

# Amateur Radio

## Ham Radio

### Learning Radio Communication Skills



## Ham Radio for Disaster Management

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<http://vu2mue.bravesites.com>

<http://www.qsl.net/vu2msy>

# What is Ham Radio?

Ham Radio or Amateur Radio is a two-way worldwide communication system maintained by private individuals.

These individuals have a passion for radio communication for which they establish their own two-way radio communication system entirely with personal effort.

As per the existing rules of the telecommunication authority, they need to take a radio communication licence known as Amateur Station Operator's Licence for which they need to appear for a licencing exam

# Self Reliance/Capacity Building

- Ham Radio (Amateur Radio) is the only scientific activity in the world which requires a licence from the Telecommunication Authority of a country. It is a Do-It-Yourself activity where radio communication experimenters get an authorization to communicate anywhere in the globe. It is a skill more important than any other sports from national security point of view an to build a technically advanced resilient society; this is the reason NASA (USA) promotes it too.
- It is legitimized by ITU (International Telecommunication Union, Geneva) as socially constructive important technical activity and every member country of ITU on principle needs to promote it
- Without promoting it we cannot expect to have engineers with an entrepreneurial bend of mind and to Made in India (not just Make in India) possible.
- 
- Like any other 'Science', it is also 'Science' and the backbone of communication (including science communication)

# Knowledge of Radio & Electronics Theory

- Training (extensive theory & practical training)
- Examination (Radio theory & Practice)
- Licencing
- Setting up of a personal two-way radio communication station (Needs individual expertise. So it is tool to learn new technologies unlike just user of a technology)

Needs to get trained in Radio & Electronics (Both Theory and Practical) as per syllabus devised.

A 100 marks exam (Theory+Practical) is conducted by the Ministry of Communications. License is issued after passing of the examination by the WPC wing (Wireless Planning & Coordination Wing) of Ministry of Communications.

# As per Indian Wireless Telegraph (Amateur Service) Rules, 2009

Amateur service' means a service of self-training, inter-communication and technical investigations Carried on by amateurs that is, by persons duly authorized under these rules interested in radio Techniques solely with a personal aim and without pecuniary interest

# HAM operator helps families connect with Tsunami victims

**RAMESH RAMACHANDRAN**  
TRIBUNE NEWS SERVICE

**NEW DELHI, DECEMBER 28**  
An amateur radio enthusiast based in the Capital has succeeded where most government agencies have failed. Sandeep Baruah, a licensed HAM operator who works in a government organisation by day and pursues his hobby from home at night, has managed to establish communication links with Port Blair, the capital of Andaman and Nicobar Islands, and has helped relay messages between the people stranded on the island and their families back home.

Sitting at his terminal Tuesday afternoon, Baruah told The Tribune that he has received 10 "calls" over the past 48 hours. "I have received e-mails and SMSes from several places at home and abroad ... Bangalore, Ranchi, Pune and Thailand .... I have relayed all their messages to this team of HAM operators stationed at Port Blair and forwarded the replies from them to the families wherever they are," he said. One such distraught family is from New Delhi.

Dr Karan Singh Chauhan, who teaches in a college here, was holidaying with his two sons and a daughter on the island when the Tsunami hit the shore. It had only been a few days from the time they reached Port Blair. "Fortunately," Dr Chauhan recalled, "There were these people staying on the fifth floor of the hotel where we were put up ... they had this equipment (HAM), so we asked them if they could relay the infor-

mation of our well-being to people back home."

Within hours, Sandeep Baruah was on the telephone informing Dr Chauhan's domestic help of their whereabouts. Dr Chauhan and his family, who returned to the Capital last night, have not spoken with Baruah yet but he is all praise for him and the amateur radio operators on the island for coming to his help in their hour of need. Baruah, meanwhile, has no regrets. He has no time for that for there are other calls to be attended to, he says as a distant station crackles at his terminal.

Like Dr Chauhan, Mrs Cesar Maia from Bangkok, Thailand, has established contact with Baruah. She wants to if her husband is safe and sound on the island. "I have not received any news about her husband but I am trying ... the audio quality today is poor, so I might have to wait longer to hear from my counterparts stationed on the island," says Baruah, who is happy being Good Samaritan for people he has come to know only in the past few days.

Meanwhile, Dr Chauhan is still to recover from his harrowing experience on the island. "Buildings were literally swaying from side to side, the hotel where we were staying was damaged ... there were cracks in the walls, the sea was violent and washed away anything and everything that came in its way ... even the boundary wall of a college nearby was swept away ... all of us spent the first night outside," he recalls before he, his children and one other family flew to Kolkata on way to Delhi.



**Sandeep Baruah, a licensed HAM operator who works in a government organisation by day and pursues his hobby from home at night, has managed to establish communication links with Port Blair.**

## Delhiites chip in with relief

TRIBUNE NEWS SERVICE

**NEW DELHI, DECEMBER 28**

The leader of Opposition in Delhi Legislative Assembly, Prof. Jagdish Mukhi, has expressed grief over the widespread death and destruction caused by the Tsunami in southern India and many countries in the Indian Ocean.

A meeting of the BJP legislature party was called in this regard and it observed a two-minute silence as a mark of respect to the deceased. The BJP legislators have also

decided to donate their one-month salary for the victims.

Meanwhile, the NDMC Vice Chairperson, Tajdar Babar, has moved a resolution for contributing Rs. one crore as financial assistance from the municipal funds. This is in addition to the token contribution from NDMC employees for the quake victims of Tamil Nadu.

The Municipal Corporation of Delhi has also decided to pay Rs. 4 crore to the Prime Minister's Relief fund. This fund is being raised by way of

contributions from MCD councillors who are contributing their one month's stipend and employees who are contributing one day's salary. The contribution of the latter adds up to Rs 3 crore.

According to the mayor, the MCD has set up collection centres in all 12 zones under the supervision of Deputy Commissioner to collect relief materials. The material collected would be handed over to the Ministry of Home Affairs for transportation to the affected areas.

Vigyan Prasar's  
Contribution  
To Emergency  
Communication  
Media Coverage  
During Tsunami  
operation

# Vigyan Prasar's contribution to emergency communication During Bhuj Earthquake

NEW DELHI SUNDAY FEBRUARY 4 2001

## EARTHQUAKE

Local administration carrying on demolition of damaged buildings in Bhuj. Photo: Manish Gwarp

# From sinking Titanic to quaked Bhuj, ham picks up SOS

Saurabh Shukla  
New Delhi, February 3

THEY MADE news for the first time when they beat everybody by intercepting an SOS from a sinking Titanic in 1911. They were in action during the Morvi floods of 1979, Gulf War, Orissa cyclone, and the Latur and the Uttarkashi earthquakes. They are back again aiding the Gujarat relief effort in whatever manner they can. They are the ham radio operators.

After trying for two days to track his brother in Gandhidham, Jodhpur's VK Banchal despaired. But then somebody

suggested he should try 'ham' radio operation network in Delhi. He did. A few hours later, his telephone rang. "Your brother Sanjay is safe," said the caller.

The same ham network helped Delhi's Dr Sujata get in touch with her husband in Anjar, one of the worst hit areas.

High frequency radio transmitter/receivers are the standard equipment for all hams, who have to pass a stiff international test to get their licence. The word 'ham' is said to have been taken from the first letters of the three pioneers of radio communications: H (from Hertz), A (from Armstrong, inventor of Oscillator circuit), and M (from Marconi).

Functioning out of a tiny shack in Delhi with whatever little manpower they have, these 'hams' have been sending "emergency disaster communication messages" to the Gujarat amateur radio operators' network.

They get back-up support from other individual hams in Delhi, who are keeping track of the government agencies' requirements plus passing on the distress messages.

Says Sandeep Baruah, one of the hams associated with the Delhi station, "We have five base stations operating — in Anjar, Bachau, Bhuj, Gandhidham and one located right inside the Chief

Minister's residence. There are some mobile units too, who quickly relocate themselves to send us the replies to our queries about the situation in remoter parts of the state."

The Delhi hams have been flooded with calls from all parts of India. "Some from Bihar, Bengal, Rajasthan and even from areas in Gujarat," says Baruah. But it's not an easy job tracking people and relaying messages.

Especially for those operating out of remote areas of Gujarat. "There's no power in many areas. Our radio sets can't run for very long on batteries alone," says a Gujarat ham, Dalbir Singh. A big draw

on battery power is adverse weather. "Often messages have to be re-routed through hams in Mumbai or Hyderabad as direct communication is not possible," he explained.

"For most hams, this is purely voluntary work," explains Dr Kamble of the DST, agreeing that there was need for more hams in the country. Barely 2,000 of the 10,000 licencees are active now. A related factor restricting growth of ham-culture in India is government's lack of support, lamented an enthusiast. Reason: Costly equipment — mostly imported (nothing less than Rs 40,000) and no relaxation on customs duties.

## Fresh round of tremors spreads panic among quake survivors

Rathin Das  
Ahmedabad, February 3

A FRESH tremor, measuring 5.0 on the Richter scale, this morning coupled with the doomsday prediction of a local astrologer spread panic among the locals here.

The self-styled astrologer, Ambhal Damodardas Patel, who

mal with a few shopkeepers raising shutters.

Minister of State for Home Haren Pandya urged the panic-stricken people not to succumb to imaginary fears. He announced that 50 teams of engineers and

### Cases registered

builders and architects would have nothing to do with these teams, the Minister asserted.

