

A COURSE IN
ORGANISATION AND MANAGEMENT FOR
SPACE COMMUNICATION (TV & TELECOMM)

1.0 PURPOSE.

This course is meant for students who have to be trained for management of Space Communication Systems ^(Television and/or Communications). The course being multidisciplinary, it is intended to shape an executive with an overall picture of the System. For areas ~~areas~~ of specialised expertise such as spacecraft management, ^{or} representing the country in international bodies etc, the student has to concentrate on specific areas dealt with here as special courses viz., spacecraft technology or international law for an additional period.

2.0 THE NEED:

There is an explosion of communication systems all over the world. Some countries have already established viable domestic communication systems such as U.S.S.R and Canada. Many U.S. Companies are building domestic satellite system. Many systems for Europe,

and the developing ~~are~~ countries are being planned either on a domestic or regional basis. Some active Space Communication System experiments are planned around 1974 - 1975.

In this situation it is worth pointing out that the spacecraft technology and launching are fairly well controlled factors now; Countries can have viable communication systems built around known, ~~off~~ ^{and} essentially "off-the-shelf" technology.

Thus the major, probably most important, aspect for the future Communications Systems planned throughout the globe, is the Organisation and management of the System. Right from the beginning ~~the~~ and planning stages, many legal, economic, social, ^{and} cultural factors are to be analysed in detail before launching the System into operation. ~~Such~~ Such a planning as well as execution and maintenance of the System require many trained men and women knowledgeable in all the gamut of legal, political, economic, technical and social aspects. It is to meet this need, this course is being addressed.

3.0 ORGANIZATION OF THE COURSE

The course is organized under four major headings:

- (a) Legal aspects of Space Communication
- (b) Management of Space ^{System} Technology.
- (c) Management of Ground ^{System} Technology
- (d) Management of Software and Administration.

Each of these will have three or four subheadings, which ~~will be~~ ^{are} described in later paragraphs. Under the management of spacecraft and Ground System technologies, the contractual - legal aspects of the same also will be addressed.

4.0 DURATION OF THE COURSE.

To be determined. Nominally it should be about one year leading to M.S. degree. Those who wish to specialise in specific areas should do project work of about 6 months in specific areas of interest such as Space technology, law etc. Even research beyond that leading to Ph.D. degree may be considered with promising students.

5.0 QUALIFICATION FOR ENTRANTS.

Bachelors & degree in Sciences

preferably ~~hard sciences~~ mathematics or physics, engineering, law, social sciences etc. Details may be worked out. However those with specific work experience would be preferred depending on their experience.

6.0 DETAILS OF THE COURSE

The arrangement of the topics below does not mean ~~the~~ a serial order of the course. In fact the lectures may be interwoven, e.g. ~~one~~ in a week one or two lectures on Legal Aspects, one or two space segment and so on.

6.1 Legal Aspects of Space Communication.

This covers many areas of international law, politics, tariffs, frequency and orbit regulations, possible legislations of ^{TV} program contents etc

6.1.1 International Legal Aspects and Historical Survey.

Specific areas that will be covered in this are the various international bodies like ITU, WARC, UNESCO, UN Committee on Outer Space and regulations and principles put forth by them. Briefly, the working of these will be described.

To give the student the genesis of the the ~~the~~ laws, recommendations etc historical background of these will be dealt with.

~~Then to implement a national or regional Communication System (for Telephone carrying and~~

Some international communication Systems like INTELSAT & INTERSPUTNIK will be described ^{along} with their regulations.

Then [↑] procedures for implementing a regional Communication System (for Television Broadcast ^{and/or} Telecommunication) such as registration with IFRB, administrative co-ordination with adjacent countries etc will be addressed.

6.1.2 International Politics.

Knowledge of international law would operate in ~~vacuum~~ or in an idealistic plane without the knowledge of international politics related to these. Hence the politics as it exists in U.N. ~~forum~~ Committees and panels, in various existing systems etc will be addressed. Some specific topics which a planner and executive should look into will be addressed.

6.1.3 Internal Regulations

Many countries have many internal regulations which control the domestic communication system. The regulations within U.S. will be specifically addressed in detail. Also some one or two developing countries or European countries will be chosen as specific example of details.

6.1.4 Internal Politics

As mentioned for international law, one should not be blind to internal political realities — the interests of various departments, their prerogatives, etc. ~~Some~~ Such internal co-ordination problems with few specific examples will be dealt with. Also some ~~suggest~~ organisational interfaces which exist in various countries and how they effect inter-departmental co-ordinations can be addressed.

6.2. Management of Space Technology

For the U.S. essentially this is an internal procurement or construction. For many countries for some more years this

may involve procurement from abroad. Thus both these aspects will be addressed with technical and contractual aspects.

