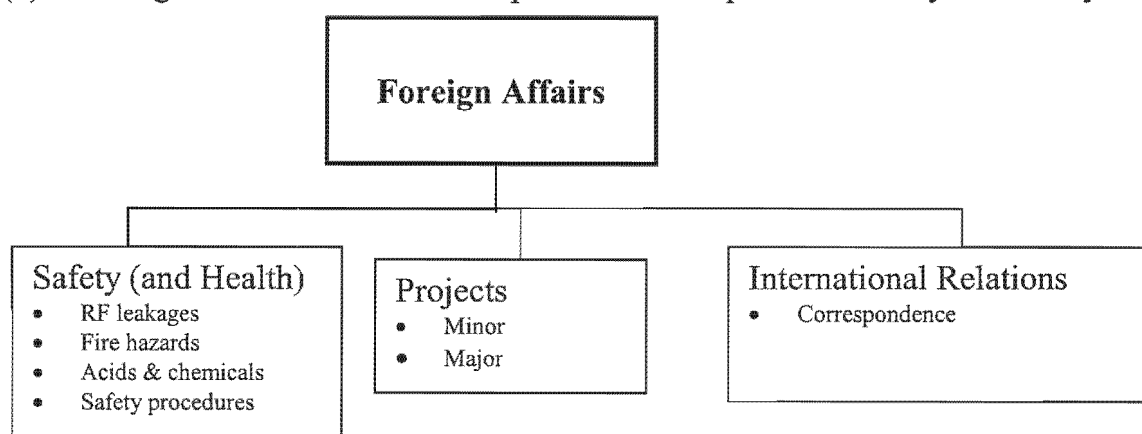


Figure 15.0 Foreign Affairs Department

The sub-units that form the Foreign Affairs department are shown in Figure 15.0. These units will be discussed in the next sections.

4.3.3.1 Health and Safety

In any working environment, health and safety precaution measures are primary concerns. Gerber, Nel and Van Dyk emphasise this further by saying today's managers have to deal with what Deming calls a complex set of problems threatening the health and safety of employees in the work situation. According to Ackoff (1994) also and under normal working conditions, health and safety of employees receive increasing attention from unions and administrations of organisations. Health and safety in the work situation depend upon factors such as right layout of work places, standards, equipment and other physical conditions. Information about what a specific job entails, and the type of employee needed provide the information for establishing safe work procedures. The copies of the Health and Safety Act 85 of 1993 were also obtained from SABS offices in Pretoria, South Africa. These copies (17 of them) provided a vast amount of very important information that was used in developing earth station health and safety procedures. The health and safety procedures and guidelines in the earth station section are designed and intended to protect both people and the expensive equipment that constitutes the satellite earth station. Job analysis undertaken gives the opportunity to identify and expose unhealthy and limiting environmental factors such as noise, heat, voltages, space, dust and many others. Many accidents that occur at non-mechanical work normally result from inconspicuous hazards that staff members and people in general cannot see and perceive as dangerous off-hand.

Warning labels are placed around dangerous pieces of equipment, hazardous places like antenna feed areas and high voltage areas like HPA, mains voltage switch to caution workers of possible dangers. In liaison with the department of the Internal Affairs, high standards of cleanliness and hygiene are developed, maintained and checked regularly.

The earth station equipment radiates high frequency signals to the satellite some 36 000 kilometres up in space. These frequencies are hazardous on contact with the human body. Unlike in the past, the present improvement efforts highlight the importance of safety. People are guarded against hazardous Radio Frequency (RF) leakage (radiation) that is capable of maiming and possibly and eventually taking life. RF leakages are not visible to the naked eye. RF detectors have been purchased from Wandel and Goltermann, German subsidiary company. The detectors are used to detect and warn the staff of any excessive exposures or contacts with RF frequencies. Forms (Appendix K) have already been completed and routine checks of RF leakages are carried out. Any leakage is noted down in the relevant form. Staff and management are notified.

Also, acids and chemicals can be very dangerous and deadly if care is not taken. Few acids and chemicals are used at the earth station. These include sewerage drainage chemicals, antenna cleaning and greasing agents. These acids and chemicals have previously been stored in the workshop. As part of this research, the workshop was thoroughly cleaned and made free of all items not used for workshop activities. Only tools are left in the workshop. New tables and working benches were placed. Other items including battery chargers, acids, chemicals, test equipment, spare parts modules and many others were accommodated in the storeroom. This exercise was initially performed in liaison with the department of the Internal Affairs to ensure enough space, cleanliness and orderly placement of items in the storeroom. Forms have been put into use for recording acids and chemicals.

Another most serious threat to the earth station in the past had been fire. Many pieces of paper, files and books were lying around and crowding all equipment rooms. The worst affected area was the battery room which was full of papers, files, books and boxes, most of which have been there since the construction of the earth station in 1984. The safety sink strategically placed in the battery

room was completely covered and unknown to many staff members. The safety sink, under normal circumstances, is the first and primary tool for treating acid and or chemicals spillage that makes contact with bare skin. However, all these shortcomings have recently been changed as a result of the improvement or change initiatives. Fire extinguishers have been sent for service in order to improve their efficiency and effectiveness during fire. Forms (Appendix K) have been designed and developed to manage the servicing and general handling of fire extinguishers. Procedures on what to do in case of fire have been developed. Training on operation, application and use of fire extinguishers has been initiated and effected or undertaken. This training equips the earth station staff with fire fighting skills. Fire and or smoke detectors and alarms are already in place and operating as part of the new earth station improvement policy.

In general, procedures and guidelines aimed at protecting both people and property against hazards have been developed. Important health and safety equipment such as RF detectors, First Aid Kit, High Voltage probe etc is purchased. Public awareness of dangerous areas and hazardous places has been increased and enhanced.

4.3.3.2 Projects

In general, all sectors of the economy involve in projects at some stage during their business life. The earth station department involves in many projects necessitated by technological advances and customer demands. Some projects have been excellent success stories while others have been a near miss. Engaging in projects at times is purely for network improvement and or enhancement aimed at improving service quality in order to satisfy the customers. In the past years, the earth station section has experienced and carried out a number of projects including digitalisation of UK (1996), Deutsche (1997) and USA (1997) routes, installation and commissioning of optic fibre link between earth station and international switching centre (ISC)

(1996), installation and commissioning of DAMA traffic terminal (2000), to name a few. Any project involves a lot of documentation starting from design stage through to commissioning stage. Each project is detailed and documented in its own separate file. The file contains documents covering the project type, equipment needed, prices, feasibility study, maintenance, suppliers, training and many other project related issues. All documents are safely kept for future reference. In the past, these documents were not well controlled and managed. Only equipment operating and reference manuals are still available from most of the previous projects.

In the new dispensation, a totally different approach is used. Each project has its own separate file. All correspondence and documents relating to a particular project are filed chronologically. The test results or equipment line-up results from tests performed during commissioning are safely filed for use as a good source of information and reference guide as equipment ages and drifts from its operating position.

Contact persons and names of installing technicians are kept for use in future when problems arise. This information together with names, addresses and telephone contacts of equipment manufacturers are placed on the first page of the project file.

Steps and guidelines that guide the implementation of projects have already been successfully compiled.

4.3.3.3 International Relations

Many organisations lose touch with their external environment and eventually suffer from what Kimberly calls institutional paralysis. Learning is a fundamental benefit of interacting with and observing the outside world.

The Foreign Affairs unit is charged with the responsibility of international relations and correspondence on behalf of the earth station department. Before, anybody or the Earth Station Manager dealt with the issues relating to international relations. No correspondence was noted and or logged down, making it difficult if not impossible to account for any missing mail. Response to the incoming correspondence was the job of the often-busy Earth Station Manager. In most cases, delays in responding annoyed correspondents.

The international relations forms (Appendix L) have been completed and are in use. Any incoming or outgoing mail is jotted down or logged down in this form. The form details the reference number, date, time and recipient and intended person. The subject/title of the message is also noted down. The arriving staff normally checks the file for any messages that may need urgent attention. The white marker board is also used to relay some messages that are expected or to be sent out. The notice board is also effectively used as a message centre. In collaboration with the department of Internal Affairs, publicity of both national and international messages is enhanced and strengthened to the delight of all staff members.

The Foreign Affairs department's responsibility to the outside world cannot be overemphasised. Clear signals are read from the business environment and are properly interpreted to ensure continued operation and existence of the earth station organisation. Appointed departmental team uses its "radar" properly and to the fullest extent to achieve this. Based on the demands, projects are undertaken to timeously respond to the customer demands and requirements. In any work situation, and in particular in projects, precaution and health and safety measures are of primary concern.

4.3.4 Internal Affairs Department

In cybernetics terms, as Clemson (1984) puts it, the homeostasis of the organisation is crucial and needs to be maintained. Maintenance of the earth

station homeostasis ensures that all critical variables and parameters are kept within normal limits so that the whole organisation continues to function effectively. In pragmatic terms of Deming and Shewhart, this means minimising variation and operating the system within the control limits. The Internal Affairs unit management team has developed principles that guide maintenance of homeostasis of the whole earth station organisation.

The Internal Affairs department is responsible for the earth station cleaning, security, welfare, sports and recreation, and filing and documentation. The Internal Affairs unit is allocated two technicians on a rotating basis. The team specifically performs the following functions or duties:

- (1) cleaning of all equipment
- (2) cleaning of the building – inside and outside (surrounding)
- (3) security of the earth station property and assets
- (4) liaison office for contracted security and cleaning companies
- (5) cooking and food storage
- (6) sports, entertainment and recreation facilities
- (7) keeping attendance records, leave forms and other useful forms
- (8) general filing including creating personal files for individual workers

The sub-sections that constitute the Internal Affairs department are diagrammatically related as shown in Figure 16.0.

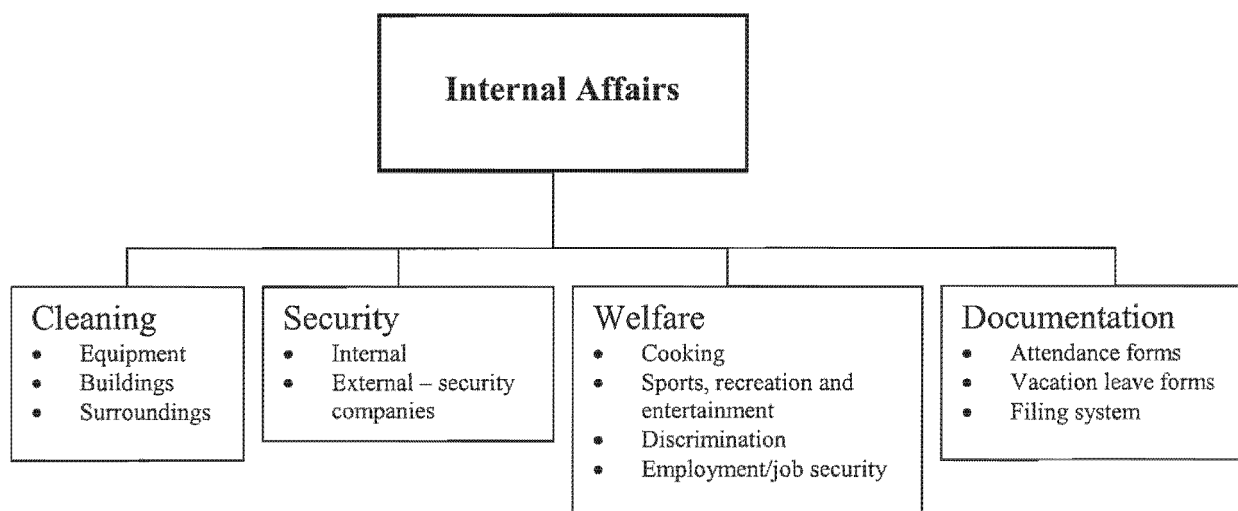


Figure 16.0 Internal Affairs Department

The units that form the Internal Affairs department are briefly discussed in the next section.

4.3.4.1 Cleaning

During the period when the German expatriates administered the earth station, cleaning policy was strictly enforced and became a culture. The then Earth Station Manager, Mr. Hilpman used to strike the floor with a finger (one stroke of the finger) and expected no dust on his finger. Otherwise, a cleaner was immediately reprimanded. This, however, like many other good things ceased. The inside and the outside of the building became very dirty. The equipment was covered with dust. The floor was normally dusty. The surroundings were full of long and uncontrolled grass. The plants that used to form a nice hedge became unmanaged bushes. The storeroom, workshop, equipment rooms, kitchen and battery room became very dirty.

In line with the new initiative, a large cleaning campaign was planned and effectively launched. The aim was to give the responsible team a kick-start ahead of a mountain of a job. The storeroom, which previously looked like Figure 17.0, was the first place to be cleaned. Spare parts were nicely shelved and labelled. Useless items were removed from the storeroom. Test equipment was also taken to the workshop. All equipment rooms were thoroughly cleaned. All unused test equipment, cables and other items that are not regarded as spare parts were removed from the storeroom. Staff members constructed cable trays in order to hang all different forms of cables according to their application or use.

Particular attention is now paid to the cleanliness and general appearance of the plant (equipment) and buildings including the whole earth station surroundings. Equipment is cleaned regularly (weekly). Equipment has been rearranged and properly organised. Unused pieces of equipment are removed from the

equipment rooms, thus creating space, improving safety and saving on cooling expenses.

The inside of the house is cleaned and polished daily. All rooms are nicely cleaned and polished as well. Kitchen and food storage are also cleaned daily. All utensils are kept clean and dry. This is essential for food handling, thus developing and promoting high standards of hygiene.

Surrounding is also managed well. A hedge is being rejuvenated. Flowers and new grass are being planted to improve scenery and beauty around the earth station complex.

The earth station cleaning code of conduct has been agreed upon. The cleaning company is contracted by L.T.C. and its activities checked and monitored by the management of Internal Affairs department.

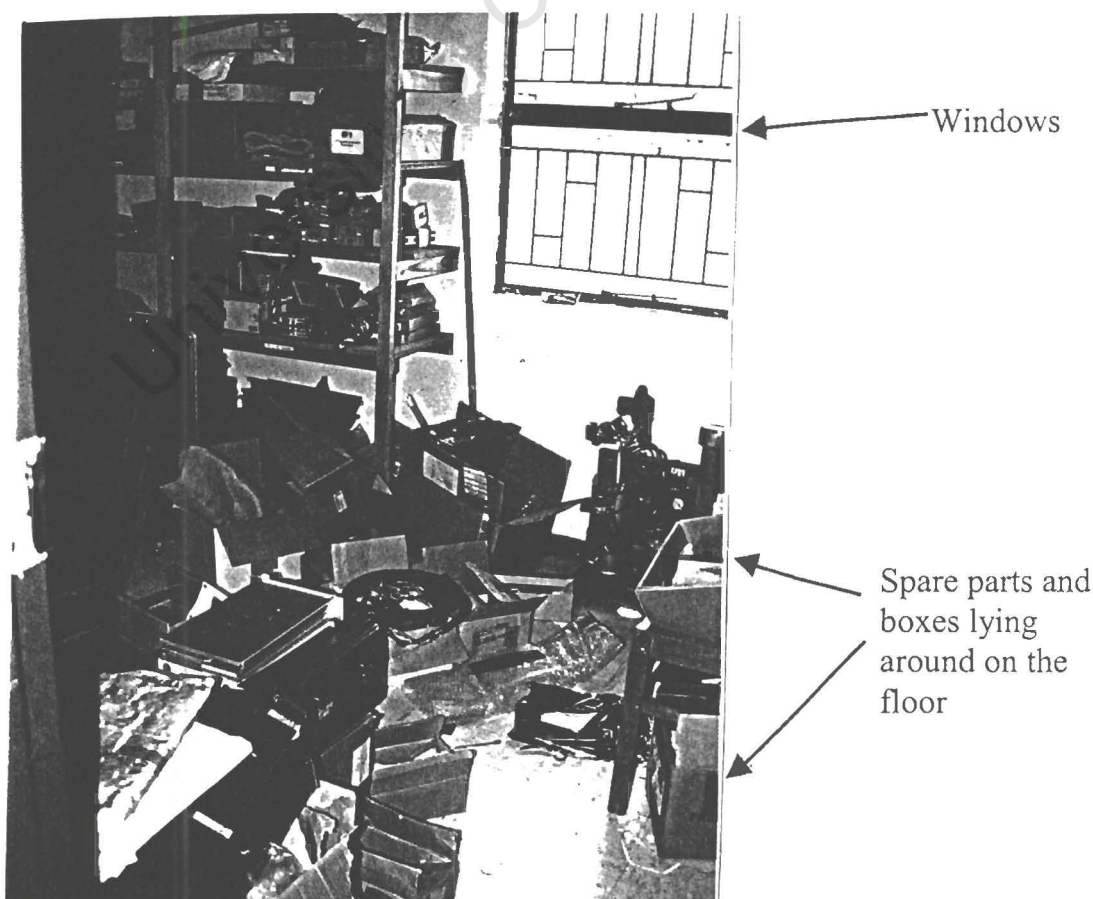


Figure 17.0 Earth Station Storeroom before Improvements

4.3.4.2 Security

In any organisation, and in deed the earth station department, protection of property and assets against any possible danger or risk is crucial and vital. Security relates to perceived threat and the preservation of group identity. The earth station department in addition to its valuable human resources has very expensive equipment that constitute the earth station, a few of which is mentioned in Chapter 5.0. Security at the earth station is the responsibility of the Internal Affairs unit.

Property

The earth station equipment, buildings, land and the overhead optic fibre cable are some of the important possessions of the earth station. Security of these assets is vital to the very existence of the earth station. Security has not, unlike other areas, been a problem in the earth station history. In the past, Basotho people were recruited and trained by the army for L.T.C. security services. These trained recruits reliably and consistently guarded the earth station property and other assets against any danger or risk. The main threats to the well-being of the earth station unit are vandalism and theft.