Meanwhile, the State Government has decided to build a memorial for the school children who were killed while marching through Anjar on Republic Day. An additional ex-gratia payment of Rs 50,000 would be made to the

## Sharjah trip could still be a reality

EVEN THOUGH Union Sports Minister Uma Bharti did not approve of India participating in the three-nation tournament in Sharjah for the quake victims in Gujarat, sources close to the Ministry of External Affairs and the PMO said the February 8-11 tournament could still be a reality.

The sources said, Minister of External Affairs Jaswant Singh

## No scientific link between corpses, epidemics: WHO

DISMISSING MYTHS in the aftermath of natural disasters, the World Health Organisation (WHO) has said that communicable diseases do not usually occur after earthquakes. However, epidemic risk factors were the rupture of water sanitation, interruption of public health services such as immunisation and lack of control

WHO report, after the Turkey quake, said.

It said the health hazard associated with bodies was negligible and the contamination may occur in very limited cases when the corpses are in contact with the water system and transmit gastro-enteritis.

"A relationship between cadavers and epidemics has never been scientifically demonstrated or reported."



हैम रेडियो की मदद

भी कर सकते हैं = Digital Addressable केबल टीवी उपभ

NDTV Coverage of VP's role during Uttarakhand Flood

# Multifaceted benefits of Ham Radio

- As an Alternative Mode of Community Communication empowering people in a specific branch of practical science
- To make the people self-reliant in radio communication technology
- To imbibe and interest in the art and science of radio communication technology
- A Do-It-Yourself activity for school children and students of the technical institutes (to complement theory with practical learning)
- to create a pool of emergency radio communication volunteers

# Ham Radio For Disaster Communication

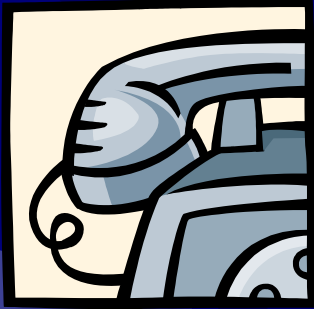


# Wireless



Is it very uncommon?

# Conventional modes of two way long distance communication



All the above modes of communication rely on governmental networks.

Whereas,  
Wireless Communication in general is NOT considered as a CONVENTIONAL MODE of communication because very few people have access to it

The governmental agencies  
have their own radio  
communication channels already  
existing

- The Police-
- Armed Forces-
- Para-military Forces
- Fire Department-
- Inland Water Department-
- Meteorology Department-
- Electricity Department-



## The Wireless Telegraphs (Amateur Service) Rules

❖ Eligibility for Licence: A licence may be granted subject to

I. to a person:-

- a) Citizen of India
- b) not less than 18 years of age
- c) qualifies ASOC Exam

Age Eligibility to become a ham (Govt. licensed Amateur Radio Operator)

**Answer:** Any citizen of India who is above 12 years of age can become a ham by qualifying the Amateur Station Operators Licence (RESTRICTED or GENERAL) examination.

Information Courtesy: Onkar Nath, Assistant Wireless Advisor  
WPC, Ministry of Communications

## *The Wireless Telegraphs (Amateur Service) Rules*

II. to an amateur radio society, club or school, college, or an institution or a university in India:- which has the aim of investigations in the field of radio or the training of persons in radio communication techniques.

Information courtesy:

**Onkar Nath, AWA, WPC, Ministry of Communications**

Online video tutorial made by him can be accessed at:

**<https://youtu.be/nEw61nyKcPo>**

# How to apply for ASOC Examination?

<https://saralsanchar.gov.in/>

The screenshot shows the homepage of the SARAL SANCHAR portal. At the top, there is a navigation bar with the Government of India logo and the Department of Telecommunications logo. The main header includes the text 'SARAL SANCHAR (Simplified Application For Registration And Licenses) A Portal for License Management in DoT'. Below the header is a navigation menu with links: Home, About Portal, Registration, Login, FAQs, Helpdesk, Fee Calculator, and Document CheckList. The main content area is divided into three columns. The left column contains links for 'List of Existing Licenses', 'List of Existing OSP Registrations', 'List of Licenses/Registrations Issued through portal', 'User Manual', and 'Support'. The middle column is titled 'Apply for:' and lists 'Unified License / authorizations', 'Unified License (VNO) / authorizations', and 'Other Service Provider registrations'. The right column contains 'New to Portal?' with a 'Register Yourself' button, 'Already Registered?' with a 'Login' button, and 'Forgot Password?' with a 'Reset' button. Below the main content area is a 'What's New' section with a link to 'Applicants for ETA(Self-declaration) in WPC'. At the bottom, there are three sections: 'Quick Links' with links to DoT Website, Telecom Licensing, Wireless Planning and Coordination, and Non-Tax Receipt Portal (NTRP); 'About Saral Sanchar Portal' with a paragraph describing the growth of the Indian Telecommunications Sector; and 'Downloads' with links to Sample UL Application, Sample UL VNO Application, Sample OSP Application, and Sample Power of Attorney.

Information courtesy:

Onkar Nath, AWA, WPC, Ministry of Communications

## How to apply for ASOC Examination?

- ❑ Candidates have to apply through online by registering themselves once on the portal through username & password.
- ❑ After login through the same user details one can apply for examination as well as for issuance of license/renewal/duplicate as the case may be.

Information courtesy:

**Onkar Nath, AWA, WPC, Ministry of Communications**

## The Wireless Telegraphs (Amateur Service) Rules

### What are the various categories and fees of examination?

**Answer:** A candidate can apply for any of the below categories:

S. No.	Category#	Examination Fee
1	Restricted	Rs. 100/-
2	General	Rs 100/-

# Applicants applied for both the categories at a time, shall be given GENERAL category certificate only upon successful of both the categories.

Information courtesy:

[Onkar Nath, AWA, WPC, Ministry of Communications](#)

# How to pay the exam fee for ASOC Examination?

The prescribed license fee is to be paid through Non Tax Receipt Portal (NTRP) available on webpage <http://bharatkosh.gov.in> under the following accounts heads:

- Purpose head: "Amateur Exam conducted by Wireless Monitoring Stations and RHQs
- Payment type: "Exam fee"
- Function head: "127500103050100 - Proficiency Certificate"
- PAO and DDO details are as under: -

Regional Headquarters	Name of the pay & Account Office (PAO) under NTRP	Corresponding Centre of Examinations (Monitoring Stations)
Western Regional Hq, Mumbai	077148-Controller of Communication Accounts, Maharashtra Drawing & Disbursing Officer: - 201562 DDO CCA	Ahmedabad, Bhopal, Goa, Mumbai, Nagpur, Raipur
Northern Regional Hq, New Delhi	077177-Controller of Communication Accounts, New Delhi Drawing & Disbursing Officer:- 201540 DDO CCA	Ajmer, Dehradun, Gorakhpur, Jalandhar, Jammu, Lucknow, New Delhi
Southern Regional Hq, Chennai	077153-Controller of Communication Accounts, Tamil Nadu Drawing & Disbursing Officer: - 201579 DDO CCA	Bengaluru, Chennai, Hyderabad, Mangalore, Thiruvananthapuram, Vijayawada, Vishakhapatnam
Eastern Regional Hq, Kolkata	077155-Controller of Communication Accounts, West Bengal. Drawing & Disbursing Officer: - 201589 DDO CCA	Bhubaneswar, Dibrugarh, Kolkata, Patna, Ranchi, Shillong, Silliguri

**Information courtesy:**  
**Onkar Nath, AWA, WPC**

## The Wireless Telegraphs (Amateur Service) Rules

Category	Earlier	At present
Fee for change of location	Rs. 5/-	Rs. 200/-
Fee for mobile endorsement	Rs. 10/-	Rs. 200/-
Fee for issue of duplicate of licence	Rs. 10/-	Rs. 100/-
Fee for duplicate of renewal licence slip	Rs. 5/-	Rs. 100/-

Call-sign block VU2 shall be reserved for GENERAL grade and block VU3 to RESTRICTED grade

Information courtesy:  
Onkar Nath, AWA, WPC

## How to pay for Gr. or Rst. Grade Amateur Station Licence fee through NTRP

Payment through NTRP Portal (<https://bharatkosh.gov.in/NTRPHome/Index>) for General or Restricted Grade Amateur Station License - Rs 1000 for 20 years/ -Rs. 2000 for life time.

**Note:** The details of payment head for making payment through NTRP is as under:

Purpose	Payment Type	Pay & Account Office (PAO)	Correspondence Address
Amateur license	License Fee/ License Renewal Fee/ Late Fee/ Fee for issue of duplicate license	077188-Controller of Communication Accounts, PAO HQ	Assistant Wireless Adviser (COP), WPC Wing, DOT, 6 <sup>th</sup> Floor, Sanchar Bhawan, 20 Ashok Road, New Delhi-110001 Tel. No.+ 91 11 2303 6534/ +91 11 2303 6181 FAX. No. +91 11 2371 6111

**Information courtesy:**  
**Onkar Nath, AWA, WPC**

# How to apply for ASOC Examination?

## Can I take the examination at any centre?

**Answer:** The applicant can choose the examination centre at any Wireless Monitoring Station/International Monitoring Station as per their convenience. However, no change will be allowed after submission of application.