6.2.1 System Design and Economics

Before setting up a communication system, the requirement analysis and economics are to be analysed in detail to fix the general requirement of space and ground systems. These factors will be described here considering TV, ~~Telet~~ and/or telecommunications. Also the problems of indigenous production, as ~~many~~ may be desired by many countries in the coming years, and its impact of system design and economics will be addressed.

One or two typical ~~problems~~^{cases} will be dealt with.

6.2.2 Launch Vehicles : The various launch vehicles available in the world, with the main stress on U.S. ~~vehicles~~ vehicles, the U.S. government policy on launch vehicles, availability for foreign countries, economics of the same, probability of success etc will be addressed here. How the selection of launch vehicle ~~with~~^{with} affect the system design will also be illustrated.

6.2.3 Procurement of Spacecraft.

Many countries presently do not have the capability to build their own spacecraft. However, they ~~may~~ some of them may acquire the capability in coming years.

The problem of procurement of spacecraft can be either "buy (internally ^{or externally}) or build" alternative. This applies to U.S. companies proposing satellite systems as well as to other countries. The choice of "build" ~~is~~ demands skilled personnel, testing facilities etc.

The "Buy" ~~is~~ alternative demands setting up of a Contract Management Office and decision on various forms of contracts and incentives — fixed price, cost-plus-award-fee, etc.

Here the requirements for both "buy" and "build" alternative will be addressed. Some specific illustrative examples will be shown. For the build ~~major~~ broad outline of the facilities, test philosophies, management techniques etc will be discussed. In addition to the "buy" alternative also because

The knowledge of "building" processes is essential for effective "buying".

6.2.4 Spacecraft Operations

Operations before launch, during launch, and during ~~concomit~~ check-outs before commercial use of the system and the later operations will be addressed. Specific items like eclipse operation, emergency links etc will be discussed.

6.3 Management of Ground System Technology.

Various technologies of big antennas, cheaper antenna systems, tracking and non-tracking antennas, redundancy, power systems, village type community reception systems etc will be addressed here.

6.3.1 System design

This, naturally, will interact with the spacecraft system. Such interaction and specific design examples will be shown. The need to autotrack or avoiding the same by spacecraft design etc will be addressed.

The community reception sets, the chicken mesh antennas, converters etc will be broadly described. The power sources ~~are~~ for transmitting station, and receiving sites, the access roads, etc will be addressed.

6.3.2 Interweaving into Economic Structure

No space communication system is expected to be launched into a totally virgin area. There will be existing microwave links, metropolitan areas requiring heavy traffic, existing TV broadcast stations, ~~at~~ some access roads, power sources etc.

How these fit into the Space Communication System, ~~is~~ — its design, ~~the~~ economics and choices — are dealt with here. General economic picture and availability of facilities should be borne in mind, in designing ground system. These, with one or two illustrations will be addressed here.

6.3.3 Geo Logistics of Maintenance and Operations

Since the system — multiple access communication or heavy traffic telecommunication centres or community TV

reception centres, need to be maintained for daily operations. The problems associated with maintenance of the power sources, repair of TV sets and other electronic equipment, training of technicians etc will be addressed here.

~~6.0~~ 6.4 Management of Software and Administration

This is a complex topic. It will vary very much between countries depending on their goals and systems of government. However this will touch upon some fundamental ideas regarding these and illustrate some of them.

6.4.1 TV program production: The content of software, whether or not a single agency monopolises the programs in a country, whether it is used commercially, whether it is educational or entertainment etc will affect the organisation of these contents and hence the management of design and production. ~~A~~ Various such parameters and

their effects on administrative practices and software design will be addressed with one or two specific examples. Also some equipments involved in TV production will be described as a general introduction.

6.4.2 Telephone, Telex and data transmission

This describes some toll practices, payment, switching etc for telephones. Special requirements of data transmission, such as maintenance of ~~the~~ privacy etc would also be addressed. Communication between ~~&~~ Computers also will be touched upon.

6.4.3 Allocation of timing and treatment of customers

Allocation of timings between various ~~the~~ customers - for TV, telephone, data etc, Organization for dealing with advertisement, news etc for various private and public sector economies will be dealt with.

6.4.4 Administration of the System

The administrative system required to ~~do~~ plan, deploy and maintain a Communication System (for TV, Telecommunication etc) will be addressed here.

6.4.5 Social implication.

Lastly but not the least, the ^{social} implication of quick communication be it on management or on villagers who see community reception areas will be broadly touched upon. These will be addressed more as ~~an~~ an introduction, as an exercise for mind, as many of these will be unfolding in coming years.