Disappearance of many tools and portable items from the earth station (Appendix M) is mainly attributed to the earth station staff. The previous Earth Station Manager used to take almost anything from the earth station for private and personal use, bypassing rules that govern borrowing of tools and items for private use. For example, if one has to borrow any item for private and personal use, a logbook is always used to note the names of the borrower and details of items borrowed. Unfortunately, the then Earth Station Manager never returned the tools and test equipment taken from the earth station department. In the light of this, many staff members started stealing whatever they could lay their hands on. Eventually, tools and equipment like multimeters, battery chargers, air-conditioners, laptops (PCs), and test equipment etc were lost (Appendix M)

as workers connive at and collaborate with security personnel in transgressing the rule of law.

The present earth station improvement efforts only enhanced and improved the security measures, drawing valuable lessons from the past experiences and events of vandalism and theft.

At the early stages of the research, the earth station had internal (L.T.C. own employees) and external (outsourced) security personnel. The external security service was outsourced from Security Lesotho and later from Gray Security. Two people, one from each security source, normally manned each shift. The sole purpose of security personnel was and is to protect both equipment and people – property and assets as a whole. Security personnel, for fear of losing one's own employment, never reported incidents of theft by senior staff of the earth station. In the long run, it became difficult to report even junior staff, who knows quite well that earth station property is getting stolen. The junior staff was also angry, frustrated and unhappy that their seniors openly steal and no action is taken to curb the practice.

Security of property and other assets is primary and vital for this organisation, and in deed L.T.C. as a whole. Improvements have been made to curb stealing especially by staff members. They have been motivated and made to appreciate the fact that the property belongs to them. These employees are constantly reminded that they (employees) are vital for the success of the organisation and that they are essentially “running their own business” [31]. “The staff members are the first line of defence against internal theft”, said one participant. Vandalism and robbery have no place in the earth station's quest for maintaining equipment working and providing expected quality of service. The earth station is currently manned and patrolled by armed professional security agents. L.T.C. no longer has its own security personnel. Security services are outsourced from local security companies.

Procedures relating to all security matters and personal interaction with the security personnel have been laid down. Liaising and contact points with the employer organisation for security personnel have been established. Locking facilities have been installed or improved and activated in most rooms to provide added security and comfort.

Workers

The rapid, far-reaching, and continuing changes of recent years have brought about a situation where understanding the psychology of individuals and teams is of prime importance in work settings. The traditional notion of careers is changing and according to Williams (1998), the expectation is that an individual's career is less likely to be within a single organisation, which has implications for how organisations like earth station will command loyalty and commitment in the future. "The full impact of the information technology revolution is finally being felt", says Williams. More and more workers lose their once-regarded-as permanent employment. Job security and Government social security become a hot issue especially in the political arena. The capacity of workers to cope with the scale of these changes has become a major issue, and the literature on work stress bears testimony to this.

The earth station department, not being an island is fully affected by these changes. The recent right-sizing of the parent organisation, namely L.T.C. has shaken the foundations of the earth station social structures. Workers have felt more insecure than at any time before. Frustration and despair have engulfed workers resulting in distrust in employment. The immense fear of the unknown has demotivated and demoralised workers, thus destroying work enjoyment.

Prior to effecting the right-sizing exercise, the earth station Supervisor was asked for comments regarding the level of staff complement at the earth station department. The Earth Station Manager, then the earth station supervisor, consulted with L.T.C. management on minimising reductions in workforce and

on maintaining the efficient and effective operation of the earth station unit bearing in mind the planned improvement changes. “No retrenchments were necessary at this section”, emphasised the Earth Station Manager. In fact, the L.T.C. management was convinced that more staff is needed in order to address the issues that appear on the improvement/change agenda. Furthermore, the cost of replacing the skilled workers would be significant as new recruits would frequently involve in costly training. In this way, cement of trust was built between earth station staff and earth station management. It is this vital and essential trust that allows workers to take risks, give inputs and become creative in the work situation. The earth station staff members and the rest of the remaining L.T.C. staff members were offered a formal contractual undertaking not to be retrenched further for any reason after the present wave of retrenchments. This was achieved without concessions normally made in other organisations to restructure – transfers, retraining, reductions in pay and so on.

Sadly, non-core business services like cleaning and security guards were deregulated and such services outsourced. Staff members who were performing these functions were retrenched. Employment of these people could not be secured.

The Government and L.T.C. were saved from the expansion of social security and increases of personal savings resulting from compensation from lost employment. The remaining staff is also not given terminal benefits as 70% of L.T.C. is sold under the privatisation policy. This means savings on the Government and L.T.C. side. However, the move has been very unpopular among the staff members who want to start afresh with the new employer, especially in view of the fact that the members of the top management are on the other hand, allowed to have their terminal benefits.

Lesotho's unemployment soars very high (about 58%) and more retrenchments are according to Rautenbach a major source of bitterness and unrest among employees. Retrenchments are a major fear amongst the working employees who would prefer to have got their terminal benefits before the corporation is sold. Deming noticed a striking difference between American and Japanese workers. American workers, whose Western culture of employment is adopted by Lesotho, live and work in fear while the Japanese workers live in the secure knowledge that they are employed for life. Japanese build trust, the source of commitment and creativity.

4.3.4.3 Welfare

An essential component of any organisation is human resources, which according to Douglas McGregor [17], forms the human side of the enterprise. In fact, organisation's "competitiveness is born in the gap between a company's resources and its managers' goals", said Hamel and Prahalad (1993). Organisations are about people. Any successful organisation, no matter which country it comes from, takes care of its people. Success, according to Paton and McCalman, comes from customer satisfaction that is generated from motivated employees. Studies have shown that employee motivation influences performance. The welfare of staff in this context means creating and making available conditions that satisfy well-being, comfort and happiness of employees in a work environment. The earth station is at a remote location and no source of employee satisfaction available nearby. Conditions should be created and established at this place to address most of the welfare issues.

Cooking and food storage facilities have been available for years. The staff had in the past been having their meals at earth station kitchen. The cooker was also retrenched during the recent right-sizing programme.

Sports and recreation facilities that are the greatest source of fun and entertainment have never been considered for the earth station.

As part of the improvement efforts, a few things were undertaken in order to change the status quo. An imminent need and desire to improve employees' welfare necessitated the change initiatives. Despite the absence of a cooker, the kitchen and all food storage units are cleaned regularly and dried up. All pots and utensils are cleaned and stored in a safe and dry place. The staff was able to retain coffee/tea facilities for the normal morning and afternoon tea breaks. The shift staff is also advised to take care of their meals. The staff members are advised to prepare or take meals before going to work. The normal shift staff always drives to town to buy some food for lunch. At times, the staff members purchase foodstuffs and prepare their own cook. Arrangements are underway to have quality foods prepared and served again at the earth station.

According to Ackoff (1994), the value obtained from sports and recreation is intrinsic and consists of satisfaction, fun and entertainment. Investigations are underway to have lawn tennis and volleyball facilities at the earth station. The earth station department needs the most appropriate sporting facilities that can be availed at minimum cost. No tangible results are available as regards this endeavour. However, sports and recreation facilities that provide "the pause that refreshes" (Ackoff) are still in continuous pursuit.

Excursion and educational trips are also vital in the category of "the pause that refreshes". Several trips were planned during the year 1999/2000. However, the earth station department was surfing in the waves of change brought about by privatisation and last-minute touch-ups to recondition the network before potential buyers come for pre-bidding network surveys. As a result, only a few excursion trips were taken even though not as planned or scheduled. The Christmas party that closed the old and opened the new millennium ended up with a trip. Secondly, the American technician that installed DAMA was also taken on a tour and educational trip into the lovely mountains of Lesotho. The Hughes Network Systems Field Training technician, also an American, was taken on similar tour. But on the whole, no significant success was registered in

this regard. This has been a letdown in terms of delivery since many people raised their hopes.

4.3.4.4 Documentation and Filing

In developing countries and organisations like the earth station department, information is still stored in a hardcopy format. This hardcopy form of information is in papers or files. The electronic storage of information is still at its infancy.

The earth station department's documentation and filing system is one of the poorest. For example, it is normal to find five files bearing the same name and containing the same or related documents or information. Many documents are misfiled and need a complete re-organisation. In most cases, filing cabinets are full and completely used up. Consequently, some files, books and manuals are lying around. Some filing space needs to be created to accommodate these loose documents or files.

Efforts have been made to completely transform the documentation and filing system. The cleaning of the storeroom, battery room and workshop was undertaken. All the files, books and manuals lying around in these rooms and offices were taken to one collection point. The files, books and manuals in the filing cabinets were updated – obsolete replaced by the new, operational handbooks or files. Some filing space was created in the offices, storeroom and workshop. Old, ancient, obsolete, unused files, and useless materials or items were taken to the L.T.C. central stores for safekeeping as part of the new improvement initiatives. This created some space for the recent and most up-to-date files and manuals that are normally and regularly used.

All duplicated files or documents were merged into a single file. Related or similar documents were filed in the same file or folder. These include

personnel, training, staff matters files etc where new files were opened. Some of the very old files were taken to the central stores.

A file was opened for each correspondent administration and all information was filed per administration.

Efforts have been made to transform documentation and filing system at the earth station. This has been a gruelling battle that is not yet won. Much work is still underway to put things in order. Everybody believes that this is one of the most difficult tasks of the transformation process. However, simple issues like attendance and leave application forms have already been filed in new files or folders.

All in all, the Internal Affairs team is working hard to design and put in place a robust and easy to use filing system. Cleaning of equipment, building and surrounding in general is now a routine activity. Security of both property and assets has been systemically enhanced. Earth station social welfare system has been overhauled in order to bring welfare activities closer to the workers.

4.3.5 Operations and Maintenance

Few can doubt that the world is witnessing a revolution in communications at a scale unsurpassed since the invention of the printing press. An important facet of this information and technology revolution is that new technology has provided the key to a hitherto unimaginable wealth of knowledge – a virtual limitless fund of information covering multitudinous facets of human endeavour [56]. This vast resource is commonly available almost anywhere in the world and people now have virtually instantaneous access to any part of it. An essential pre-requisite to accessing this fund of information is the establishment of efficient, effective, cost-effective and reliable operations and maintenance principles.

The satellite earth station is a technology-driven organisation. The earth station equipment forms a network infrastructure that enables individuals and societies to communicate with ease irrespective of the distance separating the communicating parties or individuals. Equipment network should always be available when customers need it. Central to the availability and reliability of network is operations and maintenance of that network. The department of Operations and Maintenance is therefore charged with the responsibilities to ensure that equipment units that form network are operated optimally and according to specifications. Preventive and corrective maintenance, thus prolonging the life span of network and ensuring that the network performs as expected, is also the responsibility of this department. Preventive maintenance checks ensure that equipment units operate within specifications and any drift is noted and corrected if possible. Corrective maintenance on the other hand replaces the dead or the malfunctioning unit with a healthy unit. The combination of material and human resources, with greater aspirations leads to proper operations and maintenance of the available technology to achieve goals of the organisation. In general, organisations work towards development by setting goals for information and communications, but development of infrastructure is not possible without properly trained personnel.

The operations and maintenance duties and responsibilities have previously been performed consistently, though with some limitations and shortcomings here and there.

The RF wideband equipment has been the most neglected in terms of preventive maintenance. Normally, corrective maintenance is carried out because the equipment unit has failed or is at fault. This causes unnecessary disruptions in service provision. Lack of expertise and knowledge is always cited as a barrier to achieving the required or expected level of preventive maintenance. The hazardous RF and high voltage signals are generated by this category of equipment. In the past, staff members were prohibited from even

coming close to these equipment units. This may also explain the reason why no preventive maintenance is carried out on these RF units. The only limited corrective maintenance performed on the up/down frequency converters was only replacing the fans or blowers. In recent years and as management (personnel and style) changes, senior staff members were allowed to remove faulty units for shipment to the manufacturer for repairs. Microwave normally received regular (yearly) line-ups to adjust and correct parameter settings to the required operating point. However, the microwave system is obsolete and problems are mounting. Optic fibre is the new technology that is replacing the obsolete and ailing microwave systems. Unfortunately, the earth station department has no personnel trained in this field. The only trained technician left for another local company and since then L.T.C. has been looking into ways of training few technicians on the fibre systems.

Control and supervisory and backhaul form the surveillance and backbone of the network respectively. Control and supervisory performs the surveillance of the network and equipment units. It relays any breakdown and or outage to the alarm display. A siren sounds each time an alarm becomes on or off. Backhaul provides the backbone of the network. It provides the media over which important communications signals and 'message' carriers travel. Maintenance of control and supervisory had been limited to corrective, which also does not go beyond resetting the CPU (Central Processing Unit) for the alarm system. No sufficient knowledge and expertise available at the earth station to perform proper maintenance. Preventive maintenance is not performed on the control and supervisory system, which seldom fails. Preventive maintenance of the backhaul link is a regular exercise performed every year.

Ground communication equipment, which forms an integral part of the earth station equipment, consists of equipment generating and receiving the harmless IF (Intermediate Frequency) and baseband signals. These are the equipment units closest to the customer in the network chain. The ground communication

equipment is the only area where earth station's operations and maintenance efforts have been largely concentrated on over the past years. Almost all engineers and technicians received comprehensive training on different types of ground communication equipment units. Internal training also concentrated on this type of equipment probably because those conducting training happened to be experts in this area.

Power and air-conditioning services have since the retrenchments and deregulation of power services been the sole responsibility of the earth station department. Previously, Power Section was responsible for operations and maintenance of all power related and air-conditioning units. Although maintenance of all power equipment was the responsibility of Power Section, the earth station staff, who then had to report any abnormality to the Power Section, performed routine checks of operating parameters.

Test equipment and testing facilities including tools have been the earth station responsibility. Testing facilities were purchased and installed to ease testing of network operating parameters. Test equipment is also available though not regularly sent for calibration as necessary and recommended by the manufacturers. As a result, most test equipment units operate way outside the normal operating points, thus giving inaccurate readings and measurements. Most technicians are quite familiar with the operations and application of the available test gear. The test equipment that operates outside the normal settings is also knowledgeable to the technicians and they use it effectively.

The Operations and Maintenance department is responsible for operations and maintenance of RF wideband, Control & Supervisory and Backhaul, Ground Communication Equipment, and Power and Air-conditioning units. This department is allocated a team of three (3) workers on a rotating basis that designs and develops guidelines that ensure smooth governance. The team specifically performs the following duties:

- (1) operations, minor repairs and maintenance of RF wideband equipment like Up/Down frequency converters, high power amplifiers, antenna subsystems
- (2) operations and maintenance of control and supervisory alarm system
- (3) routine line-ups and maintenance of Ha Sofonja earth station Mux - Maseru Mux backhaul link including microwave terminal equipment at both ends
- (4) checking and reporting alarms on the Ha Sofonia earth station optic fibre terminal
- (5) checking and reporting acts of vandalism on the overhead optic fibre cable
- (6) routine checks of operating parameters of all ground communications equipment
- (7) programming, with approval of the Earth Station Manager, DACCS⁸, Transcoder, Modems, DAMA terminal
- (8) operations and basic maintenance of power equipment like battery, standby generator set, uninterruptible power supply etc
- (9) provision of proper air-conditioning to the equipment
- (10) outsourcing of power services that require advanced and developed expertise, but in close consultation with the Director
- (11) checking and basic maintenance of domestic/commercial power in liaison with Lesotho Electricity Corporation

The Operations and Maintenance department is therefore divided into four sub-units as shown in Figure 18.0

⁸ DACCS is acronym for Digital Access and Cross-Connect Systems

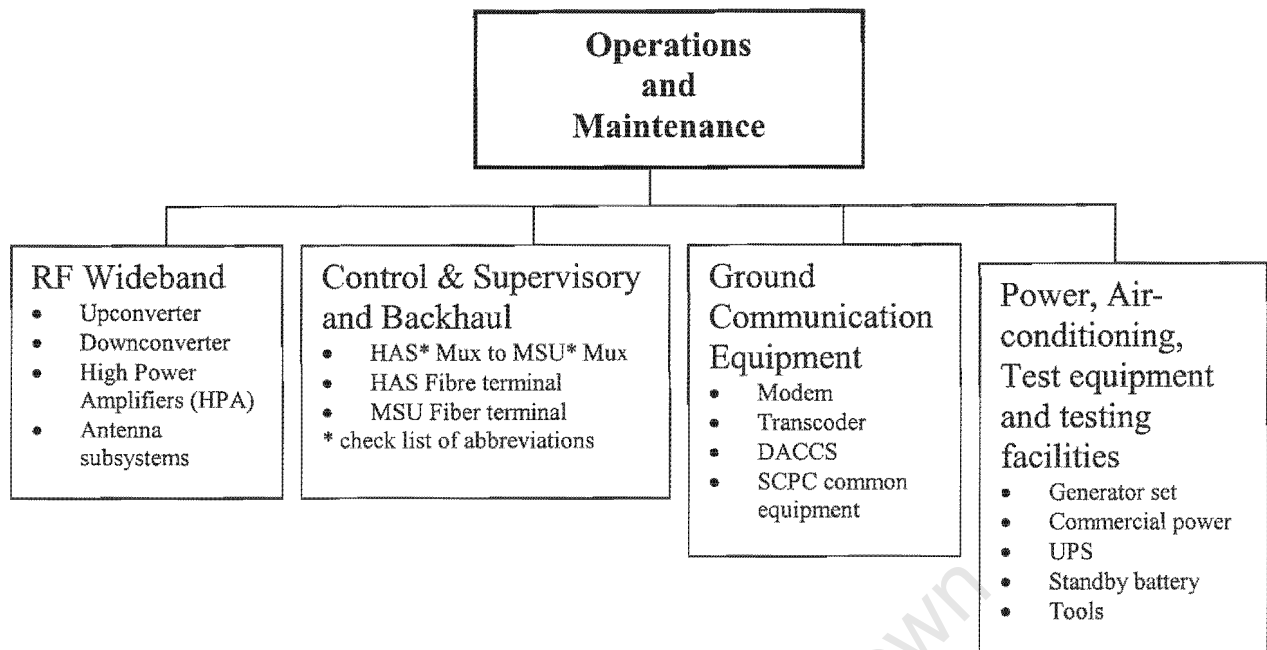


Figure 18.0 Operations and Maintenance Department

Figure 18.0 shows an organisational structure of the Operations and Maintenance department as envisaged in the new satellite earth station improvement efforts.

