

# Remote Sensing Training Opportunities

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## INTRODUCTION

Since the last two decades a large number of remote sensing studies are being carried out utilising the data from various satellites. This has gained further impetus with the launch of the Indian Remote Sensing Satellite – IRS-1A in March 1988. For effective utilisation of large volumes of data available from various satellites for application studies, availability of adequately trained manpower is the crucial factor. The Seven Task Forces constituted by the Planning Commission in Agriculture, Forestry, Geology, Oceanography, Soils and Land use, Water Resources and Urban and Rural studies, had critically assessed the total requirement of trained manpower in these areas, collectively, to be of the order of 870 personnel per year at different levels. The present throughput of 550 persons per year indicates a great need for augmenting training facilities in India.

## TRAINING IN REMOTE SENSING APPLICATIONS

The utilisation of space technology requires a vast number of trained professionals. Therefore, Department of Space (DOS) has taken a leading role in training in-service personnel in remote sensing applications at the Indian Institute of Remote Sensing (IIRS) of the National Remote Sensing Agency (NRSA) which is a major training centre in the country. Besides this, the National Remote Sensing Agency (NRSA), Hyderabad; Space Applications Centre (SAC), Ahmedabad; Regional Remote Sensing Service Centres (RRSSCs); Centre of Studies in Resources Engineering (CSRE), IIT, Bombay; Institute of Remote Sensing (IRS), Anna University, Madras; Geological Survey of India Training Institute, Hyderabad; Forest Survey of India (FSI), Dehra Dun; National Bureau of Soil Survey and Land Use Planning, Nagpur and Bangalore offer

short and medium term training courses. Collectively, about 550 personnel are trained in these Institutes/Organisations, each year.

## EXISTING GAP IN THE NUMBER OF TRAINED MANPOWER IN REMOTE SENSING

The total requirement of long-term and mid-term trained personnel in the remote sensing is around 260, whereas the existing throughput at these levels, with the available infrastructure, is only about 200. Thus, there is a gap of about 50 personnel per year at this level, which is viewed seriously because of the major role these scientists have in the actual execution of the scientific projects at national, regional/state level.

In India, 21 State Remote Sensing Application Centres (RSACs) have been established and a majority of them are operational. In the coming 2 to 3 years, all the 26 states are likely to be operationalised to take up remote sensing projects specific to the priorities and programmes of the states themselves. Presently the 21 RSACs have 150 trained personnel against the requirement of 500. Here again the requirement falls short of 350 personnel.

Then there are State Remote Sensing Cells (RSCs) with a total requirement of 375 personnel, where only 50 are presently available. In the case of the RSCs with the Central Government Departments and other user agencies, the requirement is estimated at 375 against the present strength of 125 trained personnel.

## TRAINING REQUIREMENT FOR UNIVERSITY FACULTY

The Department of Space, as part of promoting remote sensing in education curricula, has recently finalised, jointly with the University Grants Commis-

sion, the "Curriculum Development in Remote Sensing" for introduction at the post-graduate level in all the relevant subjects. For this, the annual requirement of training the faculty would be of the order of 50 persons per year. Overall, the training requirement, since the last 2-3 years, at all levels and for all the different proposals is estimated at about 1000 personnel, given the existing status of remote sensing applications.

Hence, augmentation of the remote sensing training infrastructure in the country is a pre-requisite for effective utility of the technology. The present remote sensing training opportunities in India are briefly given below.

#### INDIAN INSTITUTE OF REMOTE SENSING, DEHRA DUN

IIRS offers training courses in Remote Sensing applications at three levels, viz. (i) Decision makers, (ii) Orientation, and (iii) PG-Diploma Courses (Details are in table 1).

The Institute has so far trained more than 2400 scientists/engineers in various disciplines of remote sensing including 150 personnel from developing countries of South-East Asia and Africa.