## Can I change the centre of examination after application?

**Answer:** No, change in Exam Centre is not permitted after submission of application.

## Can I change the category of examination after submission of application?

**Answer:** No, change in category will not be permitted after submission of the application.

**Information courtesy:**  
**Onkar Nath, AWA, WPC**

# Exam Centers for HAM in India

Sl. No.	Name of Stations/ Exam Centres	Concerned Regional Monitoring Headquarters
1	Ahmedabad	Western Regional Hq, Mumbai
2	Bhopal	
3	Goa	
4	Mumbai	
5	Nagpur	
6	Raipur	
7	Ajmer	Northern Regional Hq , New Delhi
8	Dehradun	
9	Gorakhpur	
10	Jalandhar	
11	Jammu	
12	Lucknow	
13	New Delhi	
14	Bengaluru	Southern Regional Hq, Chennai
15	Chennai	
16	Hyderabad	
17	Mangalore	
18	Thiruvananthapuram	
19	Vijaywada	
20	Vishakhapatnam	
21	Bhubaneswar	Eastern Regional Hq, Kolkata
22	Dibrugarh	
23	Kolkata	
24	Patna	
25	Ranchi	
26	Shillong	
27	Silliguri	

**Information courtesy:**  
**Onkar Nath, AWA, WPC**

# Exam Centers for HAM in India

Examination may be conducted at any of the 27 Wireless Monitoring Station/ International Monitoring Station in India.

The list of Monitoring Stations



1. Ahmedabad
2. Ajmer
3. Bengaluru
4. Bhopal
5. Bhubaneswar
6. Chennai
7. Dehradun
8. Dibrugarh
9. Goa
10. Gorakhpur
11. Hyderabad
12. Jalandhar
13. Jammu
14. Kolkata
15. Lucknow
16. Mangalore
17. Mumbai
18. Nagpur
19. New Delhi
20. Patna
21. Raipur
22. Ranchi
23. Shillong
24. Siliguri
25. Thiruvananthapuram
26. Vijayawada
27. Vishakapatnam

Information courtesy:  
Onkar Nath, AWA, WPC

# How to apply for ASOC Examination?

*Can I apply for both GENERAL and RESTRICTED?*

**Answer:** Yes, A candidate can apply for both General and Restricted categories. If a candidate passes in both the categories, a GENERAL grade Licence will be issued. If a candidate passes only in RESTRICTED category of the examination, a RESTRICTED grade Licence will be issued.

*Can I apply the General Grade examination after passing Restricted Grade?*

**Answer:** Yes, if you are interested for General grade licence, You will need to apply again for General Grade even after the completion of the Restricted Grade examination.

Information courtesy:  
Onkar Nath, AWA, WPC

# How to apply for ASOC Examination?

What is the pattern and duration of examination?

**Answer:** The examination consists of two parts;

Part A: Basic Electronics and

Part B: Radio Regulations.

- ❑ The Restricted Grade examination consists of 25 Questions each in Part A and Part B and is for one hour.
- ❑ The General Grade Examination consists of 50 Questions each in Part A and Part B and is for two hours.
- ❑ The General Grade candidates will have to appear for a test in Transmission and Reception of Morse Code.
- ❑ For detailed syllabus, please refer to the Govt. circulars/order/gazette notifications.

Information courtesy:  
Onkar Nath, AWA, WPC

# How to apply for ASOC Examination?

How many marks are needed to pass the examination?

**Answer:** For Restricted Grade, the maximum marks will be 100 and candidate must secure at least 40 % in each section and 50% in aggregate for a pass.

- For General Grade, the maximum marks will be 100. A candidate must secure at least 50% in each section and 60% in aggregate for a pass. In addition, a candidate shall have to pass both Morse Reception and Sending simultaneously.

Information courtesy:  
Onkar Nath, AWA, WPC

# How to apply for ASOC Examination?

Are there any exemptions from the exam?

**Answer:** Candidates having the following Qualifications are exempted from appearing in Part A of the Examination

- (i) B. Tech/BE Degree in Electronics or Telecommunications
- (ii) B.Sc/M.Sc with Electronics or Telecommunications
- (iii) Diploma in Engineering with Electronics or Telecommunications.

**Note:** A copy of certificate to be enclosed while applying.

Information courtesy:  
Onkar Nath, AWA, WPC

# 'Ham' – it is a noun (not an abbreviation)

Many people wrongly write it as 'HAM' (correct is 'ham'). It is an English word which is in use since the beginning of the history of radio and telegraphic communication dating back to nearly 172 year

## halfback → ham

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parents are of different races. **half-crown** (or **half a crown**) a former British coin equal to two shillings and sixpence (12½p). **half-dozen** (or **half a dozen**) a group of six. **half-hearted** without enthusiasm or energy. **half-hour** (or **half an hour**) a period of thirty minutes. **half-life** the time taken for the radioactivity of a substance to fall to half its original value. **half measures** actions or policies that are not forceful or decisive enough. **half nelson** a hold in wrestling in which you pass one arm under your opponent's arm from behind while applying your other hand to their neck. **half-term** Brit. a short holiday halfway through a school term. **half-timbered** having walls with a timber frame and a brick or plaster filling. **half-time** (in sport) a short gap between two halves of a match. **not half 1** not nearly. **2** Brit. informal to an extreme degree.

**halfback** noun a player in a ball game whose position is between the forwards and fullbacks.

**halfpenny** or **ha'penny** /hay-pni/ noun (plural **halfpennies** or **halfpence** /hay-p'nss/) a former British coin equal to half an old penny.

**halfway** adverb & adjective **1** at or to a point equal in distance between two others. **2** to some extent.

**halfwit** noun informal a stupid person. ■ **half-witted** adjective.

**halibut** noun (plural **halibut**) a large flat sea fish used for food.

**halitosis** /hali-toh-sis/ noun bad-smelling breath.

**hall** noun **1** (also **hallway**) a room or space inside a front door, or between a number of rooms. **2** a large room for meetings, concerts, etc. **3** (also **hall of residence**) Brit. a university building in which students live. **4** Brit. a large country house.

**hallelujah** /hal-li-loo-yuh/ or **alleluia** /al-li-loo-yuh/ exclamation God be praised.

**hallmark** noun **1** an official mark stamped on objects made of pure

gold, silver, or platinum. **2** a distinctive feature. • verb stamp an object with a hallmark.

**hallo** ⇒ HELLO.

**hallowed** /hal-lohd/ adjective **1** made holy. **2** very honoured and respected.

**Halloween** or **Hallowe'en** noun the night of 31 October, the evening before All Saints' Day.

**hallucinate** verb (hallucinates, hallucinating, hallucinated) see something which is not actually there. ■ **hallucination** noun **hallucinatory** adjective.

**hallucinogen** /huh-loo-si-nuh-juhn/ noun a drug causing hallucinations. ■ **hallucinogenic** adjective.

**halo** /hay-loh/ noun (plural **haloes** or **halos**) **1** (in a painting) a circle of light surrounding the head of a holy person. **2** a circle of light round the sun or moon.

**halogen** /hal-uh-juhn/ noun any of a group of elements including fluorine, chlorine, bromine, and iodine.

**halt**<sup>1</sup> verb come or bring to a sudden stop. • noun **1** a stopping of movement or activity. **2** Brit. a minor stopping place on a railway line.

**halt**<sup>2</sup> adjective old use lame.

**halter** noun a rope or strap placed around the head of an animal and used to lead it. □ **halter neck** a style of woman's top that is fastened behind the neck, leaving the shoulders, upper back, and arms bare.

**halting** adjective slow and hesitant.

**halve** verb (halves, halving, halved) **1** divide into two halves. **2** reduce or be reduced by half.

**halves** plural of **HALF**.

**halyard** /hal-yerd/ noun a rope used for raising and lowering a sail, yard, or flag on a ship.

**ham**<sup>1</sup> noun **1** meat from the upper part of a pig's leg which is salted and dried or smoked. **2** (hams) the back of the thighs. □ **ham-fisted** clumsy.

**ham**<sup>2</sup> noun **1** an actor who overacts.

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**2** (also **radio ham**) informal an amateur radio operator. • verb (hams, hamming, hammed) informal overact. ■ **hammy** adjective.

**hamburger** noun a small cake of minced beef, fried or grilled and typically served in a bread roll.

**hamlet** noun a small village.

**hammer** noun **1** a tool with a heavy metal head and a wooden handle, for driving in nails. **2** an auctioneer's mallet, tapped to indicate a sale. **3** a part of a mechanism that hits another. **4** a heavy metal ball attached to a wire for throwing in an athletic contest. • verb (hammers, hammering, hammered) **1** hit repeatedly with a hammer. **2** (hammer away) work hard and persistently. **3** (hammer something in or into) make something stick in someone's mind by constantly repeating it. **4** (hammer something out) work out the details of a plan or agreement.

**hammerhead** noun a shark with flattened extensions on either side of the head.

**hammock** noun a wide strip of canvas or rope mesh suspended at both ends, used as a bed.

**hamper**<sup>1</sup> noun a basket used for food and other items needed for a picnic.

**hamper**<sup>2</sup> verb (hampers, hampering, hampered) slow down or prevent the movement or progress of.

**hamster** noun a burrowing rodent with a short tail and large cheek pouches.

✓ no p: hamster, not hamp-.

**hamstring** noun any of five tendons at the back of a person's knee. • verb (hamstrings, hamstringing, past and past participle hamstrung) **1** cripple by cutting the hamstrings. **2** severely restrict.

**hand** noun **1** the end part of the arm beyond the wrist, with four fingers and a thumb. **2** a pointer on a clock or watch indicating the passing of time. **3** (hands) a person's power or control. **4** an active role. **5** help in

## hamburger → handicap

doing something. **6** a person who does physical work. **7** a round of applause. **8** the set of cards dealt to a player in a card game. **9** a unit of measurement of a horse's height, equal to 4 inches (10.16 cm). • verb give or pass something to. □ **at hand** (or on or to hand) near; easy to reach. **from hand to mouth** meeting only your immediate needs. **hand grenade** a grenade that is thrown by hand. **hand in glove** working very closely together. **hand-me-down** a piece of clothing that has been passed on from another person. **hand-pick** choose carefully. **hands-on** involving direct participation in something. **hand-to-hand** (of fighting) involving physical contact. **in hand** in progress. **out of hand 1** not under control. **2** without taking time to think.