4.3.5.1 RF Wideband

The range of RF wideband equipment basically includes frequency upconverters and downconverters, Low Noise Amplifiers (LNAs), High Power Amplifiers, and antenna and its subsystems. The basic structure of the transmit/receive chain of equipment is normally the same from earth station to earth station. This makes it easy to liaise with developed earth stations regarding operations and maintenance guidelines. Co-operation between earth stations helps to ensure reliable service provision and builds trust and friendship.

As already mentioned, several factors contributed to the neglect of the RF wideband equipment regarding operations and maintenance. These factors

range from lack of expertise to in-house or organisation politics compounded by poor management.

A totally different approach is taken regarding operations and maintenance of the RF equipment. In the mid-90s after the departure of the then Earth Station Manager, dramatic changes took place. These changes in perception were brought about by desire to explore and learn the “unexplored territory of the experts”.

In the new improvement efforts, the operations and maintenance team is charged with the responsibility of improving the operations and maintenance of RF equipment. Based on the manufacturer’s specifications, procedures governing operations and routine maintenance of all RF equipment are established. These include checking and recording of any RF leakage as discussed in Section 4.3.3.1.

Preventive maintenance is routinely carried out and forms (Appendix P) are used to fill in the operating parameters as read online. These operating parameters provide guideline information on the basis of which one realises when the system or equipment drifts from the normal operating points. By design, according to Deming and Shewhart, systems operate efficiently and effectively within a range of operating points or control limits. A system or equipment operating outside the control limits becomes unstable and service disruptions occur. All the operating points of the equipment were set at the centre to allow flexibility in times of need for upwards or downwards adjustment and or natural wander. The exercise was carried out on all equipment including HPAs. This assisted in avoiding operating the equipment outside their operating range (upper and lower control limits).

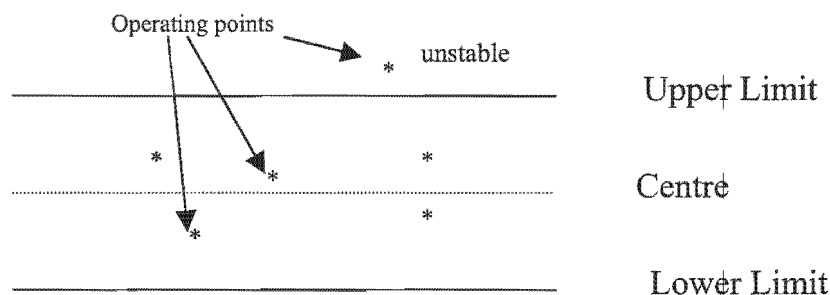


Figure 19.0 Operating Points of Equipment

Figure 19.0 shows control charts being used to plot and demonstrate the operation of a system that is in control and that is out of control (unstable). Preventive maintenance is normally carried out to ensure that equipment does not drift from the stable operating points. Ideally, the centre would be the best operating point, but practically operating point wanders around the centre. For points outside the control limits (upper or lower), equipment fails to operate as expected and service is disrupted. Otherwise, equipment operates normally.

Regular checks were carried out in the past, but results were never analysed. Unlike before, the measurements are analysed and used to pre-empt any potential problems. Prevention of outages ensures that network is reliably available and provides quality service. Logging down of these operating points also provides a database for future reference. Knowing equipment data and points of efficient performance provides valuable data and information in case re-programming becomes necessary.

Antenna and its subsystems form an important piece of earth station external equipment. The antenna, pointing and synchronised to a spacecraft – satellite, is always positioned such that signal reception is a maximum attainable signal. Otherwise, adjustments through an in-house satellite tracking system are manually or automatically initiated. Similarly, this as Deming puts it, ensures that the earth station is operating within the control limits where maximum

signal reception is attained and this is around the centre (see Figure 19.0). Routine maintenance on the antenna and its subsystems e.g. antenna greasing is according to the manufacturer, an annual event and is carried out yearly. However, visual inspection of weather sensitive parts like antenna feed horn is performed on a weekly basis. Furthermore, the antenna structure has aged and developed abnormal play (free movements) and needs attention of qualified and professional people in the field of antenna construction and structures. Any repair work to the antenna and its subsystems including the feed is well supervised to avoid endangering lives with extremely high radiation.

The waveguides, providing passageway for the signals to and from the antenna, are regularly checked for RF leakage. No incidence of RF leakage has been reported, but regular checks are routinely performed. The waveguide dehydrators, which ensure that the waveguides are clean and in a state of vacuum, are regularly checked and monitored. The dehydrator further provides RF leakage checks by initiating alarm if pressure or vacuum does not build up inside the RF waveguides due to air leaking out. The dehydrators are connected to and monitored by the central alarm and supervisory system to ensure minimal failure.

RF wideband principles call for proper procedures on health and safety during operations and maintenance of RF related equipment. Safety is of primary concern in any work situation and maintenance procedures also embrace these safety factors. Technicians and engineers operating or allowed to work on the RF equipment, especially those units which are online, should be well-trained, mature and responsible citizens with a proven track record. Even then, no person is allowed to work alone in the RF equipment and other hazardous areas.

4.3.5.2 Control & Supervisory and Backhaul Link

Control & Supervisory and Backhaul link form the network surveillance and backbone respectively. Control and supervisory performs the surveillance of the network and all equipment units. It relays any network breakdown, outages or equipment failure in the network to the alarm display in real time for interpretation and analysis by technicians. The technician after recording the details of the alarm decides on the course of action to clear the alarm or restore the service. In the past, the alarm recording and management system had been another strong point of the earth station management and organisation policy. However, in recent years, the current alarm and supervisory system has shown signs of ageing. False alarms have become more and more regular. Alarm signals have not been showing when necessary and equipment or network is clearly and visibly at fault. Efforts were made to replace the present control and supervisory system with its recent generation. However, budgetary quotations of one million Deutsche Marks quoted by Bosch Telecom scared the organisation from buying. Alternative systems that were less costly were quoted by Alcatel, but still exceeded the earth station budget. Control and supervisory forms an important part of any telecommunications network. It becomes imperative therefore that the earth station strongly seeks to obtain the necessary equipment to perform the functions of control, supervisory and overall network surveillance.

Backhaul provides the backbone links of the network. It provides the media over which important signals and 'message' carriers travel. The backhaul also includes the microwave and optic fibre multiplexing (or Mux in short) equipment at both ends of the backhaul link, namely Ha Sofonia (HAS) and Maseru (MSU) ends. Forms, operations and maintenance procedures for the microwave backhaul link are already in place, established some 20 years ago. The microwave technology in Lesotho has not changed in the past two decades, hence the forms and guidelines referred to above are still very much relevant today. Routine maintenance of the microwave backhaul link is an annual event

well known to almost all technicians. The regularity and consistency in carrying out routine maintenance on the microwave link has been in doubt since the 1996/97 industrial actions. New efforts have been made to revive the practice especially in view of the fact that the microwave equipment is obsolete and terribly ailing, providing one of the poorest services.

In the mid-90s, microwave equipment began ageing and outages increased resulting in regular disruptions of service. No spare parts could be found anywhere in the world to carry out necessary repairs and maintenance activities. Lack of trust and anti-management sentiments were also growing among staff members. Management who totally relied on workers' goodwill became frustrated when outages mounted and customer complaints piled. Management of L.T.C. then embarked on introducing a new technology on all major routes. The new technology was to become optic fibre backhaul links. Due to the staff troubles of the time, no personnel were trained on this new technology. Presently, the optic fibre technology is in place and operating. Efforts are underway to have technicians trained on optic fibre technology especially operations and maintenance of this technology. Central to the operations and maintenance of optic fibre technology are routine maintenance and system line-ups that need competent personnel. Prospects of having trained personnel in this field look grimmer than before. The only technician that was well trained volunteered for retrenchment package during the 1999 retrenchments and later joined another local company. Both Telkom SA and Commonwealth Telecommunications Organisation (CTO) have been approached for assistance and relevant information is obtained. But no training has been undertaken till now.

Forms, procedures and guidelines that relate to operations and maintenance of microwave backhaul links are, as already mentioned, available (Appendix P). The results of routine maintenance are always analysed and steps taken to rectify any drifting from the normal operating position. All necessary

adjustments are carried out immediately after routine maintenance and backhaul link line-ups. However, nothing to that effect is available regarding optic fibre links and its terminal equipment.

On the whole, minor changes have been introduced on the control and supervisory system. The sense of importance has been strongly advocated and attached to the logging down, interpreting and clearing of alarms. Any alarm is noted down when it appears and steps taken to clear it are clearly and logically written down. A separate notebook from the normal logbook is dedicated to this function. This notebook serves two purposes. Firstly, it shows that concrete effort has been made to clear the fault causing the alarm. Secondly, it serves as a reference for future faults of the same or related nature. Regular maintenance of the microwave backhaul links has been agreed upon. However, test equipment needs to be calibrated first. Also, the existing and continuing uncertainty within the organisation brought about by privatisation makes it difficult for people to enjoy their work. Existing maintenance forms are slightly changed and updated.

4.3.5.3 Ground Communication Equipment

The ground communication equipment like modems, common equipment etc forms an integral component of the earth station equipment. "This equipment generates the harmless intermediate frequency (IF) and the baseband signals", said one participant. This is the only area where earth station's operations and maintenance efforts have been largely concentrated on over the past years. The organisation has expertise on the ground communication equipment. Most training (internal and external) activities in the past also concentrated mainly on this type of equipment. The present forms, procedures, and rules that guide operations and maintenance of the ground communication equipment units have remained nearly unchanged. Shift operators perform regular e.g. daily, weekly, monthly etc checks. The performance of these checks and the taking of measurements are done at the pre-agreed time of the day. The checking

technician normally reports any irregularities to the maintenance engineer, whose duties also include daily checks of the completed forms for any irregularities and or out-of-specification performance. Most technicians have been warned to take this activity seriously contrary to what happened in the past. Anybody who is found not reporting irregularities in equipment and network performance is held accountable and responsible for such acts. Such practice is highly discouraged and unwelcome.

Little improvements or changes introduced in this area include motivating workers and making them attach value and meaning to the measurements taken. Also, a list of parameters under surveillance and monitoring was increased.

Certain equipment is sensitive to human error and any mistakes can be fatal to the whole network. A few of such units at the earth station are transcoder, digital access and cross-connect system (DACCS), and modems. All technicians are quite familiar with operations of these units. But any interrogation of these units is strictly prohibited unless supervised. Access to interrogation of these sensitive units is by manufacturer's management system via a laptop or a personal computer. Obviously, no maintenance is allowed unless supervised.

Control and supervisory of each unit is connected to the central alarm system. Also, each unit has its own in-built alarm detection and alarm display unit showing specific alarms or nature of fault. The central alarm system, on the other hand, only shows summarised alarms.

Forms and guidelines have been in operation for some years now, but only for non-sensitive equipment. Only programming procedures and guidelines have been developed for sensitive units and much to the delight of many technicians.

For a long time staff has requested easy and handy programming tools (Appendix Q).

On the whole, a change of attitude has been attained. This is crucial to enhancing performance and adherence to policies and guidelines that are agreed upon.

4.3.5.4 Power, Air-conditioning, Test Equipment & Testing Facilities

Power is an essential component in almost all households and technology-driven industries. Electricity supply, providing power to households is no longer a luxury afforded by the elite, but a necessity required by all people from all walks of life. Most of the household equipment e.g. television, radio, fridge etc are powered by electricity. Almost all households and industrial lighting is provided by electrical power. All equipment units at the earth station only operate and perform once powered up. Power is thus an essential component of the earth station and is primary for all operations activities. Not any type of power is suitable and applicable at the earth station. Reliable and stable power is needed that does not fail or fluctuate unreasonably.

Both equipment and people require air-conditioning. Most of the equipment operates at lower temperatures and therefore needs cooling. The warm climate in the country also necessitates installation and operation of air-conditioning facilities in all equipment rooms and a few offices.

All network components need regular testing and checking to ensure that both operation and performance are within specifications and operating points. Test equipment and tools are necessary to carry out this activity. Provision of testing facilities and or test points is crucial during network planning, design and construction.

Power (Supply)

The importance of power in any technology cannot be overemphasised. It becomes imperative therefore that operation and maintenance of power sources is efficient and effective in order to provide constant and reliable power to equipment.

Prior to privatisation scheme of the year 2000, all power related expertise was outsourced from the Power Section at L.T.C. headquarters. The Earth Station Section did not possess any power-trained technician. Power Section was the sole custodian of supply, operation and maintenance of power supplying equipment. This power supplying equipment includes commercial electricity, standby generator set, standby battery and solar modules.

The 1999 re-organisation of L.T.C. that was making way for the privatisation eliminated Power Section together with other non-core business functions. L.T.C. inability to find a reliable alternative to the services that were provided by Power Section has forced the earth station management into considering training its own staff on operations and maintenance of power equipment. At the moment, power services are outsourced from external companies and normally take long time to arrive at the site of problem. Any power disruptions and or outages hampers service provision and become costly to the earth station. Contract arrangements with the power and electricity organisations are also being looked at as a means of attaching accountability and reliability to the services they provide. Penalties should be charged for breach of contract.

“The standby generator set has not received service in the past five years”, said one technician. Its exhaust smoke bears testimony to this long overdue service. Its control panel has been faulty for a very long time, resulting in the malfunctioning of the commercial power/generator set power interlocking system. As part of the new improvement efforts in the earth station, agreement to clear the fault had been reached with Siemens SA. This work was originally

planned to be carried out during the installation of the newly purchased UPS system. The UPS unit is also supplied by Siemens SA, replacing the present Siemens-made of the UPS that had become obsolete and irreparable.

Regular checks of all operating parameters of the power supplying equipment are routinely performed.

Forms and guidelines for power operations and maintenance have been in use since the establishment of the earth station some 20 years ago. In the new improvement initiatives, more emphasis is placed on certain aspects. It is important, according to a newly developed cleaning schedule, to have all equipment cleaned regularly as discussed in Section 4.3.4.1. It is vital that the earth station personnel is capable of performing basic maintenance of power equipment in order to minimise outages. Also, most of the lights and fittings of lights fell during the 1998 SADCC forces bombing of Maseru. New installation of fittings and maintenance of existing lighting is urgently required. Efforts by L.T.C. to outsource the service have not up to now been realised.

The earth station unit has schooled and experienced technicians in the field of electrical power, and thus have capacity to learn the art of power operations, upgrading and maintenance. These technicians only need specialised training on the power equipment that is in use at the satellite earth station department.

Air-conditioning

Both equipment and people require air-conditioning. Equipment internally generates heat and needs cooling down in order to perform and function properly. "Excessive heat damages sensitive parts like integrated circuits and unwanted thermal noise is also generated", said the maintenance engineer. People also need air-conditioning to cool down and warm up during hot and cold times respectively.

Air-conditioning equipment or plant is already installed to provide cooling and warming up functions. Operations and maintenance of air-conditioning equipment was, prior to 1999 retrenchments, the sole responsibility of both Power Section and the external contractor. Currently, maintenance of air-conditioning equipment is outsourced from the external contractor. The earth station staff, however, notes and reports the alarms and or faults on the air-conditioning units to the external contractor. The operations and maintenance team currently carries out basic line maintenance like replacement of air filter. Thermostat adjustments to give the required degree of coldness/warmth are also performed by this team. Technological advancement has resulted in equipment units continually becoming smaller and smaller, hence requiring less and less cooling. The reduction in cooling power brings some savings to the earth station section.

Forms and guideline procedures for checking, monitoring and recording of operating parameters of the air-conditioning units have been in use for a very long time. These guidelines and forms form part of operations and maintenance activities well established by expatriates within the earth station department.

Test Equipment and Testing Facilities

Test equipment and testing facilities form an integral part of any telecommunications organisation. Many organisations invest huge monies in test equipment, and testing facilities and actual training of personnel on testing, measurements and instrumentation.

In today's digital world, customers expect accurate measurements that lead to an error-free performance and high quality service. Equipment, and service in general, is sensitive to small and even insignificant errors.

Competition in the markets that is introduced by deregulation and privatisation, forces organisations into performing better and better in order to remain in business.

The earth station has reasonable and near enough test equipment to perform all necessary functions. The testing points are also in-built into the equipment network. But the provision of testing facilities in the network has recently been done. Most of the technicians are quite familiar with the operations and application of available test equipment. Continued practice as recommended and advocated by the earth station management only enhance their knowledge and improve their expertise and network performance as a whole.

It is vital that technicians appreciate the importance of test equipment. Lack of interest, motivation and skills normally result from insufficient training. During this research, people were motivated into appreciating and valuing the need and importance of test equipment more than ever before. A mobile table that carry and move test equipment around as necessary came into use. The table was further supplied with commercial electricity points to suit equipment requirements.

Another exercise carried out during the research was the logging down of all test equipment by name, make, manufacturer and serial number. A large number of unknown test equipment was discovered. A separate room was made available for storing test equipment and related facilities. Test equipment that is currently in use was placed in its own partition and labelled accordingly.

The equipment has last been sent for calibration in 1995 according to the records and stickers on the equipment. Calibration is normally performed annually. Most of the equipment gives very inaccurate or out-of-specification readings or measurements. Strong recommendations have been made to the management to send the equipment for calibration especially in view of the fact

that the earth station department has maintenance contract including calibration with Concilium Technologies (formerly Hyperformance Systems/HP).

As already mentioned, test equipment and testing facilities are essentials in a technology-based organisation. They facilitate and enable measurements that show performance of network and hence that of the whole organisation. Necessary adjustments and corrections are made to pre-empt or avoid unnecessary service disruption.

This section has looked at issues directly responsible to the department of Operations and Maintenance.