The Institute does not provide any financial support. However, foreign trainees may avail fellowships awarded by the Department of Space, Govt. of India, under SHARES programme. In addition to the above, fellowships under TCS of Colombo, SCAAP, and other programmes may also be available for those undergoing courses at IIRS. Details of various courses can be obtained from **Head, Indian Institute of Remote Sensing, 4, Kalidas Road Dehra Dun, India.**

#### NATIONAL REMOTE SENSING AGENCY, HYDERABAD

The National Remote Sensing Agency (NRSA), Department of Space, offers a training of 8 weeks duration and the 5-day appraisal courses on remote sensing. The 8 weeks training course is designed to train resources scientists in basics and application of remote sensing in their routine resources surveys and monitoring. The 5-day appraisal course is primarily meant for the decision makers to provide an overview of the potentials of remote sensing.

More details can be obtained from **Head, Training Division, National Remote Sensing Agency, Balanagar, Hyderabad-500 037, India.**

#### SPACE APPLICATIONS CENTRE, AHMEDABAD

The Space Applications Centre (SAC) of ISRO, Ahmedabad offers training courses to resources scientists and engineers of user Departments in various

application areas on need and request basis. More details can be obtained from **Group Director, RSAG, Space Applications Centre, SAC PO, Ahmedabad-380 053, India.**

#### REGIONAL REMOTE SENSING SERVICE CENTRES BANGALORE, DEHRA DUN, JODHPUR, KHARAGPUR AND NAGPUR

The five RRSSCs located at Bangalore, Dehra Dun, Jodhpur, Kharagpur and Nagpur are presently fully operational and are equipped with VAX-11/780 super-mini-computer augmented with an array processor and three graphic units of Numelec PC-2001 image analysis display which are partly used for hands-on training in digital techniques.

The course fee for each candidate is Rs. 500/- and the duration of the course is generally 2 weeks. More details regarding the course can be obtained from **Director, NNRMS-RRSSC, ISRO HQ., Antariksh Bhavan, New BEL Road, Bangalore-560 094, India.**

#### CENTRE OF STUDIES IN RESOURCES ENGINEERING, BOMBAY

The Centre of Studies in Resources Engineering (CSRE), IIT, Bombay has adequate facilities for training in-service Engineers/Scientists in the area of satellite remote sensing and its application to resources engineering. The Institute offers training programmes in the areas of image processing and digital analysis, photo-interpretation and aerial photography, water resources, mineral exploration and geographic information system, etc. The centre also offers training programmes on the basis of need. More details can be had from **Chief Research Engineer, Training Extension and Project Cell, CSRE, IIT, Powai, Bombay - 400 076, India.**

#### INSTITUTE OF REMOTE SENSING, ANNA UNIVERSITY, MADRAS

The Institute of Remote Sensing, Madras is located in the campus of and affiliated to the Anna University. It is primarily engaged in carrying out remote sensing application projects. The Institute offers M.Tech. in remote sensing. In addition to this, the Institute also organises training programmes for professional scientists at working level and also planners and decision makers in the areas of water resources, land use analysis, agriculture, forestry, photogrammetry, etc. The Institute houses a VAX-11/780 computer system and a number of advanced photogrammetric work stations. More details can be obtained from **Director, Institute of Remote Sens-**

Table 1. Calendar of training courses at Indian Institute of Remote Sensing, Dehra Dun