**handbag** noun Brit. a small bag used by a woman to carry everyday personal items.

**handball** noun **1** a game in which the ball is hit with the hand in a walled court. **2** Soccer unlawful touching of the ball with the hand or arm.

**handbill** noun a small printed advertisement handed out in the street.

**handbook** noun a book giving basic information or instructions.

**handbrake** noun a brake operated by hand, used to hold an already stationary vehicle.

**handcuff** noun (handcuffs) a pair of lockable linked metal rings for securing a prisoner's wrists. • verb put handcuffs on.

**handful** noun **1** a quantity that fills the hand. **2** a small number or amount. **3** informal a person who is difficult to deal with or control.

**handgun** noun a gun designed for use with one hand.

**handhold** noun something for a hand to grip on.

**handicap** noun **1** a condition that limits a person's ability to function physically, mentally, or socially.

# Vigyan Prasar Promotes it through various outreaching activities: PUBLICATIONS/STUDY MATERIAL



## A Guide to Ham Radio



BE A HAM! TALK TO  
THE WORLD



(An Autonomous Organisation Under DST, Govt. of India)  
Vigyan Prasar  
C-24, Outer Institutional Area  
New Delhi - 110016

# Not Uncommon!!

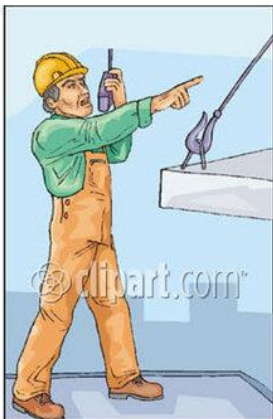
Police/Military/Navy/  
Air force



Two way radio: Listen & Reply




# Police




# Industrial Man





Then Why  
Ham Radio  
as a  
second line of  
communication?

The background features a vertical strip on the left with a colorful, textured gear-like pattern in shades of orange, red, and yellow. The rest of the background is a dark blue gradient with faint, semi-transparent gear shapes scattered across it.

The existing governmental radio communication channels are **suitable only for intra-departmental** (within the same department) communication. There are many operational limitations of Inter-departmental radio communication (radio communication among different departments). In fact, **NOT AT ALL POSSIBLE.**

These are the basic technical skills every ham try to learn...knowledge and skill is disseminates. [ from one person to the other...]

# Who is a ham?

It is an English word...the word 'ham' has different meanings.  
One of the meanings is:

**A Govt. Licensed Amateur Radio Operator**

# Why a Licensed Amateur Radio Operator is called a “ham”?

The origin of the word is still ‘unclear’

- Heinrich **H**ertz+Major **A**rmstrong+ Guglielmo **M**arconi

- Albert **H**yman+Bob **A**lmy+Poggie **M**urray (Harvard Wireless Club, USA IN 1908) . RADIO AMATEURS (and other radio stations identify with a call-sign issued by the govt. During the unregulated days they could choose their own call-sign.

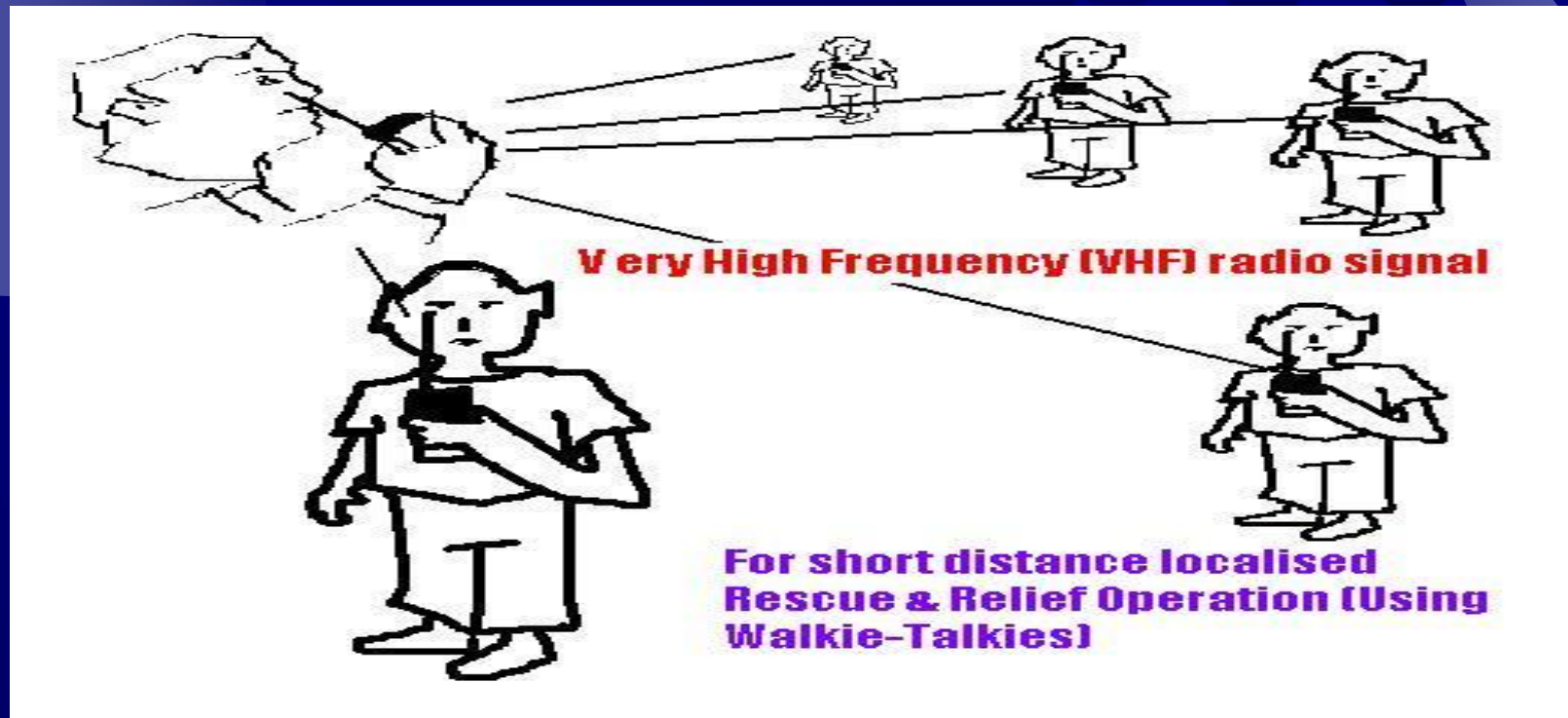
- “**H**ome **A**mateur **M**echanic”(Edited by Hugo Gernsback )- A 1900 **do-it-yourself magazine.**

- “@#\$%!! Hams are jamming us!!” Marine radio operators abusing radio amateurs as “HAMS”. Radio amateurs picked it up and wore it with pride!”

- “**Ham fisted**”-meaning poor in hand key operation using a Morse Key; **An inexperienced person**

# Why ham radio communication is successful during emergency?

One of the advantages of ham radio is that a message originated from an individual can be virtually intercepted by any number of other ham radio operators at different locations



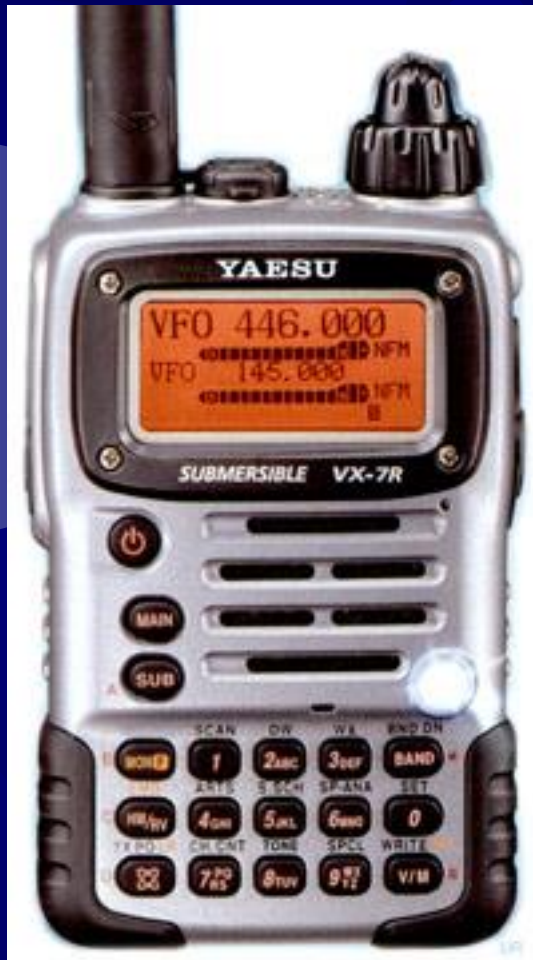
# SELF-RELIANCE

**Government wireless equipment/installations are maintained by professional engineers. In the event of a disaster/urgency their support may not be readily available to the wireless user.**

**during emergency when everything go hay-wire, the user may not be able to decide on her/his own or rectify/improve upon during make-shift operation.**

Ham radio operators are self-reliant. They decide on their own to improve upon or rectify a fault.