In conclusion, the satellite earth station department has been re-organised. The earth station structure has been re-designed, changed and the changes implemented in order to bring about lasting improvements. The efforts to implement the new structure were often threatened by people viewing this exercise as an unnecessary burden. The envisaged rotation of staff members also did not bear any significant results because people took too long to establish rules and regulations that govern their respective departments. Also, the idea of rotation was not very welcome to a number of staff members. However, tremendous improvements have been achieved or made. Apparently, the qualitative aspects of the improvements cannot be measured and presented quantitatively. Few departmental organisation structures and operation forms bear testimony to the improvements made.

The next chapter looks at the re-design of the earth station department in order to make it a robust organisation.

5.0 RE-DESIGN OF SATELLITE EARTH STATION

The previous chapters and sections have diagnosed the earth station organisation, proposed and made several changes to the organisation. Both systemic organisation and management style have been introduced to the earth station department. New code of conduct and operation has been introduced. Methods of working have been changed, where necessary, and business processes improved to enhance efficiency and effectiveness. The new organisation structure has been designed and implemented with the hope of bringing new life to this organisation and achieving improvements.

In this chapter, the earth station is re-designed to make it a robust system that can prosper without or with minimal chances of failure. The re-design process is centred on the formal system model, viable system model and the new organisation structure. The re-designed organisation is expected to have decision-making, performance-monitoring and transformation-effecting subsystems built and incorporated into it. The organisation is provided with capacity for awareness of the outer environment (wider system), showing or displaying interactions and interrelationships with other relevant components.

Most of the groundwork was done with the rest of the participants in a group. However, finer details and artwork were left to the author and later discussed together.

Many organisations, and in deed L.T.C., employ the expertise of external consultants. The consultants often carry out comprehensive and detailed studies, and put forward recommendations. In some cases and very often, the organisation management changes the implementation of the recommendations or partly implements the recommendations. Reasons for this change may be both social and financial. For example, the L.T.C. 1996 re-structuring process resulted in a massive and disorganised movement of both human and material resources to districts, leaving places of business centre with a bare minimum

number of resources. Many of the resources moved, stood-by and idled awaiting the establishment of offices and many logistics necessary for business operations. Some resources and activities or services were recalled back to the L.T.C. Headquarters as a sign of an honourable retreat. The 1997 industrial action and the subsequent dismissal of all technicians followed the restructuring exercise of 1996. This put either political or social and financial pressure on L.T.C. management and the Government. The 1999 re-organisation that was termed right-sizing resulted in retrenchments of 433 out of 785 employees through forced and voluntary severance options. L.T.C. management later had to intervene and introduce prohibitive measures for voluntary severance policy in order to control the already out-of-hand exodus of skilled people. Many of the functions that were decentralised in 1996 despite great opposition from employees e.g. Switching, Transmission and Power were centralised again in 1999. The 1996 change or restructuring was long overdue, but completely lacked employee participation, involvement and support. It was therefore bound to fail hopelessly. Any improvement process needs staff participation and buying-into it if it were to gain support and eventually succeed. Many of the changes introduced were naturally expensive and their failure meant more financial strain on the parent organisation – L.T.C. and all its departments/sections. Resistance to change is a long subject on which volumes could be written and that does not fall within the parameters of this research study. However, a brief discussion and mention of factors hindering and often failing even the most eloquently articulated change initiatives is worth appreciation and inclusion in this article.

Resistance to change is a general, normal and natural phenomenon; thus, people and organisations always oppose change. As Isaac Newton said in his Laws of Motion and also according to *Steady State Principle* [17], a body in a state of rest or equilibrium (steady state) will remain in that state unless acted upon and caused to leave that state by an external force. Both workers and management, and in deed people and organisations in general, comply with

Newton's Laws of Inertia. People as well as organisations have a strong natural reluctance to embrace change necessitating the external force to cause them move from the groove in which they are stuck, to a productive growth path manifested by organisational and management changes [48, 31]. Although change is inevitable, it seldom takes place without problems. Resistance to change seems to be a big stumbling block in the way of successful innovation in enterprises [21]. The 1996-97 L.T.C. staff troubles bear testimony to resistance to change necessitating the lubricants of change [28].

Resistance to change at the earth station department has been combated by good communication with all participants about forthcoming changes. Without such communication, rumours and fears could assume monumental proportions. Full employee involvement and participation in the design and planning of the changes have facilitated acceptance of change. Earth station management with the assistance of the author solicited and welcomed workers participation, and assured workers that their positions will not be impaired, but only changed for operational reasons. Gradual rather than abrupt changes were introduced, making transition smoother as participants become initially exposed to the changes without drastic upheavals that often ignite resistance.

The worst change an employee may face is layoff. The changes introduced, as part of the research, could not involve layoffs. Also, earth station management had a case to present in front of L.T.C. management not to layoff even a single technician at the earth station unit as already mentioned in Chapter 3.0. This boosted their morale and productivity increased. Increased productivity results in increased profits to the shareholders, greater take-home pay to the employees and lower prices to the customer that are essential benefits of any enterprise.

Several factors affect change initiatives and contribute to a staggeringly long list of answers to a simple question, "why change doesn't work?" Employee involvement and participation, communication, organisation attitude and

culture, training, reward, management style etc are a few of the issues that are core to any successful implementation of change initiatives. One is made to believe that people rise to the challenge when it's their challenge [50].

Few of the issues relating to resistance to change have just been briefly mentioned. The earth station management and workers joined hands and successfully combated resistance to change. Changes were successfully introduced with the assistance of the author. This chapter puts together the changes made and develops a concrete unit, namely, the Earth Station Department. As already mentioned, the re-designed organisation shows the head, the heart and the central nervous system of this organisation, with all parts working together synergistically to maintain the homeostasis of the earth station organisation. Figure 20.0 shows the Earth Station Department as a new organisation (re-designed) intended, unlike previous L.T.C. restructuring exercises, to address the core of the problem and not just a rearrangement of tables and chairs in the management team without any significant change.

As L.T.C. and its departments/sections experienced decades of reasonable success and viability during and immediately after expatriates' administration, they tended to spawn bureaucratic excesses [Appendix C]. The bureaucratic organisation which the present improvement efforts eliminated at the earth station, is a natural consequence of size and age characterised by the following:

- (1) a clear-cut division of labour.
- (2) a strict hierarchy of authority with many predominating layers (of hierarchy).
- (3) staffing by technical competence – abundance and overspecialisation is part of bureaucratic organisations.
- (4) rigid formal rules and procedures.
- (5) impersonal approaches to decision-making.
- (6) communication between top management and lower operations is cumbersome and distorted and often stifles creativity and initiative.

The newly developed flat organisation structure of the earth station department shown in Figure 13.0, capable of directing maximum amount of organisational resources towards customer satisfaction, has addressed and solved the above and many other characteristics of a bureaucratic organisation.

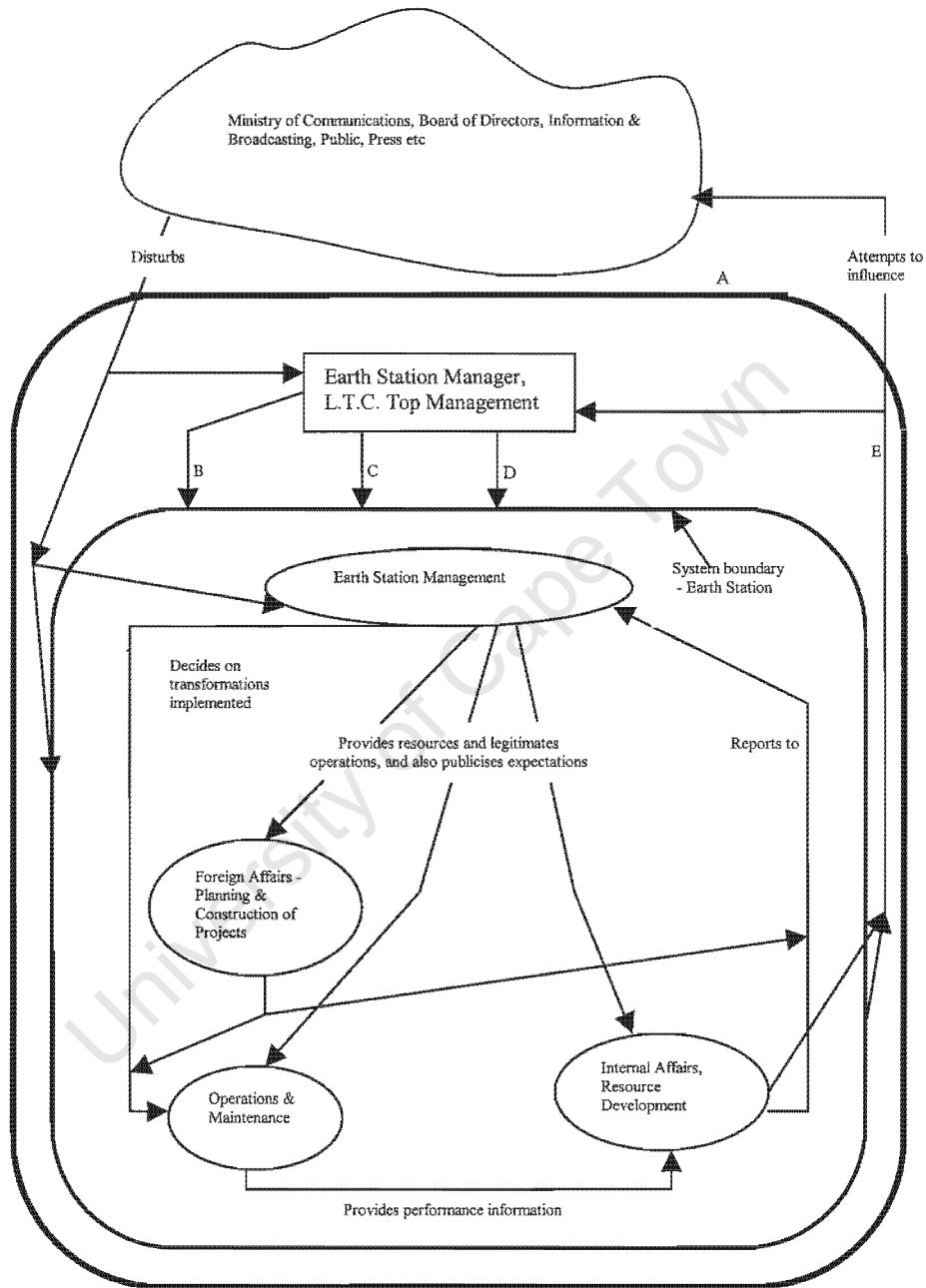


Figure 20.0 Earth Station Re-designed

Key to Figure 20.0:

- A – a Wider System (L.T.C.) boundary
- B – formulates initial design of
- C – provides resources and legitimates operations
- D – makes known expectations
- E – supplies performance information

Figure 20.0 shows the interactions and interrelationships between parts of the organisation, interactions and interrelationships that facilitate and ensure co-ordination and flow of work.

The earth station department as a system in focus is one of many integral parts of L.T.C. as a wider system. The Lesotho Telecommunications Corporation is responsible and answerable to the Ministry of Communications through the Board of Directors that runs L.T.C. affairs on behalf of the Ministry and the Government. A requisite level of recursion exists and is inherent to each part of the organisation structure.

The Ministry of Communications, prior to privatisation of L.T.C., sets the policies that govern L.T.C. The Board of Directors that manages telecommunications business affairs on behalf of the Ministry as mentioned earlier communicates the policies to L.T.C. After deregulation, privatisation and liberalisation of telecommunications services and markets around July 2000, the policies already formulated when the newly formed Lesotho Telecommunications Authority (LTA) would be communicated and disseminated to all service providers and operators by LTA (The Regulatory Authority) on behalf of the Ministry of Communications and the Government.

L.T.C. top management runs the day-to-day affairs and activities of L.T.C. and all its parts or subsidiaries on behalf of the Board of Directors. This management ensures compliance and adherence to the policies by all its departments/sections and subsidiaries. Day-to-day rules and regulations (in line with Government policies) governing the telecommunications business are

often formulated and approved by the Board of Directors. The Earth Station Manager only sits in the L.T.C. top management meetings when issues affecting or involving satellite communications are discussed. L.T.C. management formulates the initial design of and policies that guide the earth station department. This management further provides resources and legitimates the area of operation of the earth station department. It is the L.T.C. management responsibility to ensure that expectations of the organisation are known to and properly interpreted by the earth station department.

Both human and material resources are vital for the very existence of the earth station unit. Policies governing utilisation of resources and area of operation guide the earth station department into day-to-day activities. The earth station management is responsible for day-to-day running of the department on behalf of L.T.C. top management. All improvement projects are communicated to top management through the office of the Director. Significant events are always communicated to L.T.C. management prior to taking place if planned or immediately after happening if unplanned. This includes planned or unplanned service disruptions. The earth station management in general supplies performance information of all resources to the top management. Financial performance captured in the financial report is vital for both the earth station management and L.T.C. management as well. Earth station management needs to show financial performance in order to qualify for the share of profits and the making of the budgets. The financial performance expresses performance in terms of revenues generated, expenses incurred and proper use of budgets for a given period.

The earth station further attempts to indirectly influence the Ministry of Communications and Board of Directors. The Minister and other members of the Board of Directors normally pay visits to the earth station department. During these visits a high level of competence, coupled with high morale, enthusiasm and happiness are evidenced. The cleanliness, both inside and

outside (surroundings) impresses visitors. These factors and the general hospitality at the earth station are strong weapons used by staff and management to impact and impress the top-most policy makers.

The earth station management further provides resources and legitimates operations to all earth station sub-units/departments. This management is responsible for ensuring that the policies are understood, implemented and maintained at all levels of the organisation. Responsibility and authority throughout the organisation is well defined, including interrelationships of all personnel within the departments. All departmental management teams report to the earth station management, which in turn provides support rather than supervision. The earth station management also decides on the transformations to be implemented at the earth station. Publication of expectations and dissemination of information from L.T.C. top management are the responsibilities/duties of the earth station management. This includes provision of feedback, a fundamental part of the high performance environment in which learning flourishes. The principal task of the earth station management is to motivate, if not to inspire the staff and to create an environment in which, largely through self-determination, it serves the purposes of the earth station department/section as a whole.

The earth station's departments or units provide performance information to the earth station management, to which they all report as already mentioned. The earth station management consists of the Earth Station Manager and one representative from each department. As the *Law of Requisite Variety* largely advocates, respective departmental representatives filter through complexity and variety from departmental meetings.

The external environment provides disturbances and turbulence to both earth station and L.T.C. The environmental disturbances normally and naturally take different forms. The Ministry of Communications through the Board of

Directors expects a certain level of commitment to transparent service provision. Non-performance is highly discouraged and often liable for punishment. The public always demands service delivered at high quality and low costs. The public often complains to the relevant authorities (Appendix D) and often escalates the complaint if there is no improvement after the first complaint was lodged. The press and other news media are also used as a platform for raising public opinions and complaints regarding quality of service provided. This exerts public pressure on the Minister of Communications, who in turn had to answer questions in the Parliament regarding service provision as a whole. In some cases, the public demands service where network does not exist and service provision is impossible. In some instances, genuine complaints are made against unfair practice, bribery for telephone provision, mistaken suspension of service, unrealistic telephone bills and many others.

The external environment as a whole exerts a certain degree of control over the earth station. However, the environment cannot be controlled by the system – earth station. The earth station on the other hand requires capacity and ability to cope with the constant pressure.

In this chapter, the earth station department has been re-designed into a new and rejuvenated organisation. Significant changes have been made in a way different parts of the organisation interact and interrelate. Functions and responsibilities of each part of the new arrangement or organisation have been explained and discussed. This explanation briefly includes or covers the outside environment consisting of among others the Ministry of Communications, the Board of Directors, Press, and the Public. Also explained are earth station management and L.T.C. top management. In this new dispensation, anyone who has authority over others is, according to Ackoff (1994), subject to the collective authority of these others. The re-deigned organisation has not been extensively tested in real world and any practical limitations are unknown. The

real world testing and implementation of the re-designed organisation were not carried out due to time constraints.

Analysis of many factors during the research has shown that deficiencies in the management and organisation structure are the source of the problems. It has therefore been necessary to introduce intervention and change mainly in those areas. It is, however, important to note that chronic problems are systemic in nature and may be deeper than the deficiencies identified and hopefully solved in management and organisation structure.

In order that the earth station department remains dynamic and viable, an organisational development model is designed. This model guides the organisation through changing environment.

The next chapter looks at an organisational development model.

6.0 ORGANISATIONAL DEVELOPMENT MODEL

In this chapter, the organisational development model is designed, developed and discussed. Whereas the previous chapters have re-organised (Chapter 4.0) and re-designed (Chapter 5.0) the satellite earth station department, a more permanent framework is needed that would guide the organisation through major organisational changes at any stage. This framework is achieved by looking at ways of maintaining viability through self-organisation in a problematic, complex and chaotic environment.

The organisational development model (ODM) is simply defined as a planned process for change that leads to greater organisational effectiveness through better utilisation of resources and application of sound management principles to achieve organisational goals. The organisational development model for managing change looks at how organisation development can assist the move from the situation regarded as undesirable to a new state which, hopefully, is more effective [46]. The model further looks at ways of implementing and sustaining major organisational changes. The ultimate aim of this model is to assist the earth station department to maintain viability through self-organisation in a problematic, complex and chaotic environment. The concept of change or transition management is briefly defined or explained as the body for facilitating and managing change. The key to the organisational development model, according to Paton et al, is looking at what change is required, what level the change takes place at, who is likely to be involved and in what ways, and the process by which change is instigated.

The role of the consultants or change facilitating agents is analysed. The need for consultancy is examined in terms of what managers, and an organisation as a whole can and cannot do. The recommendations from the consultant studies and implementation thereof are analysed.

The in-depth practical issues illustrating the application of both the intervention strategy and organisation development approaches are concurrently discussed or dealt with.