Sl. No.	Course Code	Course Name	Entrance Requirements	Seats Available	Course Duration	Course Fee
1.	PRS	Basic Photogrammetry & R.S.	Science Graduate/preferably with mathematics upto higher secondary school level and 2 years experience	5 (This course is offered twice a year in March & July)	3 months	Nil
2.	UR 1	Basic Technology & Concepts in Human Settlement Analysis	Working level officers involved in the preparation of plans for urban and rural settlements	10	3 months	Nil
<b>PG Diploma Courses on Remote Sensing Application to:</b>						
3.	GG	Geology & Geomorphology	M.Sc.in Geology/Geography with 2 years experience	10	10 months	Nil
4.	UR	Urban & Regional Planning (Human Settlement Analysis)	Post-Graduate in Town & Country Planning/Social Sciences with 2 years experience	10	10 months	Nil
5.	CM	Coastal Processes & Marine Resources	Graduate/Post-Graduate in Ocean related Sc./Engg./M.Sc.Geology with 2 years experience	5	10 months	Nil
6.	AS	Agriculture & Soils	B.Sc./M.Sc. in Agri./Soil Sc. or equivalent with 2 years experience	10	10 months	Nil
7.	FE	Forestry & Ecology	B.Sc./M.Sc.in Forestry/Botany with 2 years experience	10	10 months	Nil
8.	WR	Water Resources	B.E./M.E. in Hydrology/Civil Engg./ M.Sc. or B. Engg. in Irrigation/Agri./ Pub. Health with two years experience	5	10 months	Nil
9.	SCO 1	<b>Overview Course for Decision Makers</b>	Decision Makers in organisations using Remote Sensing Technology	10	4 days	Rs. 4000/-
10.	SCO 2	<b>Orientation Courses on Remote Sensing Application to:</b>				
		a) Geology & Geomorphology	Middle level officers in respective disciplines	5	2 weeks	Rs. 1500/-
		b) Water Resources	-do-	5	2 weeks	Rs. 1500/-
		c) Urban & Regional Planning	-do-	5	2 weeks	Rs. 1500/-
		d) Agriculture & Soils	-do-	5	2 weeks	Rs. 1500/-
		e) Forestry & Ecology	-do-	5	2 weeks	Rs. 1500/-
		f) Coastal Processes & Marine Resources	-do-	5	2 weeks	Rs. 1500/-
11.	SCO 3	<b>Remote Sensing Course for middle level resources managers</b>	Middle level resource managers in organisations using R.S. Technology	20	8 weeks	Rs. 3250/-
12.	SCO 4	<b>Photography courses:</b>				
	SCO 4A	Aerial & Satellite Photo Processing	Inter. with Maths background & 4 years experience	6	8 weeks	Rs. 2500/-
	SCO 4B	Colour Photography	Inter/B.Sc. with Maths background with 2-4 years experience in Photo Lab.	4	3 weeks	Rs. 1200/-
	SCO 4C	Special course in photography	For IAF personnel only	8	4 weeks	Rs. 1200/-
13.	UR W	<b>Workshop in Remote Sensing Technology for Town Planning</b>	Policy decision makers/senior planners	12	4 days	Rs. 4000/-
14.	LIS	Land Information System	Deg. in Topographic Sc., Geography, U&R Planning, Agri. & Soils, Forestry, Geology, Economics, Law, Management & Public Admin.	10	3 months	Nil

ing, College of Engineering, Anna University, Guindy, Madras - 600 025, India.

GEOLOGICAL SURVEY OF INDIA - TRAINING INSTITUTE, HYDERABAD

As a part of the Department of Space, the National Natural Resources Management System/Geological Survey of India - Training Institute (GSI-TI) offers a regular 12-week training programme for the geologists outside GSI at Hyderabad. The course of photo-interpretation and remote sensing in geology is specially designed to impart sufficient knowledge and skill to the working level geologists. More details can be obtained from **Dy. Director General, Geological Survey of India, Training Institute, 21-11-252/11, Jabbar Building, Begumpet, Hyderabad - 500 016, India.**

FOREST SURVEY OF INDIA, DEHRA DUN

The Forest Survey of India of the Department of Environment and Forests, Dehra Dun is responsible for preparation of the forest vegetation map of the country biennially using remote sensing data and also to conduct forest inventory survey. In addition to this, the Institute offers training programmes of short duration on the applications of remote sensing technique in forestry regularly. More details can be obtained from **Joint Director (Training), Forest Survey of India, 25, Subhash Road, Dehra Dun - 248 001, India.**