# Short Distance Communication Using Walkie-Talkies

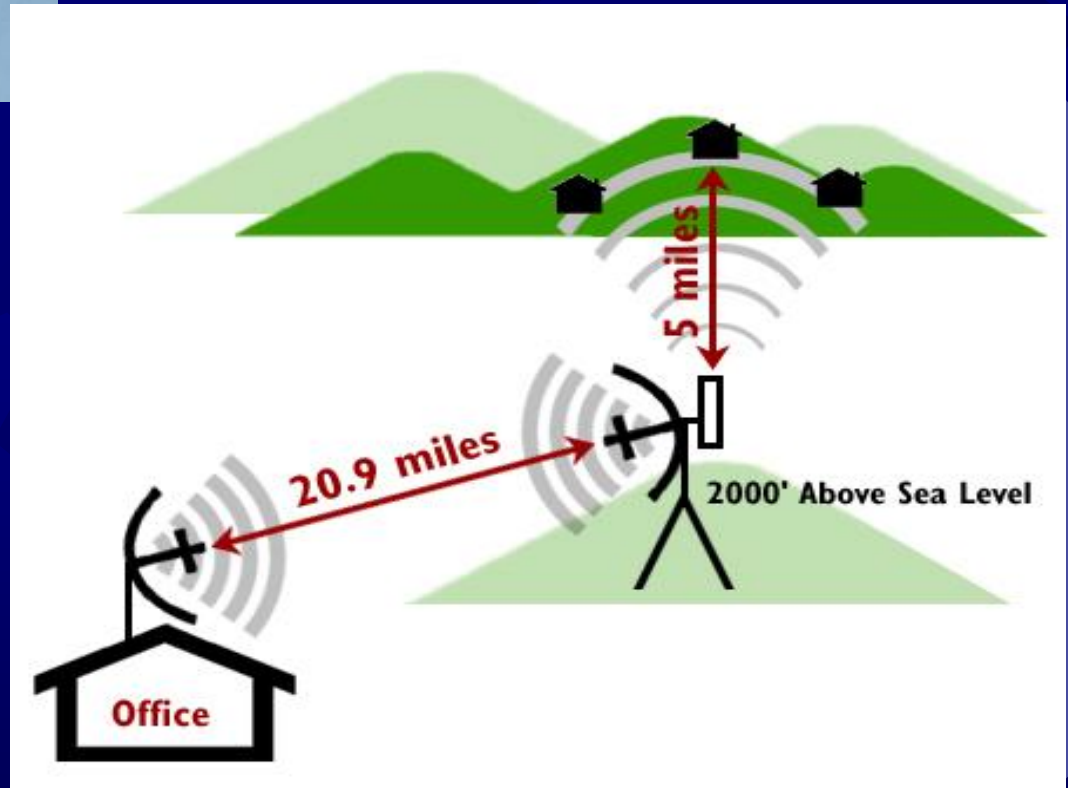


**Very High Frequencies (VHF):  
144 MHz to 146 MHz**

**Ultra High Frequencies (UHF):  
434 MHz to 438 MHz**

Useful for coordinating  
rescue & relief operation locally

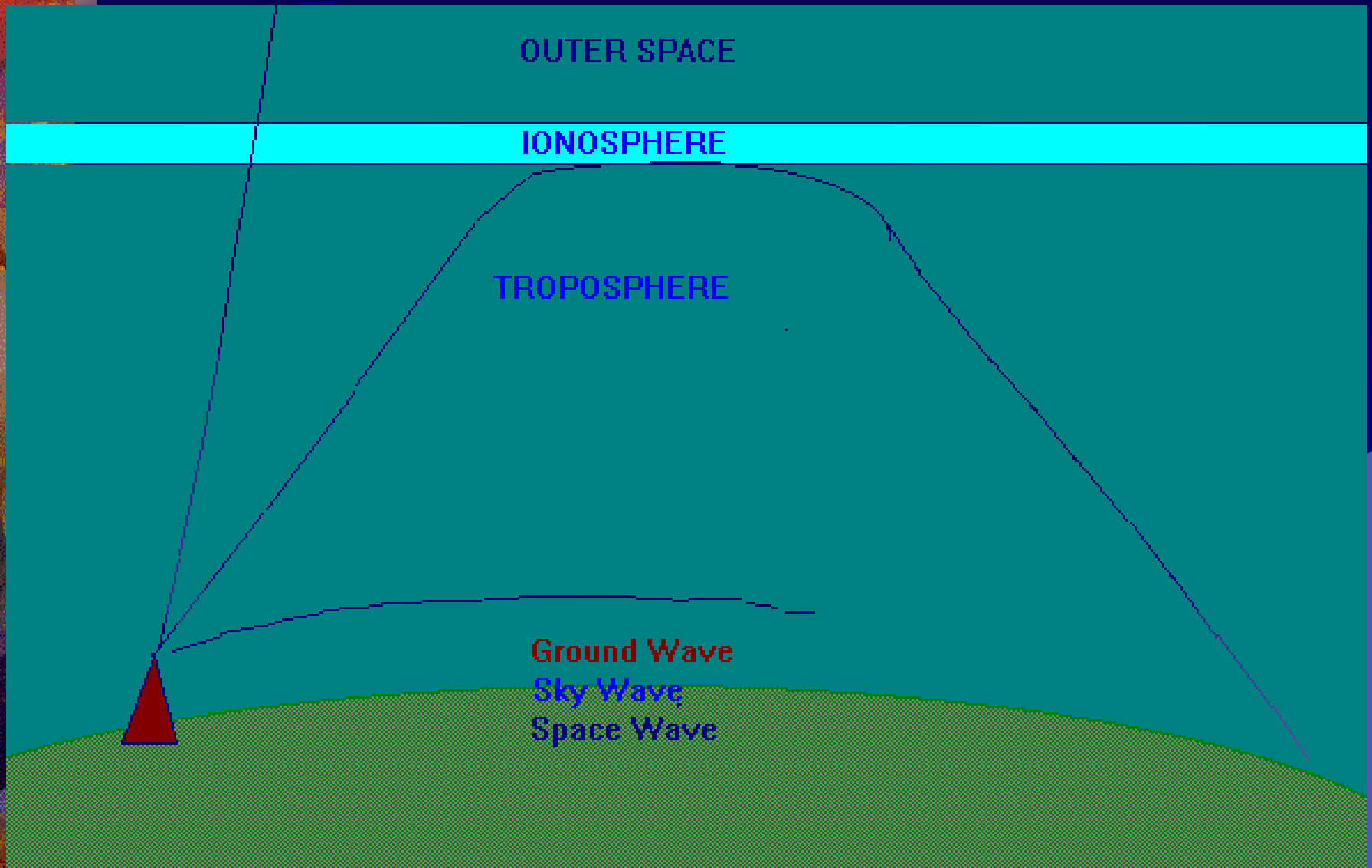
# Line-of-Sight Communication



Ham Radio Operators are the only **NON-GOVERNMENTAL** people privileged to be allowed to do private WORLDWIDE wireless communication

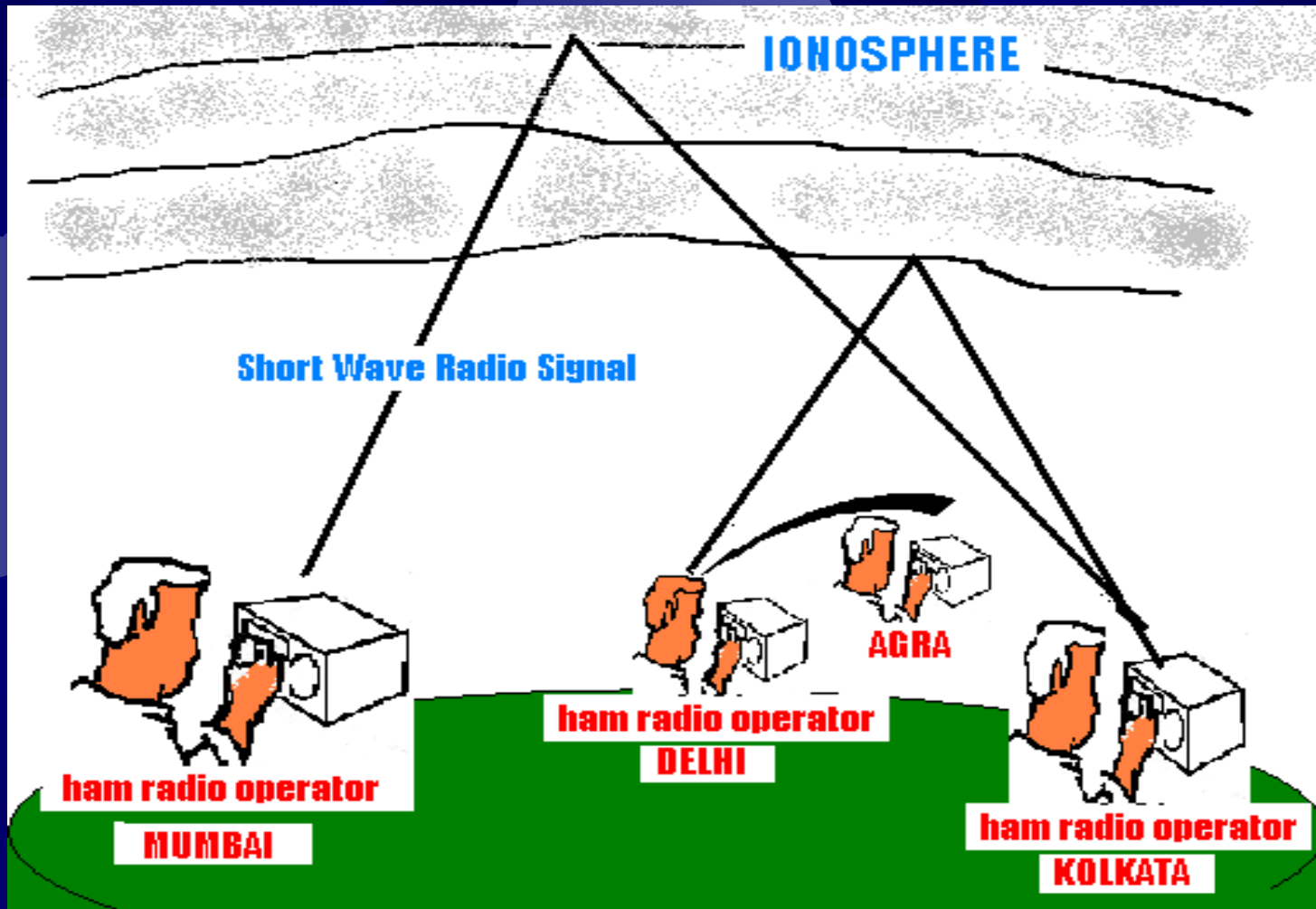


Long Distance Communication using Short Wave Frequencies in the range of 1.8 to 30 MHz