The chapter concludes by looking at the management of change. The environmental impact of change on organisations is examined in view of putting forward a proposal for managing an organisation development process [ibid.]. A review of the stages through which the process of organisational development goes is made in order to ascertain success/failure of change. The process is diagrammatically shown in Figure 21.0. It is worth mentioning and emphasising that at each stage, Deming PDCA cycle is repeatedly utilised to refine the process and achieve goals at each stage.

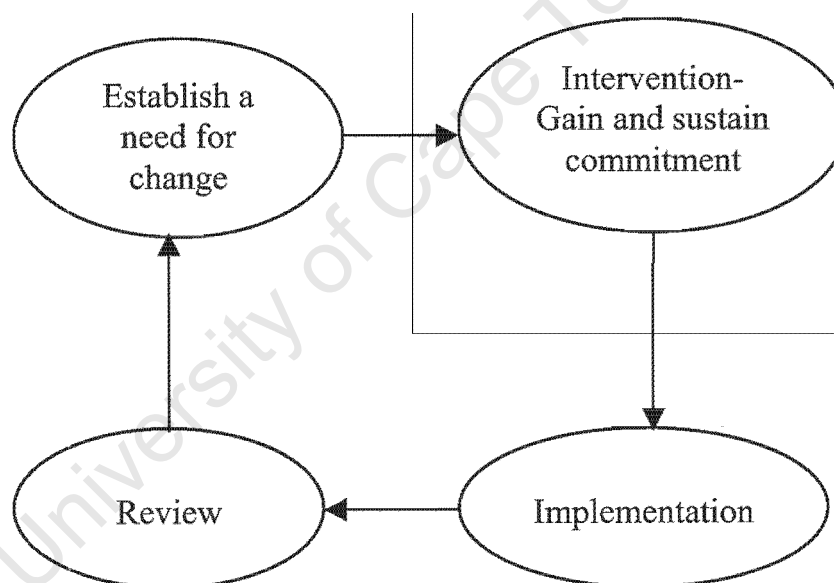


Figure 21.0 Stages of Organisational Development Model Process

The stages, as shown in Figure 21.0, are briefly discussed below.

6.1 Diagnosis

Change is inevitable and according to Paton and McCalman, any organisation that ignores the concept of change does so at its own peril. This is echoed by Handy:

“The message, I hope, is clear: the times are changing and we must change with them. Yes, but how?.....Let us make no mistake: the cultures of consent are not easy to run, or to work in. Authority in these organizations does not come automatically with the title; it has to be earned...based...on your ability to help others do better, by developing their skills, by liasing with the rest of the organization, by organizing their work more efficiently, by helping them to make the most of their resources, by continual encouragement and example”

Charles Handy, 1990

In the last few years, organisation leaders and workers have identified a need for organisational change. However, leaders carried out piecemeal efforts to patch up a problem here, fix a procedure there, or change a job description. All these were later found not enough to solve systems problems. Today, long-range and co-ordinated strategy to develop organisation climates, ways of work, relationships, communications systems, and information systems is necessary [46].

In order to achieve organisational development of the earth station department, it is important to know what changes are needed to the organisation in order to keep up with changing times and varying customer demands. Several diagnostic techniques e.g. SWOT analysis are normally applied in determining what changes are needed, what level the change takes place at, who is likely to be involved and in what ways, and the processes by which change is instigated [ibid.]. Establishment of a need for change is a crucial step towards developing an organisational development model. Involvement, participation and motivation of employees start as early as the change process is planned and designed. This increases the level of trust and support among organisational members. Trust and support are the essential ingredients of success of change. Information gathering requires commitment of staff and this must be attained. Without the expertise of staff and assistance offered, change would not

succeed. Communication with all parties affected by change is crucial from the planning, design and implementation of change.

In general, the diagnosis process highlights all parts and processes of the organisation that need to be changed. Strong points of organisation also need identification and enhancement. In most organisations, a consultant is contracted to carry out the change initiative from conception through to implementation and review of the results of the changes introduced. Most organisations employ the services of the external consultant rather than those of the internal consultant.

6.2 Objective Outsider

The basis of all organisation development programmes is to improve the organisation's processes from what they are now, to what they will be in the future – the unfreezing, change, and re-freezing process. A facilitator of change process is normally employed to assist the organisation to plan, design and implement change.

As already mentioned, organisations employ the services of a consultant to conceptualise, initiate, plan, design and implement change together with the organisation. According to Paton and McCalman, “the successful use of the organisation development model is influenced by a number of factors, not least of which are the purpose and process of change itself”. One key underpinnings of this process is the role of the consultant acting as a facilitator of change. The author has been a facilitator during the change process of the earth station department. Reasons exist that justify employment of a consultant or change facilitator hereafter referred to as a consultant. These reasons may, but not exclusively, include the following:

- (1) Organisations often do not know what is wrong and they need special assistance in diagnosing their problems.

- (2) Most organisations could be more effective and productive than they are if they learn to diagnose and manage their own strengths and weaknesses. Worse still, many organisations fail to take their opportunities.
- (3) Many organisations do not know the kind of help they need. Consequently, they need a consultant to make them aware of assistance that the consultants can offer.
- (4) Some organisations have constructive intent to improve things, and the earth station did in deed have, but lack expertise in identifying what to improve and how to improve it.
- (5) With the participation and involvement of the organisation staff members who know what changes will or will not work in their culture, recommendations or solutions that may be regarded as wrong or resisted by workers would be looked at from a different angle.
- (6) The essential function of consultancy is to pass on the skills of how to diagnose and fix organisational problems so that the organisation is capable of continuing on its own to improve.
- (7) A consultant, an outsider, may view things differently and may observe many things that are wrongly regarded and perceived as normal. The provision of multiple perspectives is crucial in idea generating and information sharing.

Consultants are often employed for specific assignment. Above are some of the reasons why consultants are employed to facilitate transformation. Study of several consultants' reports of previous change processes in L.T.C. show that well-documented, well-versed, comprehensive and time-consuming, but not exhaustive studies have been carried out. Many of the recommendations look reasonable enough to have been implemented. However, they may have not been viewed as reasonable by the management team of the time. A number of these reports highlight the importance of employees/workers participation and involvement in the change process. Consultants, however, do not have mandate or authority to force management into accepting and allowing workers'

participation. They can only recommend. In view of this limitation in the powers of consultants, workers always become antagonistic and oppose recommendations, including those that look genuine and reasonable. Most of these recommendations normally do not include workers' views and inputs. The implementation of change initiatives that are opposed by employees is likely to fail. Due to lack of interaction between staff members and consultants, many of the problem-solving skills of the consultants are not passed on to the organisation for future requirements/needs.

At the earth station, all the staff members were fully involved in the change process. They actually owned the whole process and normally came up with questions where they need assistance and or guidance. The most difficult thing was always trying to keep momentum going all the time.

Lesotho Telecommunications Corporation (L.T.C.) has throughout its previous metamorphosis processes, employed the services of external consultants as opposed to internal consultants, the latter being used mainly to save costs. The external consultant is preferred as is:

- (1) not part of the problem, hence his/her views are more objective.
- (2) at some distance to see what the problem is.
- (3) not part of the power system being examined.
- (4) not aware of or interested in the personal and social needs and demands of superiors.

Many people may, however, argue that internal consultant knows the system and can easily understand the problem, the source and location of appropriate information.

The consultant employed at the earth station department is regarded as external. Although working for the same organisation, L.T.C., the author as a consultant during this research is working in a different department, and his views are of

an objective outsider. Furthermore, the author is bringing management experience and skills just obtained from the academic institution. The academic training has completely transformed the way the author, now consultant at earth station department, views the world.

So, what role do consultants play in a change process? The answer may be simple; a consultant is simply a change facilitating mechanism working in line with guidelines set out in the terms of reference that established such a consultancy function. The consultant has no power and authority to implement, but only recommends changes and ensures existence of motivation towards change within the organisation – the earth station department in this case. The actual implementation of recommendations solely rests with the organisation. In many cases, comprehensive, well-documented and costly studies are carried out during consulting period to establish the need for change, the business processes that need change, organisation competitive advantage that need to be maintained and workers' skills that need development. However, a consultant has to obtain genuine information detailing correct symptoms to avoid prescribing wrong remedy and causing fatality. And for this, a consultant requires to gain and sustain commitment and support of all staff members of the organisation.

Failure of changes is often and in most cases unfairly blamed on the consultants. This, however, does not absolve the consultants from success or failure of change initiatives. The consultant should be committed to provide the solution via analysis, diagnosis and application of a cure by fairly standard mechanised means. The consultant further has to warn the organisation of half-heartedly implemented recommendations, the consequences of which may be suicidal. After all, organisations have already invested huge amount of human and material resources into the change programmes. The objective outsider thus helps the organisation implement changes in management and work organisation that would ensure that “organisations thrive and not survive in an

increasingly turbulent environment” [1]. The only equilibrium in a turbulent environment is certainly remaining dynamic as an aeroplane does when passing through a stormy environment. The organisation on the other hand helps the consultant by being open and committed in performing assignments and tasks given out.

6.3 Intervention Strategy

Naturally, the purpose of diagnosis is, according to Deming’s pragmatic view, to lead to treatment and eventual cure of the diagnosed diseases. The establishment of a need for change and consultancy relationship within the organisation form a critical part of the change process and its eventual success or failure. The intervention stage forms part of organisational development model. The essential elements of the intervention include clarification of the problem, examination of alternative solutions, transformation of intentions into actual change, generalisation and stabilisation of new work arrangement and ability to hand-over the change process to the organisation for continuity.

In principle, the intervention strategy includes the handing over of operations to the local organisation whereby the consultant may remain as an observer providing continual encouragement and advice. This reminds one of many military interventions so popular around the world. The intervening body or country often rushes in without clearly defined objectives and strategy or policy for handing over to local Administrations and pulling out. In the end, an intervention that was originally planned for weeks or months lasts for decades with intervening body or countries entangled in a quagmire of an even escalating hatred and divisions or partitions of societies according to ethnic origins.

Establishment and sustaining of commitment to change is vital for success of any change process. In the example of warring parties already mentioned, the intervening countries need to establish, obtain and sustain commitment to

peace as a primary step towards achieving a lasting peace. Similarly, the consultant needs to establish and sustain commitment to change from all those affected by change. In essence, commitment is required in information-gathering, transformation of intentions into actual change and continuity after termination of consultancy period, enhanced by greater participatory role taken by the organisation [46].

How do I get constant change in the organisation – earth station department in this case? The process of working through definition of the problem and possible solutions helps the organisation learn to cope with the problems that initiated the need for change. Both Deming and Revans learning philosophies are regularly in play and unconsciously applied. The earth station department, according to Paton and McCalman, knows what the causes were and is hopefully in a position to remedy them on its own should they recur. However, if the change process succeeds, the earth station organisation will also have learned how to define and clarify problems as they emerge. This learning is made possible by commitment to change through collaborative relationships with the objective outsider. In this sense, the organisational members learn directly from the consultant about mechanisms used to define and clarify the problems, type of questions asked, the way in which meetings are organised and run, the way in which change is communicated and workers' skills developed, and an efficient organisation of work for optimal resource utilisation [29] involving all parties affected. The earth station organisation learns when it has reached its own limits in dealing with problems through implicit application of Deming PDSA cycle. The organisation further, through repeated application of Revans questioning insight, as Paton and McCalman say, “hopefully learns about making decisions on when it requires outside help” and what activities can or cannot be performed without outside help. All these steps the organisation takes only if commitment to change exists. Otherwise, why take the trouble? The fact that the organisation has called in the consultant at some costs show commitment to change and desire to ensure change

becomes a norm. This means that the organisation has a window of opportunity to learn about new types of techniques and procedures for dealing with problems it may not have been fully aware of.

Creating a sense of involvement and participation with those affected by change encourages their commitment to change, commitment that is an essential ingredient for success of any change initiative. At the earth station, every staff member was part of the change process from the outset.

Commitment to change needs to be established and maintained in all systems interventions and the stages of the organisational development model.

6.4 Implementation

A need for change has been established. Commitment to change has been developed and sustained. Willingness to design and develop intervention strategy is a sign of commitment. Alternative solutions to problem have been developed and priorities may be attached to the solutions. Evaluation of alternative solutions is carried out and implementation of a few preferred solutions is undertaken.

The importance of implementation of designed solutions must not be underestimated. Most frequent faults associated with poor change management occur during implementation. For example, the 1996 L.T.C. restructuring process that led to labour disputes and dismissal of employees, was originally welcomed by staff members until the disastrous implementation stage. As already mentioned, the implementation resulted in massive and haphazard movement of both human and material resources to places where no work was possible.

Sound implementation strategy applied at the earth station department emphasised the need to build implementation issues and objectives into the actual design process as shown in Figure 11.0 of Section 3.2.

A consultant must not, after completion of evaluation, rush into implementation without fully preparing a way forward. Implementation strategies are required that address issues such as timing of events, sourcing and delivery of resources, provision of logistics like transport for delivery of material to central stores, scheduling of activities, and the development of the human resources through training and human resource support structures like counselling.

Technical aspects of change (hard issues) are important, but need not overshadow the ever-crucial human issues. The ‘softer’ people-based issues are often neglected and can have tremendous detrimental impact on the successful implementation of change. For example, the 1996 L.T.C. restructuring that completely ignored the staff issues resulted in industrial action that brought L.T.C. to its knees. Similarly, the 1999 re-organisation that was popularly known as right-sizing saw all people volunteering for severance package, leaving the organisation (L.T.C.) mainly with only management team. As a retreat, an urgent amendment to the severance package policy was made in which L.T.C. had to screen and decide on those who go or remain.

Change processes are often costly and implementation thereof should be carefully considered and prepared for well in time. “All stakeholders must have a shared perception and be around during implementation”, recommended Paton and McCalman. The change initiatives implemented at the earth station section were carried out in the presence and with the guidance of the consultant (the author). All change processes that took place in L.T.C. were implemented in the absence of the consultants. The consultants only come after the implementation, probably to review progress.

6.5 Review

The final stage of organisational development model is review. Solutions to onerous problems have been implemented and managers monitored progress and continually liaise with the consultants and the rest of the organisation. So, well-structured systems intervention has been developed and implemented to answer a particularly hard problem.

The consultant in collaboration with the organisation analyses and discusses the results of the implementation process. The organisation learns the techniques for assessing success or failure of changes introduced. Success is celebrated and lessons drawn regarding problems encountered during the change process. Success should not only be limited to implementation, but to really addressing problems. Small problems that are normally outstanding after implementation also have time to be looked at and corrected. However, if change initiatives failed to address the problem, comprehensive analysis is made of the actual cause of failure and the associated remedy. A change of implementation strategy only takes place if only implementation is suspect and solutions remain untested and unchanged. The philosophy behind single and double loop learning styles (Section 3.1.1.4) becomes useful in this exercise.

A review of the whole change process establishes loop-holes that need to be closed for future applications. This review further provides a learning curve for participants – the consultant and the organisation as a whole. It also builds confidence as well as skills and expertise.

6.6 Change Management

Central to the concept of change is change or transition management. Change management is an “umbrella” to the process of change (Figure 22.0) without which change would not succeed. Organisational members, as seen at the earth station, need to have the same shared understanding of what may happen and why, which completely smoothen the change process.

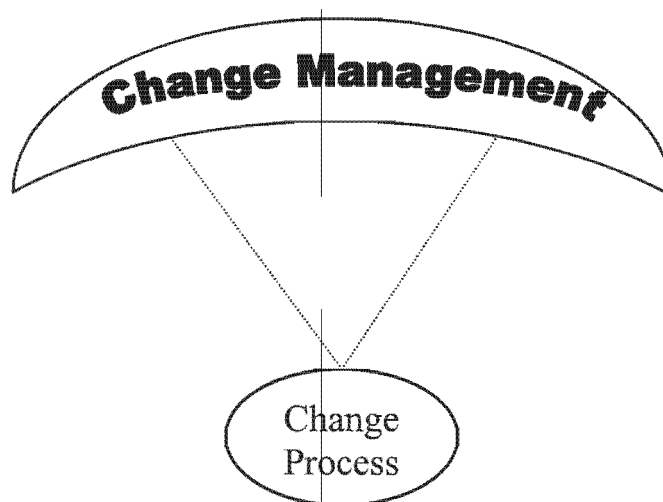


Figure 22.0 Concept of Change Management

Deming's *Out of the Crisis* (1986) provides masterpiece guidelines necessary for the ability within managers and leaders to deal with constant change. It is vital to manage a change process from conception or planning through design, implementation and sustenance of organisational change.

Accordingly, there are four stages that the change process goes through in order to implement and sustain change. The stages are as follows:

- (a) The trigger stage. This stage concerns the identification of need for change deliberately formulated in the form of opportunities and strengths rather than only threats or crises and weaknesses. However, threats and weaknesses also need to be changed to opportunities and strengths for the good of the organisation and in this case, the earth station department.
- (b) The vision stage. This stage establishes, having identified need for change, the future development of the organisation as a whole including structure by articulating a vision and the desired goals, communicating this effectively in terms of where the earth station organisation is heading. The challenges, including the desired future that the earth station department is to meet are highlighted so as to bring all organisational members into the same, shared perception and understanding of where the earth station unit is heading and how to get there. Change is normally assisted by a climate of

participation and involvement creating enthusiasm, thus eliminating resistance to change that often results from fear, prejudice, anxiety and ignorance [46].

- (c) The conversion stage. In this stage, support and commitment in the organisation is mobilised for the new direction or vision as being the most appropriate method for dealing with the problems that have necessitated change. The words are converted into actions. Staff members' participation and involvement is necessary and eliminates the famous phrases, like "you have introduced this without consulting us first".
- (d) The maintenance and renewal stage. This stage ensures that change is sustained. In many instances as the author also observed at the earth station department, it is difficult to keep momentum going especially as the problems that triggered change lose relevance. People's efforts during a change take a decaying curve and need continuous reinforcement, justification and revival so that it does not die off. In many institutions and organisations, resources are allocated and committed to maintaining and renewing the original vision and thus keeping transition "permanent". The developing organisation cannot, however, afford this luxury. Change or transition management manages change and ensures smooth transition from status quo into a new productive situation, providing what Charles Handy (1990) calls the lubricants of change as necessary. Change, in today's world, is a constant feature with which managers need to have skills and abilities to deal with it. And this challenge facing the managers is what change management is all about. Thus organisations wishing to effectively manage and deal with change need to identify problems, look at alternatives or solutions to the current situation, weighing different options and making informed decisions regarding the future state of the organisation.