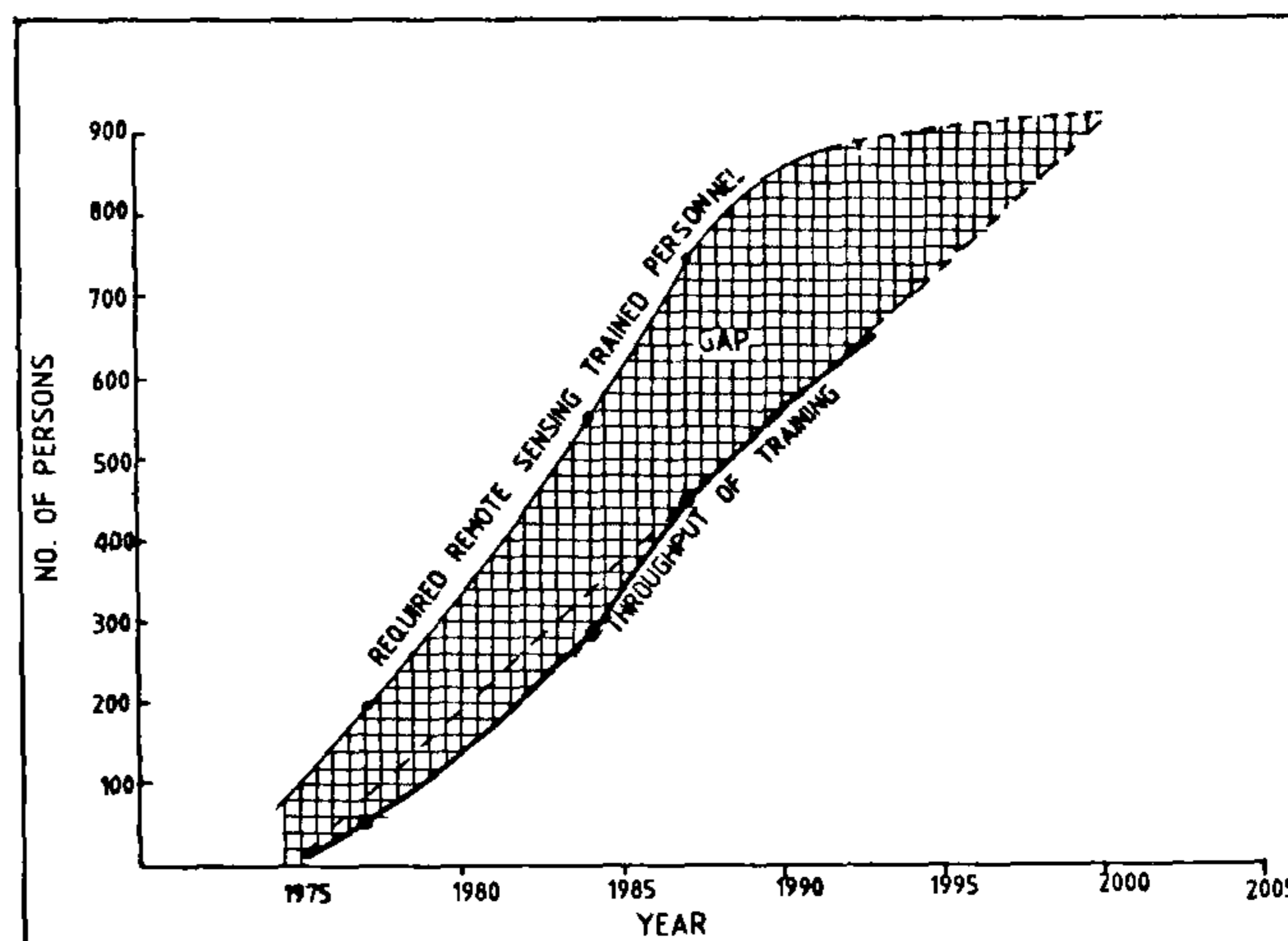


Figure 1. Remote Sensing training in the time domain

In addition to the above institutes, there are a number of Central Govt. institutions which offer remote sensing training as a component of their regular training programmes. The institutions are: (1) National Bureau of Soil Survey and Land Use Planning (NBSS & LUP), Nagpur, Bangalore; (2) Central Ground Water Board (CGWB), Faridabad; (3) Oil and Natural Gas Commission (ONGC), Dehra Dun; (4) National Institute of Oceanography (NIO), Goa; (5) Central Water Commission (CWC), Delhi; (6) Survey Training Institute, (STI), Survey of India (SOI), Hyderabad, and a few others.

The requirement of trained manpower in remote sensing during the period 1975 to 2005 AD, illustrated in figure 1 which is self explanatory.



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