# Worldwide Communication

# Why Ham Radio is successful? during Disaster?

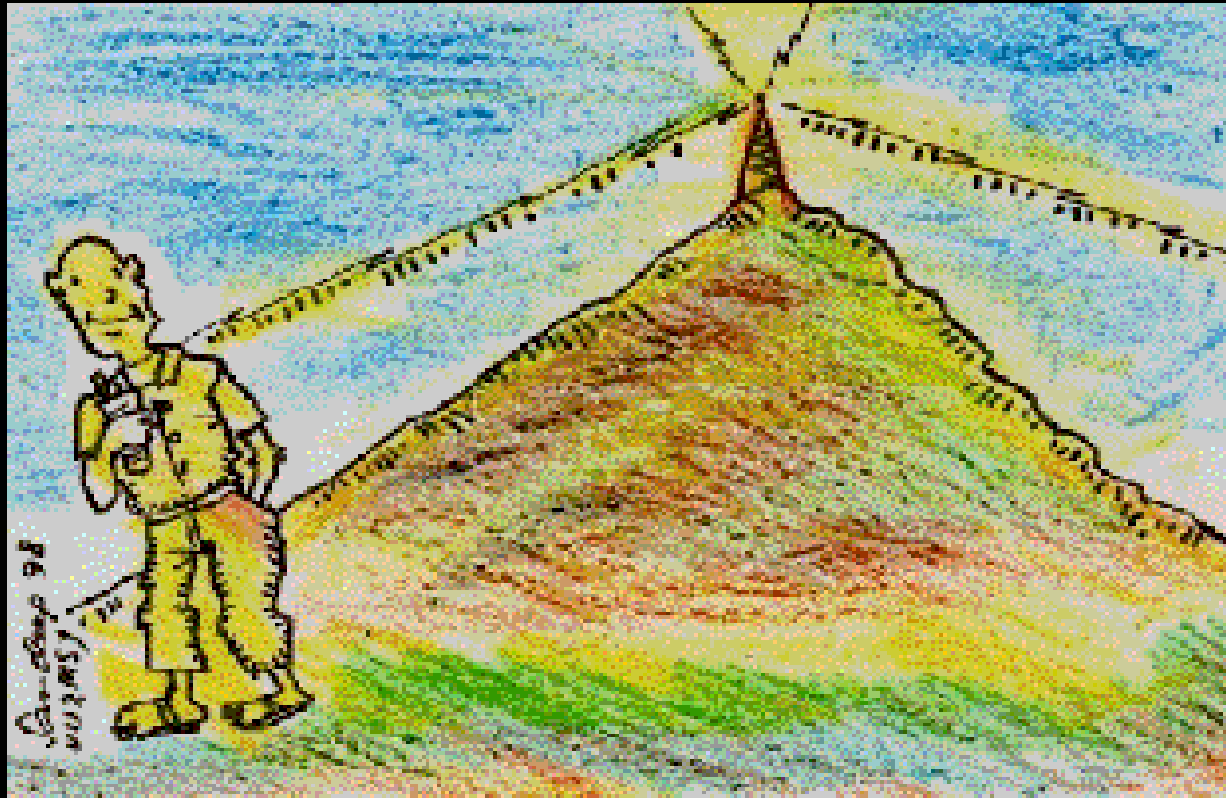


Hams communicate globally. They can relay messages when direct Communication is not possible due to bad propagation condition

# Learn to make dipole antennas for long distance communication



Hams usually communicate person-to-person without any intermediary network, but they also use Relay station (like the one maintained by Vigyan Prasar)



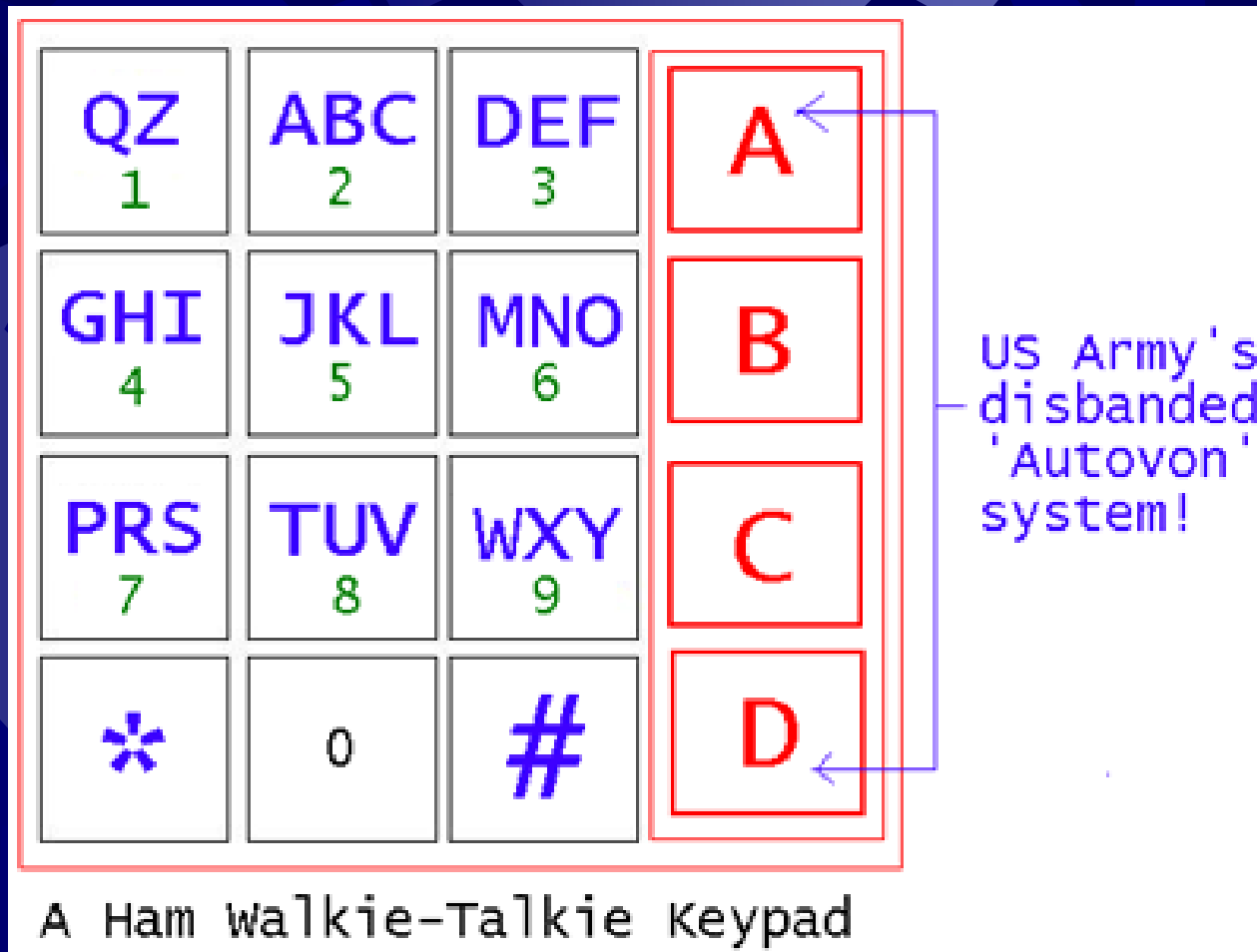
**To relay Line-of-Sight Radio Signal VHF Repeater Stations installed on top of hills/Tall buildings are used**