To conclude this chapter, organisational development model has been developed. The model has not been tested in real world, hence no practical results, strengths and limitations that are known as yet. The model, however,

serves well as a guideline in major organisational changes. The scope of the model is mainly limited to the earth station department scenario. The model is, however, nearly general enough to apply to a wide range of situations.

The next chapter concludes this thesis by drawing conclusions from the research study as a whole.

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7.0 CONCLUSIONS

Previous chapters and sections have covered a wide range of issues and aspects that necessitate change, diagnostic techniques used, interventions strategies and implementation of the intervention strategies including re-organisation.

The current chapter concludes the research study. This is achieved by highlighting the uncertainties, limitations and achievements of the study. Previous chapters and sections have covered many factors that triggered change. Solutions to these problems necessitating change, implementation of the solutions including re-organisation of the earth station department and review of implementation have all been discussed.

Few models that enhance the earth station learning and development as times change have been developed as part of the improvement efforts. These models provide framework for continuous growth and development in the turbulent environment. The developed models have not been tested in the real world application or situation and their practical limitations and strengths are not known.

Privatisation issues still provide memories of retrenchments and possibility of further retrenchments. The inherent uncertainty coupled with lack of job opportunities in Lesotho pose a threat to social stability.

Changes mentioned and referred to in this thesis have only been limited to and made at the satellite earth station department only. A larger picture would have made more impact to the whole organisation – L.T.C., but time constraints did not allow. Furthermore, it is uncertain that the changes introduced at the earth station department will continue far beyond the research study. It is further uncertain that the changes will in any way influence the direction L.T.C. is taking. The improvements at the earth station department have borne fruits. However, continuation of this is rather doubtful now that L.T.C., the parent

organisation is privatised and the strategic partner will soon bring own management team.

It is worth mentioning at this point that L.T.C. and all its departments have multifaceted and systemic problems that have been demonstrated by deficiencies identified at the earth station department. Introducing systems intervention rectified the deficiencies at this department.

The earth station department was re-organised; accordingly the new, flat structure and work organisation were achieved.

Significant improvements producing positive results are being achieved, but not easily. Thus,

- orderly organisation and performance of work
- allocation of duties and delegation of responsibilities to departmental teams
- minimal network outages achieved through improvements in maintenance procedures and efforts
- high standard of cleanliness and hygiene
- improved health and safety awareness
- improved and enhanced security measures
- motivated and committed workforce
- more care of workers by management
- futuristic thinking, planning and organisation
- revival of internal training activities
- improved resource utilisation
- more organised and awareness of interactions and interdependencies with all immediate sections and other international bodies

Regular meetings are held among departments in order to review and monitor progress. It is uncertain if this will continue beyond the research study.

Teambuilding, support and revival of organisation objectives are carried out regularly to maintain the spirit of change beyond the research study.

The next chapter briefly comments on the recommendations made or resulting from the study.

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8.0 RECOMMENDATIONS

The previous chapter has drawn conclusions from the study. In this chapter, a few recommendations are made.

The improvement efforts achieved have yielded magnificent results and the author thus recommends as follows:

- (a) newly established organisation of Ha Sofonia satellite earth station be maintained and regularly revived or reviewed to ensure commitment and sustenance of momentum. This will benefit the organisation – earth station department even beyond the research period
- (b) L.T.C. management may consider adopting the strategies and programmes used at the earth station department to change and improve other departments
- (c) Other organisations wishing to introduce changes and improvement efforts may need to use the results of this study

The chapter has briefly mentioned recommendations from the study.

The next chapter looks at lessons the author has gained as a result of this research study.

9.0 LESSONS FROM THE RESEARCH

In this chapter, the lessons the author has obtained as a result of this study are highlighted. This includes lessons on and off the field. This is achieved by considering all important events or concepts that add value to the research and to the knowledge base of the author. The lessons are highlighted in order to show value added to the author as a result of the study. Also, it will benefit other readers and students or researchers who may want to pursue this study further.

The research study has provided the author and the participating staff at the Ha Sofonia Satellite Earth Station with a vast amount of learning experiences and new philosophies like systems approach, some of which the author mastered.

During the research, the author has interacted with a number of people from different social backgrounds and positions, providing exposure to a number of things. Being in command and control of the situation (driver of the process) was a worthwhile experience.

Mixing, talking and working with the participants and other people during the research enhanced the author's communications and interpersonal skills. This was helpful and more useful when advising both retrenched and remaining employees. Good planning and time management skills for working with tight schedules, appointments and deadlines are some of the benefits reaped. However, it was extremely difficult to do academic work while at the same time working. Time, private and family commitments are just not making it easy. The pressure is massive while time is frustratingly too short and insufficient.

The research also gave the author some degree of independence in working or studying, making own decisions in real work life. The pressure to get things right is also high to avoid fumbling in front of the participants. Open

discussions in a welcoming and relaxed environment bring positive ideas. Structuring interview questions and administering interviews was a learning curve.

Resistance to change is real, normal and cannot be ignored. Expressed resistance takes place when individuals and organisations willingly oppose transition from the status quo through expressed words and or demonstrative actions. Unexpressed resistance to change happens when the organisation and its members unconsciously and slowly fall back to the old ways of doing things. Managers need to realise that resistance to change can be a stumbling block towards achieving any meaningful changes. The earth station staff regularly fell back to the old ways without being aware.

A single case study cannot “prove” that all organisations moving from a state of dysfunction to that of efficiency and high productivity pass through similar stages. But it is quite possible that under conditions generally similar to those reported in this thesis one might be able to discern a basic pattern of changing behaviour over time, which would yield similar results in other formal organisations.

The process of successful change in a hierarchical organisation starts and continues to the extent that the organisational members perceive the behaviour of superiors, peers and subordinates to be more in keeping with the norms of behaviour expressed in the organisation culture. The author has learned that the flat structure with fewer or no layers that signify seniority, enables workers to work as members of a team and colleagues.

Momentum to keep things going is rather difficult and continuous review and revival of commitment and support need regular check. *The Stability Principle* [17] shows that organisations and members would normally and naturally fall

back to the old ways (initial rest position) once the pressure to change is removed.

Giving workers authority and power to manage their own affairs builds trust, innovation and develops workers. However, support through regular meetings is an important ingredient of the process of delegating and empowering.

Once improvement programmes are initiated, efforts need to be made to correct undesirable behaviour in the workplace rather than punish those responsible for it and try to make an example of them.

Many organisations still continue to leave employees uninformed in many issues that directly affect them (employees). This explains the reasons why employees always oppose concepts like privatisation.

A large number of staff members do not trust the top management, and as a result, anything that comes from the top management is treated with extra caution and accepted with disgust.

In conclusion, this chapter has discussed some of the lessons the researcher or the author has drawn from the study.

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ABBREVIATIONS / ACRONYMS

- 1.0 Adj. – Adjust
- 2.0 AFC – Automatic Frequency Control
- 3.0 AFRALTI – The African Advanced Telecommunications Training Institute
- 4.0 AT&T – American Telephone and Telegraph Company
- 5.0 BB – Baseband
- 6.0 BBC – British Broadcasting Corporation
- 7.0 BTI – British Telecommunications International
- 8.0 CATWOE – Customers, Actors, Transformation, Worldview, Organisation, Environment
- 9.0 CPU – Central Processing Unit
- 10.0 CTO – Commonwealth Telecommunications Organisation
- 11.0 DACCS – Digital Access and Cross-Connect Systems
- 12.0 DAMA – Demand Assigned Multiple Access
- 13.0 E/S – Earth Station (short form)
- 14.0 ETP – Entrepreneurship Training Programme
- 15.0 FEC – Forward Error Correction
- 16.0 FSM – Formal System Model
- 17.0 HAS – Ha Sofonia, a place where the earth station is located
- 18.0 HNS – Hughes Network Systems
- 19.0 IDR – Intermediate Data Rate
- 20.0 IF – Intermediate Frequency
- 21.0 IMF – International Monetary Fund
- 22.0 INMC – International & National Network Management Centre
- 23.0 INT - Internal
- 24.0 INTELSAT – International Satellite Organisation
- 25.0 IOR – Indian Ocean Region
- 26.0 L.T.C. – Lesotho Telecommunications Corporation
- 27.0 LEC – Lesotho Electricity Corporation
- 28.0 LTA – Lesotho Telecommunications Authority
- 29.0 MCTC – Multi-Country Telecommunications Training Centre

- 30.0 MLA – Microwave Link Analyser
- 31.0 Modem – Modulator / Demodulator
- 32.0 MSU – Maseru, Capital of Lesotho
- 33.0 MUX – Multiplexer
- 34.0 NUL – National University of Lesotho
- 35.0 ODM – Organisational Development Model
- 36.0 PCH – Protection Channel
- 37.0 RF – Radio Frequency
- 38.0 SABS – South African Bureau of Standards
- 39.0 SCPC – Single Channel Per Carrier
- 40.0 SWOT – Strengths, Weaknesses, Opportunities and Threats
- 41.0 UCT – University of Cape Town
- 42.0 UNCAL – Uncalibrated
- 43.0 UPS – Uninterruptible Power Supply
- 44.0 VCL – Vodacom Lesotho
- 45.0 VSM – Viable System Model
- 46.0 WCH – Working Channel

APPENDICES

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APPENDIX A

Organisational Diagnosis

This questionnaire is designed to help you determine how well your organisation, namely, **satellite earth station**, works in a number of related areas.

Assess how far you agree or disagree with the following statements as they apply to you within your own work department or section, using the seven-point scale and circling the appropriate number. **READ CAREFULLY!!**

1	2	3	4	5	6	7
Agree Strongly	Agree	Agree Slightly	Neutral	Disagree Slightly	Disagree	Disagree Strongly

In answering the statements, try and be as honest as you can. This is not a test, and there are no right or wrong answers. The only correct answer is what you decide yourself.

Statements

- | | |
|---|---------------|
| 1.0 I understand the objectives of this organisation | ① 2 3 4 5 6 7 |
| 2.0 The organisation of work here is effective | 1 2 3 4 5 ⑥ 7 |
| 3.0 Manager will always listen to ideas | ① 2 3 4 5 6 7 |
| 4.0 I am encouraged to develop my full potential | 1 2 3 4 ⑤ 6 7 |
| 5.0 My immediate boss has ideas that are helpful to me
and my work group | 1 2 3 ④ 5 6 7 |
| 6.0 My immediate boss is supportive and helps me in
my work | 1 2 3 ④ 5 6 7 |
| 7.0 This organisation keeps its policies and procedures
relevant and up to date | 1 ② 3 4 5 6 7 |
| 8.0 We regularly achieve our objectives | 1 ② 3 4 5 6 7 |
| 9.0 The goals and objectives of this organisation are
clearly stated | ① 2 3 4 5 6 7 |
| 10.0 Jobs and lines of authority are flexible | ① 2 3 4 5 6 7 |
| 11.0 I can always talk to someone at work if I have a
work-related problem | ① 2 3 4 5 6 7 |
| 12.0 The salary that I receive is commensurate with
the job that I perform | 1 2 3 4 5 ⑥ 7 |
| 13.0 I have all the information and resources I need
to do a good job | 1 2 3 4 5 ⑥ 7 |
| 14.0 The management style adopted by senior
management of LTC is helpful and effective | 1 2 3 4 5 6 ⑦ |
| 15.0 We constantly review our methods and
introduce improvements | 1 ② 3 4 5 6 7 |
| 16.0 Results are attained because people are
committed to them | 1 ② 3 4 5 6 7 |
| 17.0 I feel motivated by the work I do | 1 2 ③ 4 5 6 7 |
| 18.0 The way in which work tasks are divided is
sensible and clear | 1 ② 3 4 5 6 7 |

19.0	My relationships with other members of my work group are good	① 2 3 4 5 6 7
20.0	There are opportunities for promotion and increased responsibilities in this organisation	1 2 3 ④ 5 6 7
21.0	This organisation sets realistic plans	1 2 3 4 ⑤ 6 7
22.0	Performance is regularly reviewed by my boss	1 2 3 4 5 6 ⑦
23.0	There are occasions when I would like to be free to make changes in my job	① 2 3 4 5 6 7
24.0	People are cost conscious and seek to make the best use of resources	1 2 3 4 ⑤ 6 7
25.0	The priorities of this organisation are understood by its employees	1 2 3 ④ 5 6 7
26.0	There is a constant search for ways of improving the way we work	1 2 3 4 ⑤ 6 7
27.0	We co-operate effectively in order to get the work done	1 ② 3 4 5 6 7
28.0	Encouragement and recognition is given for all jobs and tasks in this organisation	1 2 ③ 4 5 6 7
29.0	Departments/sections of LTC work well together to achieve good performance	1 2 3 4 5 ⑥ 7
30.0	This organisation's management team provides effective and inspiring leadership	1 ② 3 4 5 6 7
31.0	This organisation has capacity to change	① 2 3 4 5 6 7
32.0	The work we do is always necessary and effective	1 ② 3 4 5 6 7
33.0	In my own work area, objectives are clearly stated and each person's work role clearly identified	1 2 3 4 ⑤ 6 7
34.0	The way the work structure in this organisation is arranged produces general satisfaction	1 2 3 4 5 ⑥ 7
35.0	Conflicts of views are resolved by solutions which are understood and accepted	① 2 3 4 5 6 7
36.0	All individual work performance is reviewed against agreed standards	1 2 3 4 5 ⑥ 7
37.0	Other departments/sections are helpful to my own department/section whenever necessary	1 2 3 ④ 5 6 7
38.0	My boss's management style helps me in the performance of my own work	1 2 3 ④ 5 6 7
39.0	Creativity, innovation and initiative are encouraged	1 2 ③ 4 5 6 7
40.0	People are always concerned to do a good job	① 2 3 4 5 6 7
41.0	The management style adopted by senior management of LTC is helpful and effective	1 2 3 4 5 ⑥ 7

Results Analysis – Questionnaire

Statement Number	Issues relates to	Number of Occurrences/Average Scores						
		1 Agree strongly	2 Agree	3 Agree slightly	4 Neutral	5 Disagree slightly	6 Disagree	7 Disagree strongly
1	Strength	2	5	1	-	-	1	1
2	Weakness	-	1	2	2	-	3	2
3	Strength	2	5	1	2	-	-	-
4	Strength	1	4	1	2	1	1	-
5	Strength	2	6	-	1	1	-	-
6	Strength	5	3	-	1	1	-	-
7	Weakness	-	2	2	2	1	2	1
8	Strength	-	4	3	-	1	1	1
9	Weakness	1	2	1	1	1	4	-
10	Weakness	2	1	1	1	-	4	1
11	Strength	5	4	1	-	-	-	-
12	Weakness	-	-	1	2	1	5	1
13	Weakness	1	-	4	-	1	2	2
14	Weakness	-	-	-	1	1	2	6
15	Weakness	-	2	2	-	1	4	1
16	Strength	-	4	2	2	-	2	-
17	Weakness	-	2	2	1	2	2	1
18	Weakness	1	3	-	2	-	1	3
19	Strength	4	5	-	1	-	-	-
20	Weakness	2	-	1	3	1	1	2
21	Weakness	-	1	2	-	2	5	-
22	Weakness	-	-	3	1	1	3	2
23	Strength	3	7	-	-	-	-	-
24	Weakness	-	3	1	1	1	1	3
25	Weakness	-	2	1	2	-	1	4
26	Strength	-	3	3	-	2	-	2
27	Strength	1	6	1	-	1	1	-
28	Strength	-	3	4	1	-	1	1
29	Weakness	-	2	2	-	-	2	4
30	Strength	1	4	1	1	-	2	1
31	Strength	4	4	2	-	-	-	-
32	Strength	3	3	1	-	-	3	-
33	Weakness	-	3	1	-	1	2	3
34	Weakness	-	2	1	1	-	4	2
35	Potential Weakness	1	2	1	3	-	2	1
36	Weakness	1	1	1	-	-	5	2
37	Weakness	-	3	1	1	-	3	2
38	Strength	1	5	-	2	-	1	1
39	Strength	1	4	3	1	-	-	1
40	Strength	1	2	3	1	2	1	-

Results Analysis – Questionnaire

Number of Occurrences/Average Scores

Statement Number		1 Agree strongly	2 Agree	3 Agree slightly	4 Neutral	5 Disagree slightly	6 Disagree	7 Disagree strongly
1	Strength	2	5	1	-	-	1	1
2	Weakness	-	1	2	2	-	3	2
3	Strength	2	5	1	2	-	-	-
4	Strength	1	4	1	2	1	1	-
5	Strength	2	6	-	1	1	-	-
6	Strength	5	3	-	1	1	-	-
7	Weakness	-	2	2	2	1	2	1
8	Strength	-	4	3	-	1	1	1
9	Weakness	1	2	1	1	1	4	-
10	Weakness	2	1	1	1	-	4	1
11	Strength	5	4	1	-	-	-	-
12	Weakness	-	-	1	2	1	5	1
13	Weakness	1	-	4	-	1	2	2
14	Weakness	-	-	-	1	1	2	6
15	Weakness	-	2	2	-	1	4	1
16	Strength	-	4	2	2	-	2	-
17	Weakness	-	2	2	1	2	2	1
18	Weakness	1	3	-	2	-	1	3
19	Strength	4	5	-	1	-	-	-
20	Weakness	2	-	1	3	1	1	2
21	Weakness	-	1	2	-	2	5	-
22	Weakness	-	-	3	1	1	3	2
23	Strength	3	7	-	-	-	-	-
24	Weakness	-	3	1	1	1	1	3
25	Weakness	-	2	1	2	-	1	4
26	Strength	-	3	3	-	2	-	2
27	Strength	1	6	1	-	1	1	-
28	Strength	-	3	4	1	-	1	1
29	Weakness	-	2	2	-	-	2	4
30	Strength	1	4	1	1	-	2	1
31	Strength	4	4	2	-	-	-	-
32	Strength	3	3	1	-	-	3	-
33	Weakness	-	3	1	-	1	2	3
34	Weakness	-	2	1	1	-	4	2
35	Potential Weakness	1	2	1	3	-	2	1
36	Weakness	1	1	1	-	-	5	2
37	Weakness	-	3	1	1	-	3	2
38	Strength	1	5	-	2	-	1	1
39	Strength	1	4	3	1	-	-	1
40	Strength	1	2	3	1	2	1	-
41	Weakness	-	-	1	1	1	2	5

APPENDIX B

University of Cape Town

**AGREEMENT BETWEEN BOARD OF LESOTHO TELECOMMUNICATION
CORPORATION (LTC)**

AND

LTC WORKERS REPRESENTATIVES

Whereas: The Management of Lesotho Telecommunication Corporation (LTC) and Representatives of LTC workers (hereinafter referred to as the parties) had agreed to negotiate on a number of issues with a view to reaching further agreements;

Whereas: despite the above agreement, the parties sought an intervention of the Labour Commissioner in terms of Section 225 of the Labour Code Order No.24 of 1992.