# A Mobile Telephone keypad

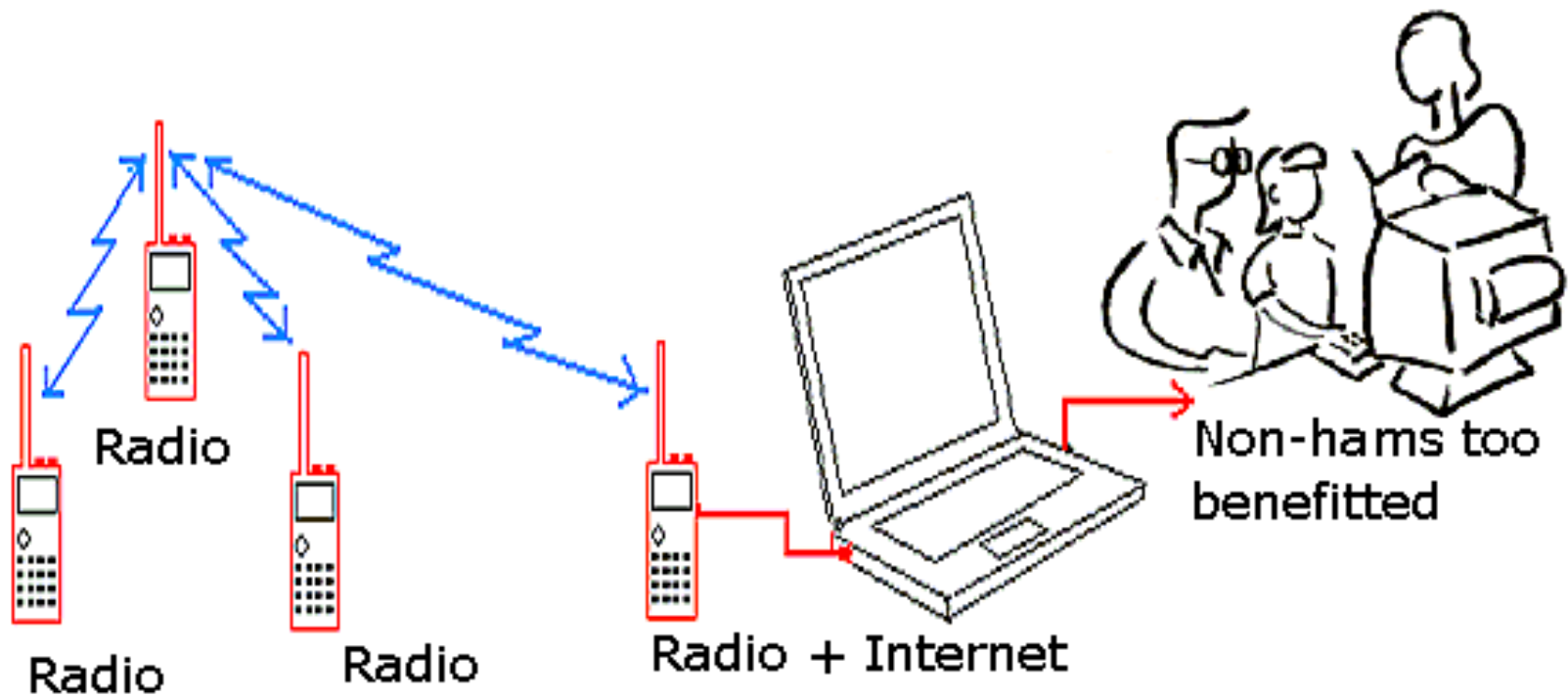
	ABC	DEF
1	2	3
GHI	JKL	MNO
4	5	6
PQRS	TUV	WXYZ
7	8	9
*	0	#

A Mobile Telephone keypad

# US Army's AUTOVON system



**DTMF stands for Dual Tone Multi Frequency. It is an invention of the Bell Laboratories (USA). The AT&T trade name for DTMF is 'Touch Tone'. Most of the modern telephone and ham walkie-talkies are DTMF enabled, i.e. when we press a particular digit of the keypad it produces two tones (a combination of 'two' out of the 'eight' tones).**



- Packet Radio [ [http://en.wikipedia.org/wiki/Packet\\_radio](http://en.wikipedia.org/wiki/Packet_radio) ]
- APRS [ Automatic Position Reporting System  
[http://en.wikipedia.org/wiki/Automatic\\_Position\\_Reporting\\_System](http://en.wikipedia.org/wiki/Automatic_Position_Reporting_System) ]
- Echolink [ <http://www.echolink.org> ]
- Winlink 2000 [ Long Distance HF email <http://www.winlink.org> ]

Example of messages handled  
by two ham radio operators during a disaster

## A Relief Message

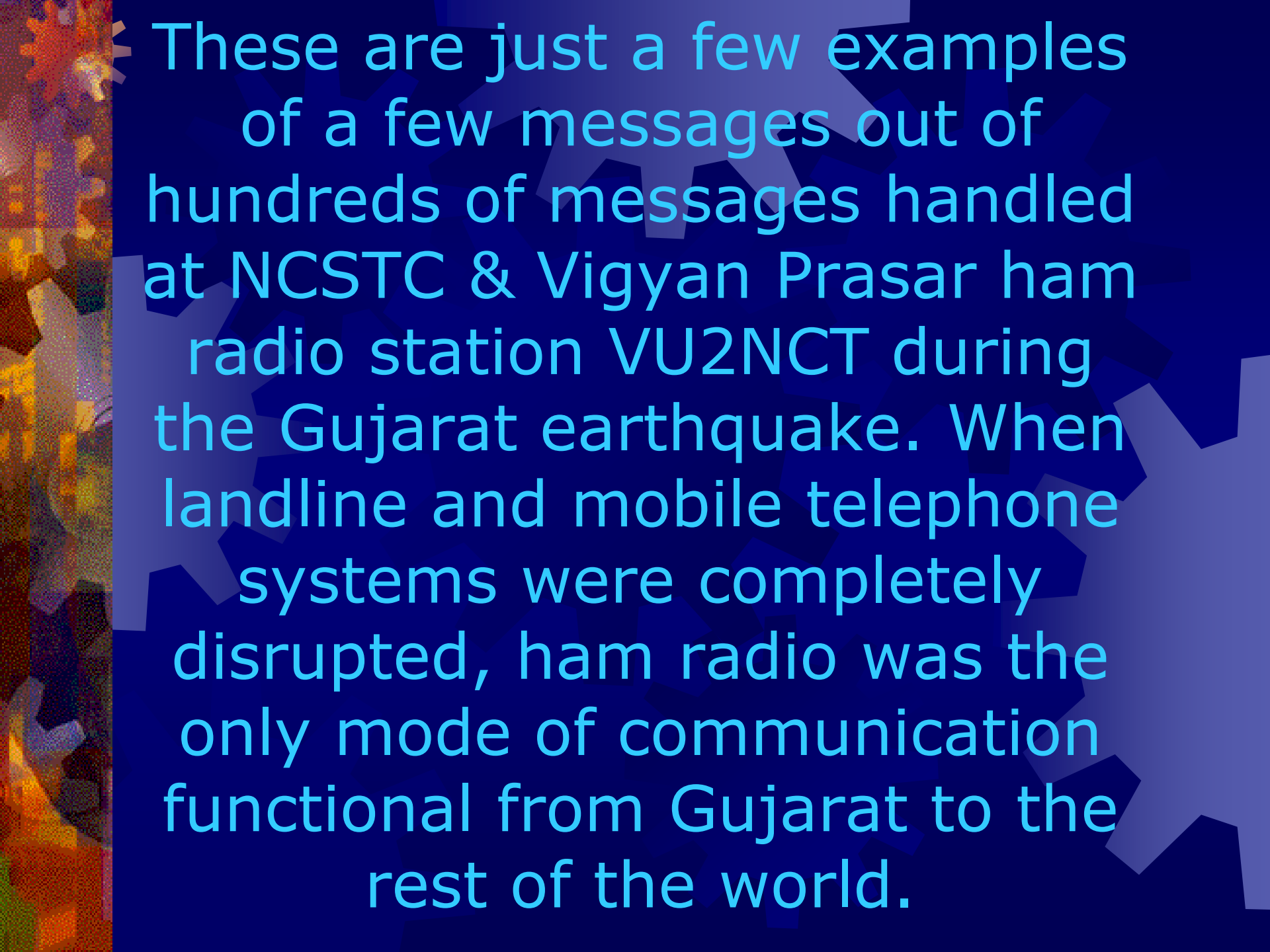
**"VU2UTM, this is VU2NCT. I have one message from New Delhi. Mrs. Prema Gopalan from Swayam Shikshan Prayog (SSP) is reaching Bhuj with a truck of essential supplies. Convey this message to Mrs. Sushma Iyengar at Bhuj Collector's office with the instruction that she passes this message to Navanirman Abinayan Samiti". Within minutes, the ham radio hobbyist Purusottam, VU2UTM, at the other end located at Bhuj Collector's office returned a prompt reply from his station that the message was conveyed to the NGO.**