Whereas: the Labour Commissioner duly intervened, an action which culminated in the process of conciliation as from 28/08/96 until and including 16/10/96, at LTC Boardroom in Maseru, under the Chairmanship of the Deputy Labour Commissioner;

The parties thereby agreed as follows:-

1. VODACOM LESOTHO (VCL)

Workers Recommendations on V.C.L.

Both Parties agreed that points 4.0, 4.1, 4.2 and 4.3 shall be re-examined.

Points 1.1, 2.0, 3.0, 5.0 and 6.0

No agreement reached between the parties. These issues shall be further negotiated.

2. RESTRUCTURING

That this issue is an on-going process, of which Bohlin & Stromberg Consultants from Sweden have already been engaged and are expected to come and complete their task no later than November 1996. The process is to continue to finality. In the event that no agreement is reached between LTC and Bohlin & Stromberg the exercise shall be continued to finality by the proposed Management Consultants.

3. PARTICIPATORY MANAGEMENT

- (a) that Workers are permitted to participate in the Administration Meetings, and that the Acting Managing Director was given mandate to develop the modus operandi in consultation with the workers representatives;

- (b) that the meetings of the Board of Directors are regulated by the Telecommunication Act 1979, Section 21 (1) - (7); and that as and when the need arises the Board shall co-opt any one or more worker(s) representative(s) to its meeting(s);
- (c) Workers' representatives to submit their proposal to the Ministry of Transcomms proposing their Membership in the Board.

4. **PERFORMANCE MANAGEMENT**

Agreed as proposed by Workers' representatives.

5. **STAFF BENEFITS**

- (a) The Managers car allowance of R2,500.00 has been abolished. The old company cars shall be re-allocated to the respective Divisions and shall be used for official duties only. The vehicles shall bear the Corporation's logo and shall not constitute the personal property of any Manager. The normal corporate Transport Regulations shall apply.

- (b) **Housing Allowance:**

This issue is to be re-negotiated.

- (c) **Car Scheme and Housing Scheme:**

The implementation of both schemes is dependent on availability of funds. Both parties agree and undertake to review the financial status of the Corporation periodically every three months with a view to initiate the funding of both schemes.

- (d) **Telephone Concessionary Units:**

The concessionary units are agreed as follows:

<u>GRADE</u>	<u>UNITS</u>
1-4	500 units per month
5-8	750 " " "
9-12	1000 " " "
13-16	1250 " " "

For operational Staff, Concessionary units shall be 20% more than entitlement of his/her grade. The units shall not be cumulative. All the benefits are not transferable. This matter will be further negotiated.

6. 20% Salary Increase

That the 20% salary increase is agreed upon, and shall be staggered between grade 1 and 16. This is effective from 1st October, 1996.

This agreement is reached on the understanding that an improvement in staff performance shall be realized.

The financial situation of the Corporation shall be reviewed periodically every three months from October 1996.

7. It is further agreed that all pending issues shall be discussed, finalized and mutually agreed to. Implementation dates shall be agreed upon.

SIGNED BY:

For and on behalf of the
Board

Date

For and on behalf of the
Workers Representatives

Date

Witness -
Deputy Labour Commissioner

Dater

APPENDIX C

1991.06.28

TO CS & ALL SECTIONAL HEADS OF O & M
IES, SB, NS, NT, NP, DC, SM(U), SO, MI, MC, MNC, CAPENTRY W/SHOP STAFF

COMMISSIONING AND PRESENTATION ON THE CAPENTRY W/SHOP MACHINERY

You are all cordially invited to witness the commissioning of the Capentry Workshop Machinery at Ha Matala at 11:30 hours.

1. 12:00 hours

There will be a presentation of various machines and their functions by the supplier of the equipment in conjunction with O & M Capentry staff.

2. 13:15 hours

Afterwards the equipment will be handed over to Mr. A. Moqhali Chief Engineer Operations and Maintenance who will officially inaugurate the Capentry Furniture Workshop.

3. 13:30 hours

You will be served with a cold lunch afterwards, please be there.

4. It is hoped that this visit will make you all aware of the facilities for all your furniture requirements, for the anticipated expansion of services to the districts and locally. It is also our hope, at this poorly housed factory, that you will be motivated to use the services provided by the staff of this workshop.

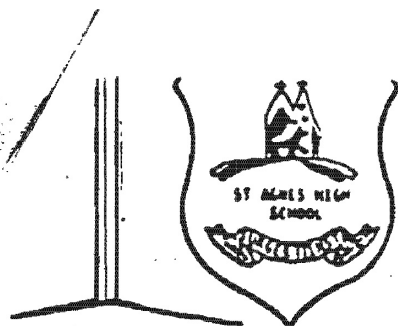
MPHE-MPHE EA LAPISA

PELE EA PELE O & M

I.P. MOILOA
DS

KEEP YOU IN TOUCH WITH THE WORLD

APPENDIX D



ST. AGNES HIGH SCHOOL

Teyateyaneng 200
LESOTHO
Tel: 500244

13/01/1997



Managing Director

L.T.C

T.Y Office

-01-21

Dear Sir/Madam

This letter serves to remind your office that in October 1995 LTC technicians took our telephone switch-board for repairs. However, our efforts to have it back in use have yielded no fruits.

We would also like to draw your attention to the fact that for all this period we have been made to pay rental charge for services we do not receive.

In the light of this information, we humbly request that you please direct that this facility be reinstalled and that we get reimbursement for the unfair fees imposed for services never rendered.

We look forward to your assistance on this matter.

Sincerely Yours

ST. AGNES HIGH SCHOOL

PRINCIPAL

APPENDIX D1

MISSION STATEMENT

Our mission is to serve you, our loyal customer with world-class satellite communications services

It is our pledge and commitment to serve you with the highest quality service that is not only reliable, but also, always available when you need it. Our services and facilities are maintained to the highest International Standards

The Ha Sofonia Satellite Earth Station staff is committed to helping you communicate

APPENDIX E

Questionnaire

Sex: M: ☒ F: ☐

(1) How do you feel about the ongoing process of right-sizing LTC?

Not Happy: ☒ Happy: ☐ Do Not Know: ☐

(2) If you were one of those retrenched, how would you feel?

Angry/Unhappy: ☒ Relieved: ☐ Don't Know: ☐

(3) Do you ~~the~~ view the amount of money given to you as severance package as

Sufficient: ☐ Just Right: ☐ Too Little: ☒

(4) How would you describe assistance offered by LTC for coping with retrenchments and the resulting trauma?

Positive: ☐ Non-existent: ☒ Negative: ☐

(5) If you were one of those who remain employee of LTC, how would you feel?

Happy: ☐ Unhappy: ☐ Don't Know: ☒

(6) What advice would you give LTC as a means of recovering from its financial crisis?

(a) Improve revenue collection: ☐

(b) Focus on core business: ☒

(c) Improve subscriber lines maintenance: ☒

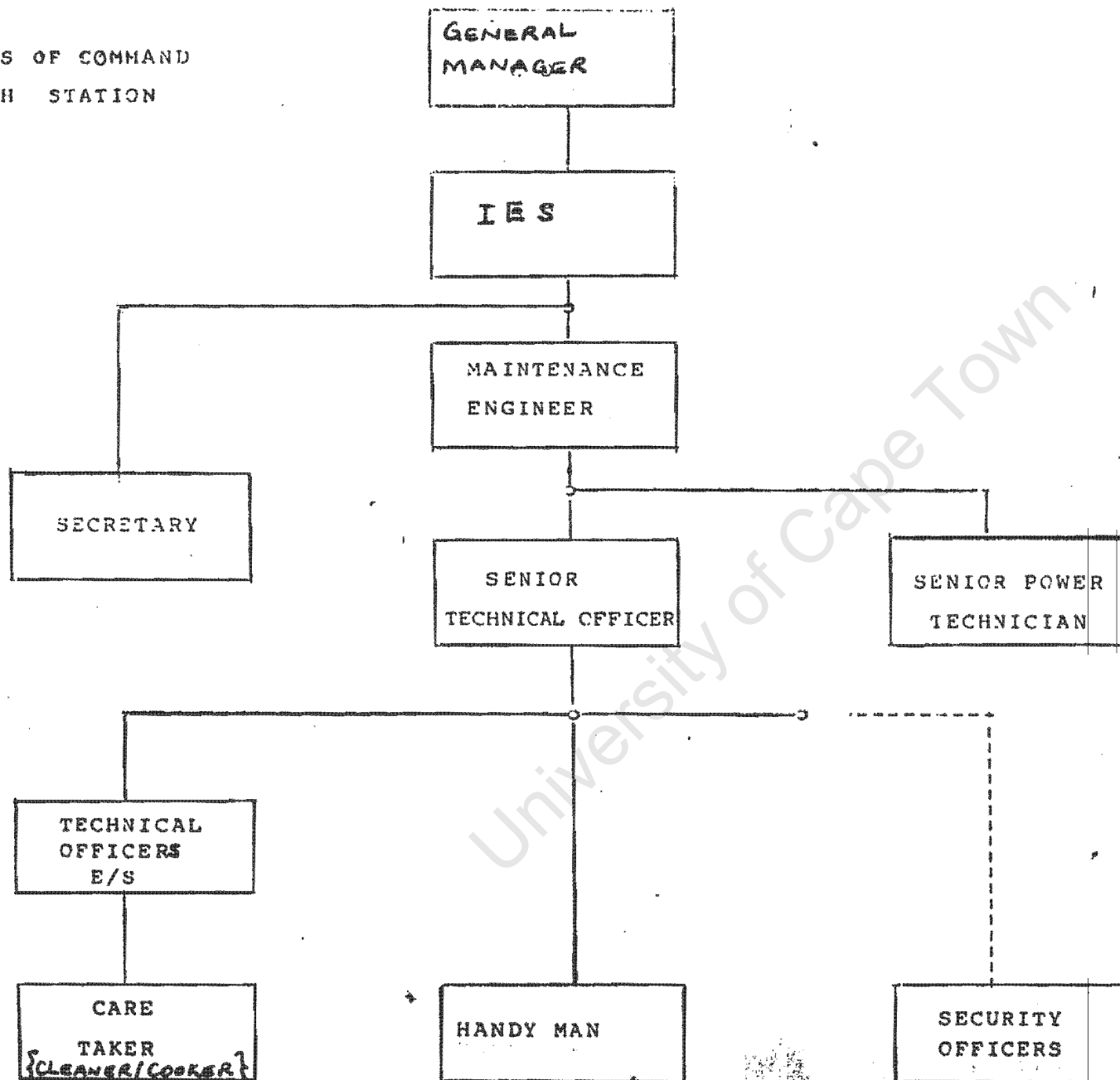
(d) Increase market share from the present 2%: ☐

(e) Reduce the present workforce: ☐

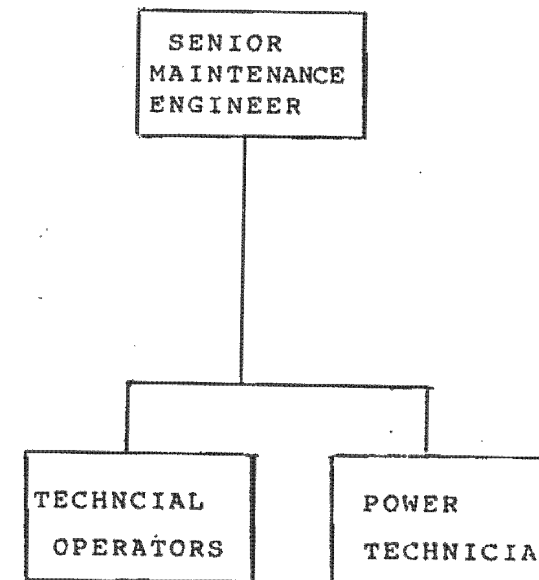
APPENDIX F

University of Cape Town

LINE OF COMMAND
EARTH STATION



SUPPORTING STAFF
(EXPERTS)



APPENDIX G



LESOTHO TELECOMMUNICATIONS CORPORATION

Earth Station Staff

2000-02-04

EARTH STATION MANAGER

Please be informed that Mr L. Ntsoebea has been appointed as Earth Station Manager.

Your full support and co- operation to him will be highly appreciated.

T. SEMOLI

D5

CC: International Services Manager



**KEEP YOU IN TOUCH WITH THE WORLD...
AND WITH YOUR NEIGHBOUR**

APPENDIX H

To : D5

From : Ha Sofonia Earth Station

Date : 1st April 1999

Subject: Nominations for the MCTC Training Programme for the E/S Staff

The following staff members are nominated for the courses (April - June) mentioned below:

<u>NAME</u>	<u>COURSE</u>	<u>DUR.</u>	<u>PERIOD</u>
SELONGOANA	MANAGEMENT PRINCIPLES AND PRACTICE	6	12/04 - 17/05
MACHAI	SIGNALLING SYSTEMS	4	12/04 - 03/05
KHAKANYO	SIGNALLING SYSTEMS	4	12/04 - 03/05
KAKA	SATELLITE TECHNOLOGY MODULE 1	4	26/04 - 24/05
MAKOKO	MICROPROCESSOR TECHNOLOGY	6	17/05 - 21/06
MOKHOTHU	MICROPROCESSOR TECHNOLOGY	6	17/05 - 21/06

Best regards,

L. Ntsoebea
E/S Maintenance Engineer.

APPENDIX I



February 3, 2000

United States Embassy
Consular Section
Maseru, Lesotho

Re: Request for travel visas for training in the United States

Dear Sir or Madam:

Employees of Lesotho Telecom have been invited by Hughes Networks Systems to attend technical training classes at our Gaithersburg, Maryland location for equipment purchased from us. This training is routinely provided by Hughes as part of our contractual obligation to our customers.

The employee names are:

Sehlabaka Mokhothu	Passport No. B11837
Teboho Makoko	Passport No. B10245
Molahlehi Selongwana	Passport No. B14316
Phakisi Kolobe	Passport No. RA016790

Training dates are February 21, 2000 through February 25, 2000, which will necessitate travel to commence the weekend of February 19, 2000.

Hughes appreciates your assistance in this process. Please feel free to contact me if you have any questions or concerns with regard to this request.

Very truly yours,

R. Steven Durst
Program Manager

Corporate Offices
11717 Exploration Lane
Germantown, MD 20876 USA
Tel: 301-428-5500
Fax: 301-428-1868
www.hns.com

APPENDIX J

INTERNAL MEMO

D5

2000-01-11

Economic Viability of the IOR Traffic

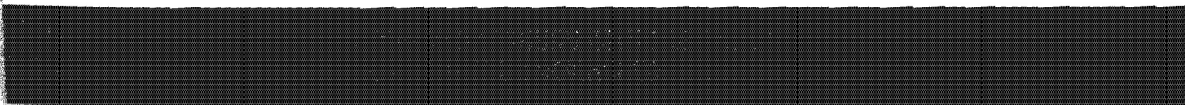
Please receive the report on the subject as discussed late last year. I hope it will meet your requirements with regards to the possibility of using the former BBC antenna.

Happy & Prosperous New Year

Regards,

2000/01/11

K. Makatsela
International & Interconnectivity Services



Economic Viability of the Indian Ocean Region

1.0 Introduction

This report is intended to highlight the economic viability of the Indian Ocean Region (IOR) with regards to telecommunications services. L.T.C at the moment has 13m INTELSAT Standard A Earth Station antenna providing services in the Atlantic Ocean Region (AOR). The antenna is pointing at the INTELSAT satellite located at 335.5 Degree East.

This report looks at the possibility of establishing a direct connection to the Indian Ocean Region.

L.T.C has a spare antenna that was originally used for BBC reception. This BBC antenna, which is INTELSAT Standard B, is currently pointing at 342 Degree East in AOR and is highly flexible in the sense that it can be moved to access all regions. The BBC contract with L.T.C was terminated in 1996. The BBC donated all the equipment to L.T.C. The equipment is very new and has a large number of hardware spares.

This reports looks at the economic benefits, if any, of putting this idling earth station (formerly BBC) into operation, but now carrying L.T.C's voice/data traffic to the Indian Ocean Region.

2.0 Available Equipment

- The present BBC earth station is equipped with Receive facilities only, and any plans to use it should include equipping it with Transmit facilities
- The Receive Chain coax cables should be replaced with the standard wave guides
- Transmit Chain (not existing at the moment and to be installed) should be equipped with wave guides too
- Presently, Redundant Frequency Down converter Set is installed

3.0 Equipment Needed

- Redundant Frequency Up converter Set
- Replacement of Receive Diplexer with Transmit/Receive Diplexer

4.0 Traffic – Asian Countries

The table below gives total minutes per country from June – August 1999. Not all countries are shown. It has to be noted that L.T.C is currently having problems of fraudulent traffic with some of the Asian countries. However, over the years Taiwan has had a consistent and reliable volume of traffic and that alone qualifies it for direct route. Not all countries are involved in the existing fraud traffic; hence for statistical purposes the total minutes to a large extent represent and reflect a true picture of the traffic between Lesotho and Asian countries.

COUNTRY	TOTAL MINUTES
Bangladesh	3360
Burma	4766
China	64547
Hongkong	1651
India	20784
Indonesia	354
Korea (Rep. Of)	906
Malaysia	579
Pakistan	16984
Philippines	8300
Singapore	3794
Sri Lanka	2374
Taiwan	21132
Thailand	520
<u>TOTAL</u>	150051

5.0 Financial Implications

Total minutes = 150 051 minutes averaged to 50 017 minutes/month

Total Revenue (assume 1min call = M2.00) = M 100 034.00/month

This analysis does not include inter-organisational settlements and related costs/revenues.

(A) Assume all these Asian countries transit via Telkom SA (one of our cheapest transit centres) at transit fee of 0.15SDR/min.

Total payment due to Telkom SA (TSA) = \$ 10 128.44/month

Total payment due to TSA (assume \$1.00 = M6.20) = M 62 796.34/month

(B) Assume DAMA equipment is used at Standard B antenna. The INTELSAT space segment charge per calls made is \$0.05/min. Total cost to INTELSAT = \$ 2500.85/month which is equivalent to M 15 505.27/month.

(C) Using a 1024MBPS IDR carrier, INTELSAT space segment charge = \$ 4 180.00 per month using Standard B antenna at coding rate $\frac{3}{4}$ FEC.

Comparing (A) and (B) above, then Total saving from transit = \$ 10 128.44 – 2 500.85 = \$ 7 627.59 per month. Total saving from transit = M 47 291.06 per month.

Comparing (A) and (C), then Total saving from transit = \$ 10 128.44 – 4 180.00 = \$ 5 948.44/month. Total saving from transit = M 36 880.33 per month.

6.0 Summary

Costs due to the present transit arrangement = M 62 796.34/month

Savings from transit when DAMA is used = M 47 291.06/month

Savings from transit when IDR carrier of size 1024MBPS is used = M 36 880.33/month

7.0 Conclusion

- More money can be saved if the antenna is used for L.T.C traffic to the Indian Ocean Region
- Huge profits will eventually be made
- The capital investment of using the antenna is minimal
- Technically, little or no equipment is required to successfully implement this project

The report is purely based on the merits of the present situation. It is further to be noted that some factors have not been taken into consideration, which may to a lesser extent affect the output of this report. However, no significant changes can be made to the fundamental principle of saving costs and making more money. The region (IOR) is economically viable. Previous efforts to establish direct route with Taiwan and probably some Asian countries have not borne any fruits. The reason for the failure is attributed to the required capital overlay. But now, the former BBC antenna can be used for that purpose without further costs to L.T.C.

Compiled, on behalf of D5, by:

International & Interconnectivity Services - L.T.C

APPENDIX K

APPENDIX L

APPENDIX M

L.T.C. MESSAGE

DATE : 13.04.1999

NO: 21/99

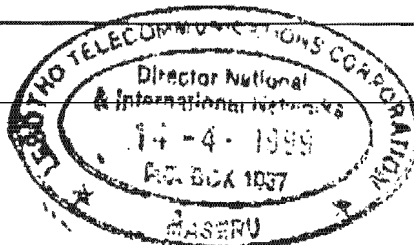
RESPONSIBLE : THAMAHANE C.F.D. RASEKILA

EXT : 100

TRANSFER OF MR T SEMOLI TO DIVISIONAL MANAGER NETWORKS

Following the announcement that Mr T Khabele has joined the Regulatory Authority SEED Group; the office of the Managing Director was compelled by circumstance to re-arrange the Management Team. Staff are therefore advised that Mr T Semoli takes over the functions of the National and International Networks with immediate effect. It is our wish that Mr Semoli can effectively and efficiently attend to the many loose nuts in that Division where there are huge losses of tools and equipment.

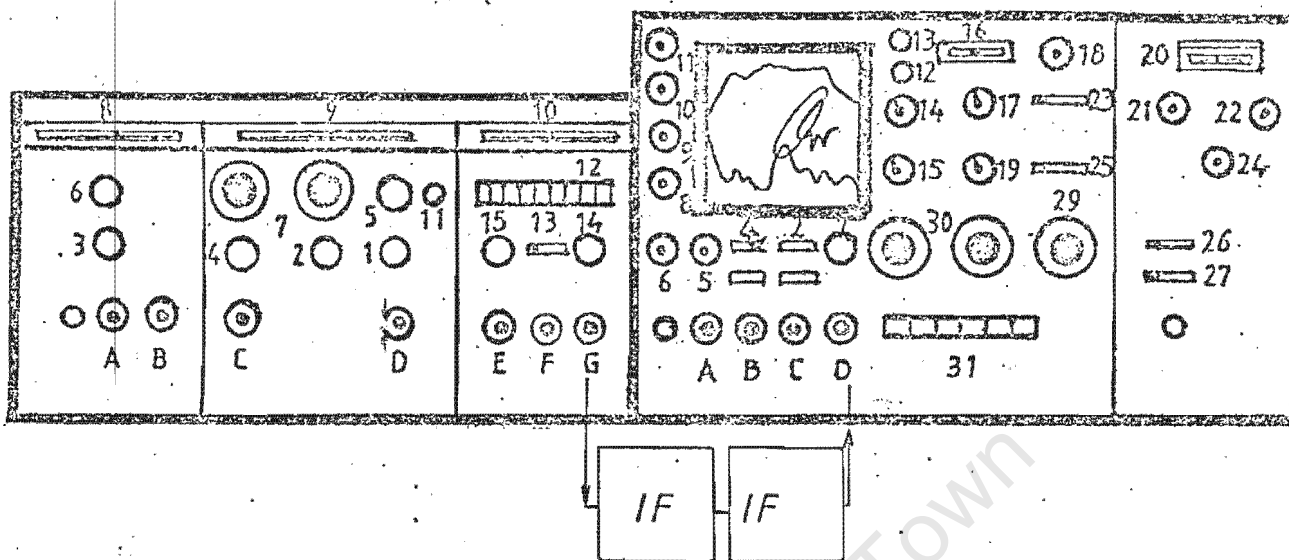
Ho latela tšebetso e supang hore Mong. T Khabele o se a tla sebeletsa Regulatory Authority SEED Group, Bookameli ho iphumane ho tlameha ho koala sekheo ka mokhoa o potlakileng 'me o ka tlisang boiphihlelo moifong oa Baokameli. Ha maemo a le joana, basebetsi ba tsebisoa ka hore Mong. T Semoli o se a tla tkarabella ka botlalo lekaleng la National/International Networks. Ke tebello ea rona hore Mong. T Semoli o tla re tlisetsa ka mafolo-folo litholoana tse hlabosehang haholo ka ho thibela tahlehelo e bolma ea lithepa tse turu tsa Koporasi kahare ho lekala lena la Networks.



12/04/99

APPENDIX P

IF - IF MEASUREMENTS



1. Set the MLA controls as follows:

IF FREQUENCY T 10.....70 MHz	5. Adj. the PHASE SHIFT control
SWEEP T 6.....INT	R8 to superimpose the markers
SWEEP WIDTH T 8.....20 MHz	on the forward and return
BB FREQUENCY T5 R 27.....555 KHz	trace edges. Reset the BLANKING
BB INPUT R1.....INT	switch R4 to ON.
SWEEP SOURCE R 2.....INT IF	
BLANKING R 4.....OFF	
Y1 DISPLAY R 17.....IF	
Y2 DISPLAY R 19.....IF	
MARKERS R 25.....SLIDING	
MARKER OFFSET R 29.....8,5 MHz	
DEVIATION T9.....141 KHz	

2. Set the Transmitter IG attenuator T 12 to +5dBm

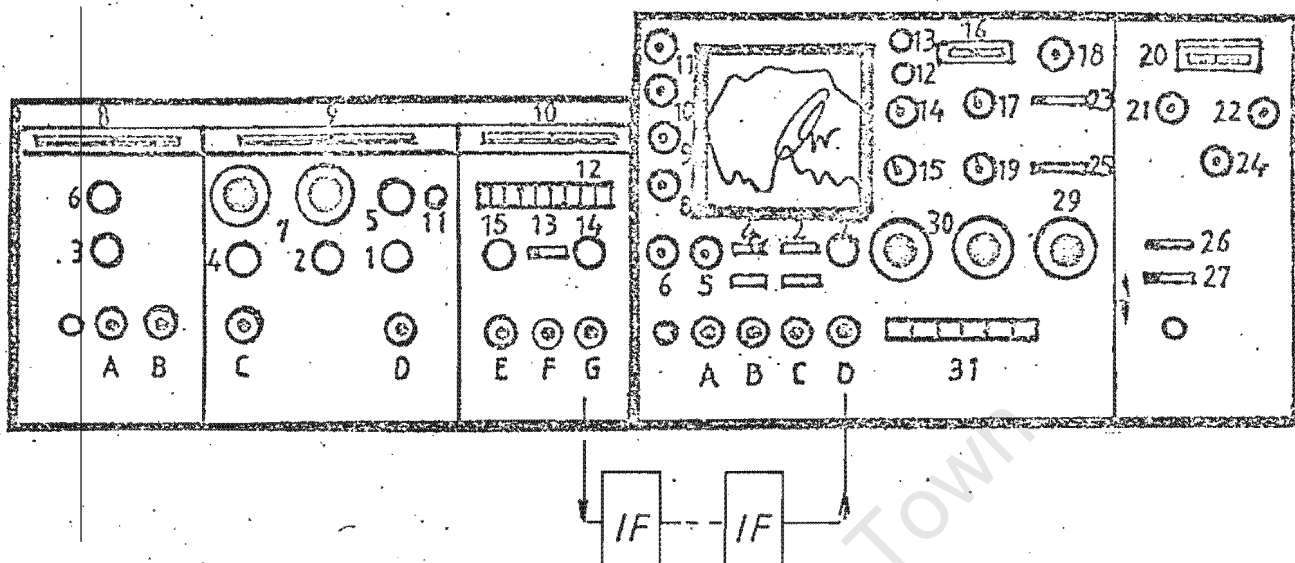
3. Connect the 75 ohm cabling as shown in the diagram

4. Adj. the Receiver If ATT. R31 for an on-scale reading on the IF LEVEL meter R 16. AFC LOCK lamp R 12 is lit and IF UNCAL lamp R 13 is extinguished.





IF MEASUREMENTS



BB LINEARITY AND GROUP DELAY DISTORTION

Set the Y 1 DISPLAY switch R 17 to BB and the Y 2 DISPLAY switch R 19 to DELAY. Set the BB FREQUENCY switches T 5 and R 24 to 555 KHz or less.

To calibrate the Y 1 trace, select a suitable calibration factor on the Y1 y2 CALIBRATION switch R 23 and adj. the Y 1 GAIN control R 14 for the required sensitivity. Reset the Y 1 Y 2 CALIBRATION switch to OFF.

To calibrate the Y 2 trace, adj. the SET LEVEL control R 21 fully clockwise and adj. the PHASE LOCK control R 22 for an up-scale deflection on the PHASE LOCK/LEVEL meter R 20.

Readjust the SET LEVEL control R 21 for a reading within the green band of the PHASE LOCK/LEVEL meter R 20. Adj. the PHASE LOCK control R 22 for a peak on the PHASE LOCK/LEVEL meter R 20.

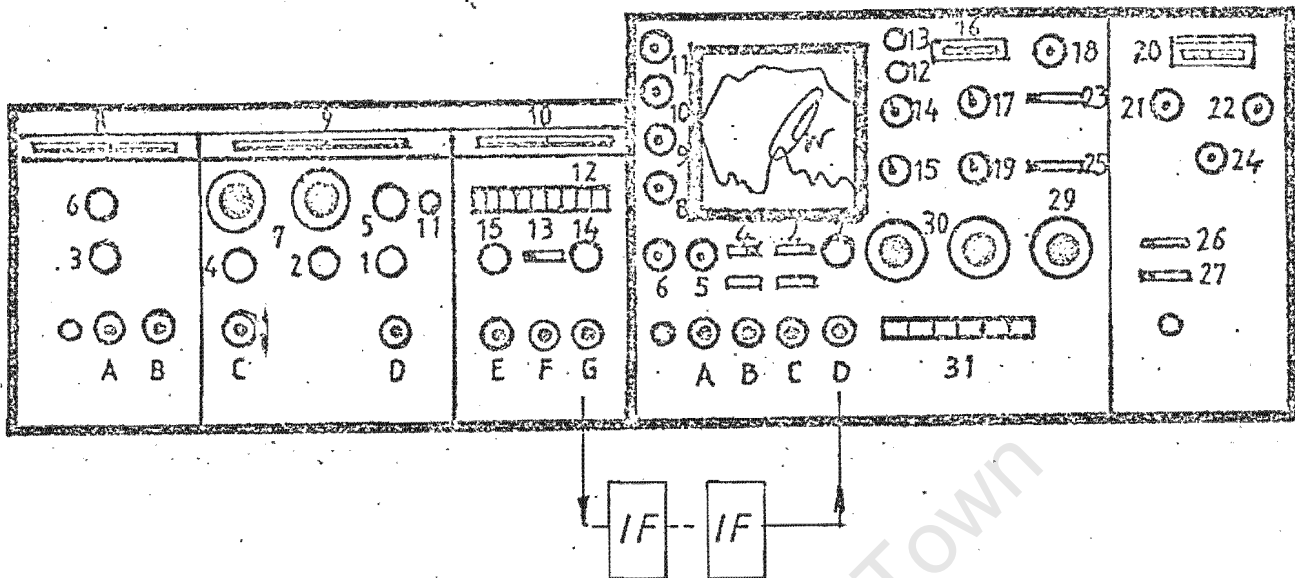
If necessary do the same procedure once more.

Set the DIFF PHASE CALIBRATION switch R 26 to a suitable calibration factor, and adj. the Y 2 GAIN control R 15 for the required sensitivity. Reset the DIFF PHASE CALIBRATION switch R 26 to OFF.





IF - IF MEASUREMENTS



DIFFERENTIAL GAIN AND DIFFERENTIAL PHASE.

A simultaneous display of differential gain and differential phase can be obtained with the Y1 DISPLAY switch R17 set to BB, and the Y2 DISPLAY switch R19 set to DELAY.

Set the BB FREQUENCY switches T5 and R24 to 4,4 MHz.

Adj. the BB POWER attenuator R30 for an on-scale reading on the BB LEVEL meter R16.

To calibrate the Y1 trace, select a suitable calibration factor on the Y2 CALIBRATION switch R23 and adj. the Y1 GAIN control R14 for the required sensitivity. Reset the Y1 Y2 CALIBRATION switch to OFF.

To calibrate the Y2 trace, adj. the SET LEVEL control R21 fully clockwise and adj. the PHASE LOCK control R22 for an up-scale deflection on the PHASE LOCK/LEVEL meter R20.

Readjust the SET LEVEL control R21 for a reading within the green band of the PHASE LOCK/LEVEL meter R20. Adj. thr PHASE LOCK control R22 for a peak on the PHASE LOCK/LEVEL meter R20.

If necessary do the same procedure once more.

Set the DIFF PHASE CALIBRATION switch R26 to a suitable calibration factor, and adj. the Y2 GAIN control R15 for the required sensitivity. Reset the DIFF PHASE CALIBRATION switch R26 to OFF.



ACCESS LINK - TESTER READINGS

MONTH 198.....

MODEM

TESTER POSITION	HA SOFONIA	
	PCH	WCH

BEREA			
MASERU		HA SOFONIA	
PCH	WCH	PCH	WCH

MASERU	
PCH	WCH

NAME:.....

SIGN:.....

DATE:.....

APPENDIX Q

HOW TO START OR200 OPERATION

N.B: The RED button in the centre is a mouse & is used to move the cursor
To CLICK use the LEFT button in FRONT of computer

- (1) Switch on POWER BUTTON on the personal computer/laptop
- (2) Click on START at the far-end-bottom-corner
- (3) Go To

- Programs
- Accessories
- Communications
- Hyper terminal -- click on HYPER TERMINAL

- (4) OR200 icon - DOUBLE CLICK on OR200 icon on the small screen
- (5) Wait for just about 10 minutes to get connected, if you are not already connected
- (6) OR200 MAIN MENU APPEARS
- (7) Type your CHOICE

HOW TO STOP OR200 OPERATION

- (1) Press "Q" for QUIT until you get to "OR200 MAIN MENU"
- (2) Go to FILE and click ONCE
- (3) Click on EXIT and say YES
- (4) Go to FILE and click ONCE
- (5) Click on CLOSE to exit or CONNECT to go back to OR200
- (6) Go to START and click ONCE
- (7) Go to SHUTDOWN
- (8) Click on SHUTDOWN
- (9) Click OK on the screen
- (10) Leave the COMPUTER LAPTOP AS IS

IMPORTANT NOTES:

- (1) NEVER DO ANYTHING OTHER THAN THE ABOVE INSTRUCTIONS
- (2) ASK IF YOU'RE NOT SURE

I was walking in the Lake Districts (England Midlands) with a group of friends when I was studying for B.Eng. (H) degree in the early 1990s when we came to a stream. The stream was in flood and the usual crossing place was a roaring torrent. We backtracked until we found a place where the stream appeared crossable. Several members of the group took a short run and jumped the stream. An elderly, portly member of the group tried and fell full length into the stream. He was quickly dragged out and seemed none the worse for fear, except that he was wet.

“I knew I couldn’t do it”, he said with a grin, “but I just thought I’ll have a go and see what happens, and here I am on the opposite side of the stream. I suppose I could’ve waded across, but trying to jump seemed more fun”.

Koalepe Makatsela (Mr.)

Adopted from Trevor Bentley (1996)