# Message for an anxious wife

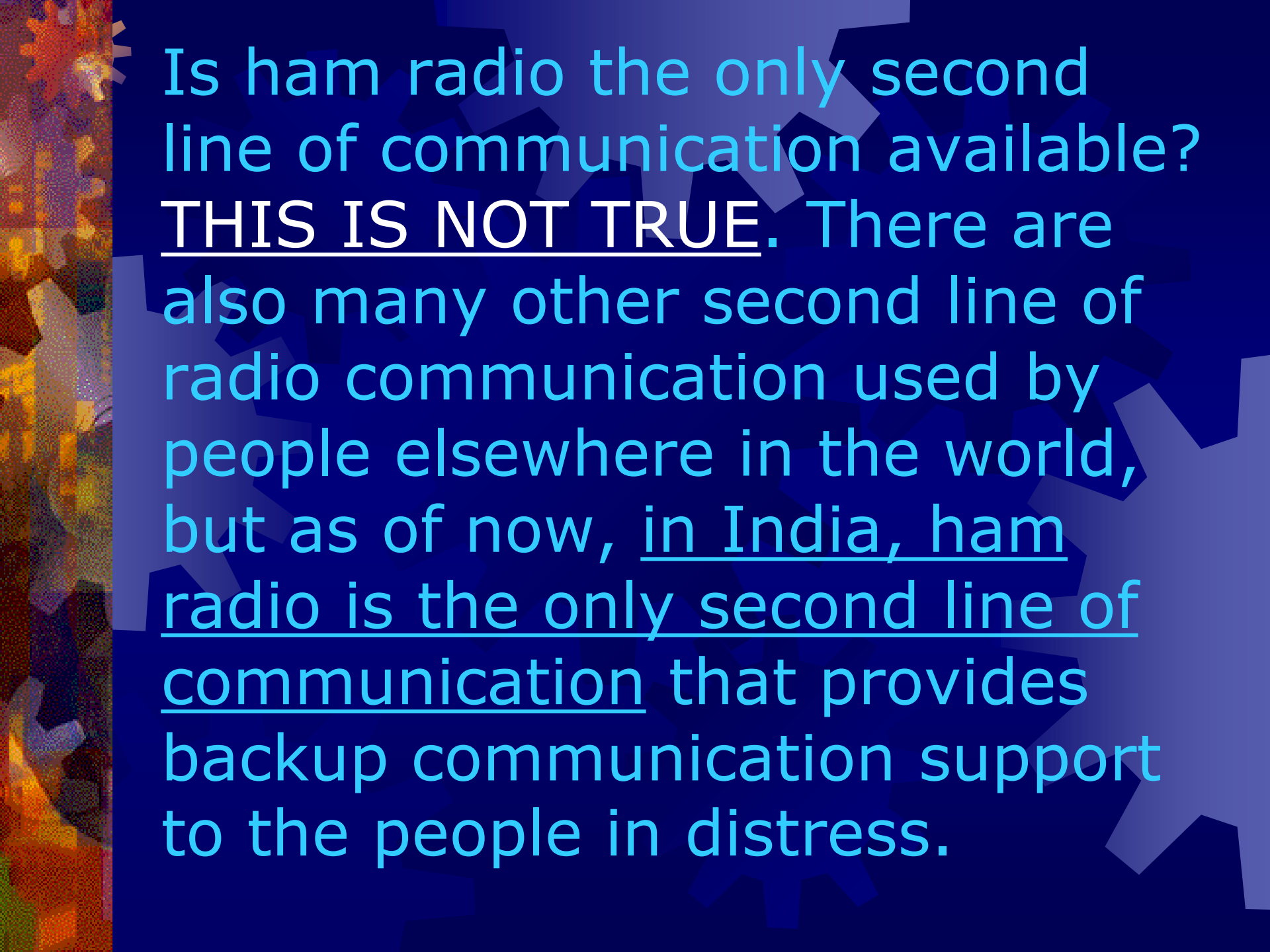
**"VU2NCT this is VU2RIO, Pankaj from Anjar. Please ring up 228973, Dr. Sujata and tell her that her husband Dr. Sunil is safe and sound at Anjar." That was a message from Dr. Sunil via a ham radio station at Anjar. Dr. Sunil had rushed to Kutch as a member of a medical team from New Delhi during the devastating Gujarat earthquake. When he had no access to telephones, he could convey his messages to his family only via our ham radio station VU2NCT.**

# Message to the family of a relief worker (volunteer)


**"VU2NCT this is VU2PHR, Pawan, from Samakhiali relief camp. Please ring up Delhi landline number 5469517, Ranjit Kaur, and inform that relief volunteer Amrutpal Singh is fine at Samakhiali relief camp. He is now leaving for Duda, some 14 kms away from this place. Also please ring up landline number 5138205, Sunder Singh, and inform that relief volunteer Paramjeet Singh will be at Samakhiali relief camp for the next couple of days."**

The background features a dark blue field with several large, semi-transparent gears of various sizes. On the left side, there is a vertical strip with a textured, metallic appearance in shades of orange, yellow, and brown. The text is centered and written in a light blue, sans-serif font.

These are just a few examples of a few messages out of hundreds of messages handled at NCSTC & Vigyan Prasar ham radio station VU2NCT during the Gujarat earthquake. When landline and mobile telephone systems were completely disrupted, ham radio was the only mode of communication functional from Gujarat to the rest of the world.

The background features a dark blue field with several large, semi-transparent gears of various sizes. On the left side, there is a vertical strip with a colorful, abstract, and textured appearance, possibly representing a gear mechanism or a natural element like a tree trunk. The text is overlaid on this background.

Is ham radio the only second line of communication available? THIS IS NOT TRUE. There are also many other second line of radio communication used by people elsewhere in the world, but as of now, in India, ham radio is the only second line of communication that provides backup communication support to the people in distress.


The background features a dark blue field with several semi-transparent, light blue gears of various sizes scattered across it. On the left side, there is a vertical strip with a textured, metallic appearance in shades of orange, yellow, and brown, resembling a gear or a mechanical part.

**Family Radio Service (FRS):** This service is not yet introduced in India. In USA, including many other countries, this is a 'Free License' two-way radio service legalized due to its utility during outdoor and adventure activities. But communication range is limited to 2 to 5 miles 'line-of-sight' only.

**NO LICENCE & PERMISSION IS REQUIRED TO OPERATE FRS walkie-talkies**

# NO LICENCE REQUIRED!




The background features a dark blue field with several large, semi-transparent grey gears of various sizes. On the left side, there is a vertical strip with a textured, metallic appearance in shades of orange, yellow, and brown, resembling a gear or a mechanical part. The text is overlaid on this background in a bright cyan color.

**Global Mobile Radio Service (GMRS):** Similar to FRS (UHF frequencies in the 462 MHz and 467 MHz band). But more power (50 watts) and distance is allowed. However, a license

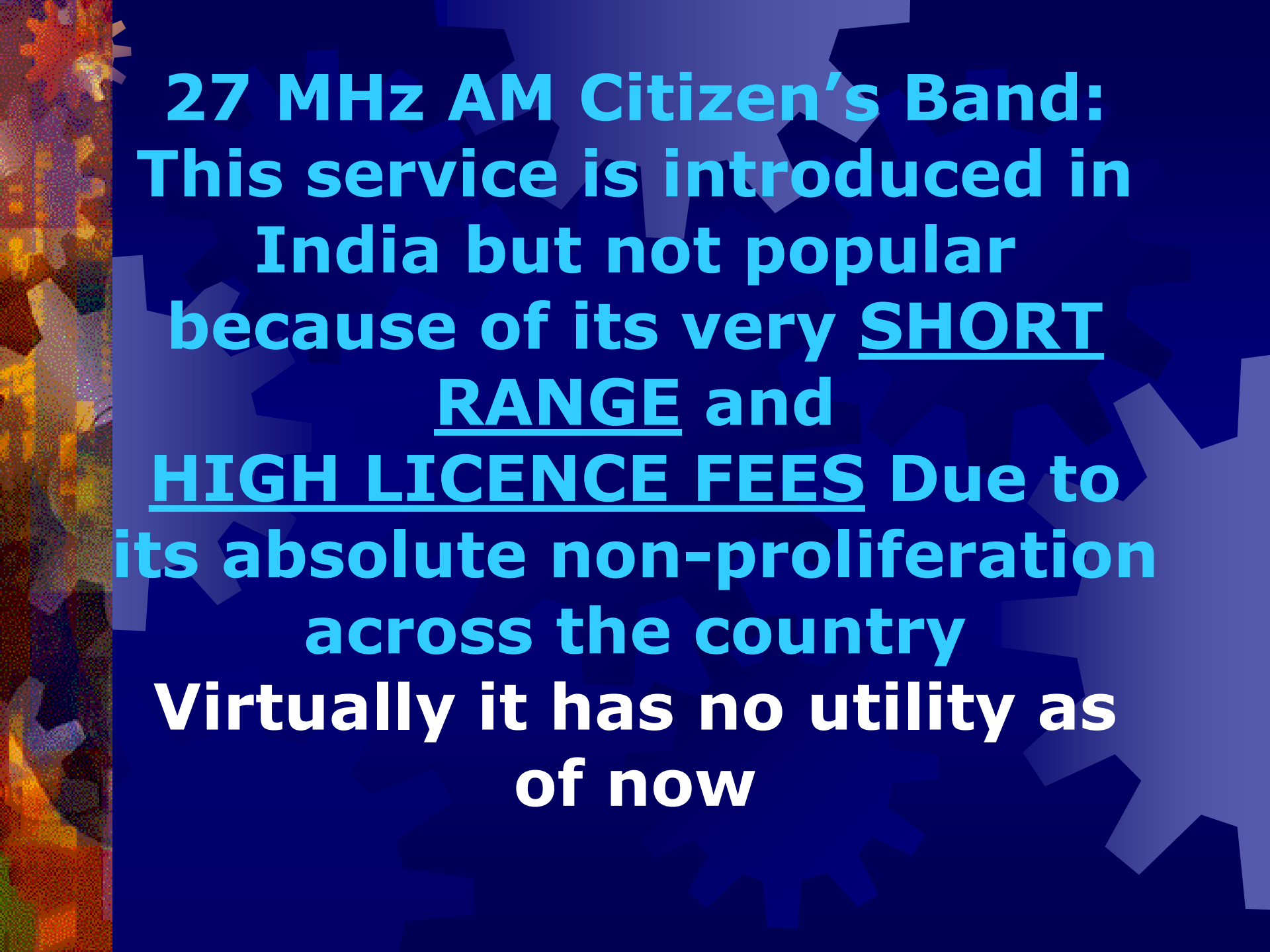
**(WITHOUT ANY EXAMINATION!)**

at a nominal fee is required for operating a GMRS wireless set.

GMRS is also **NOT YET INTRODUCED** in India. License Fee is just \$5 per year!

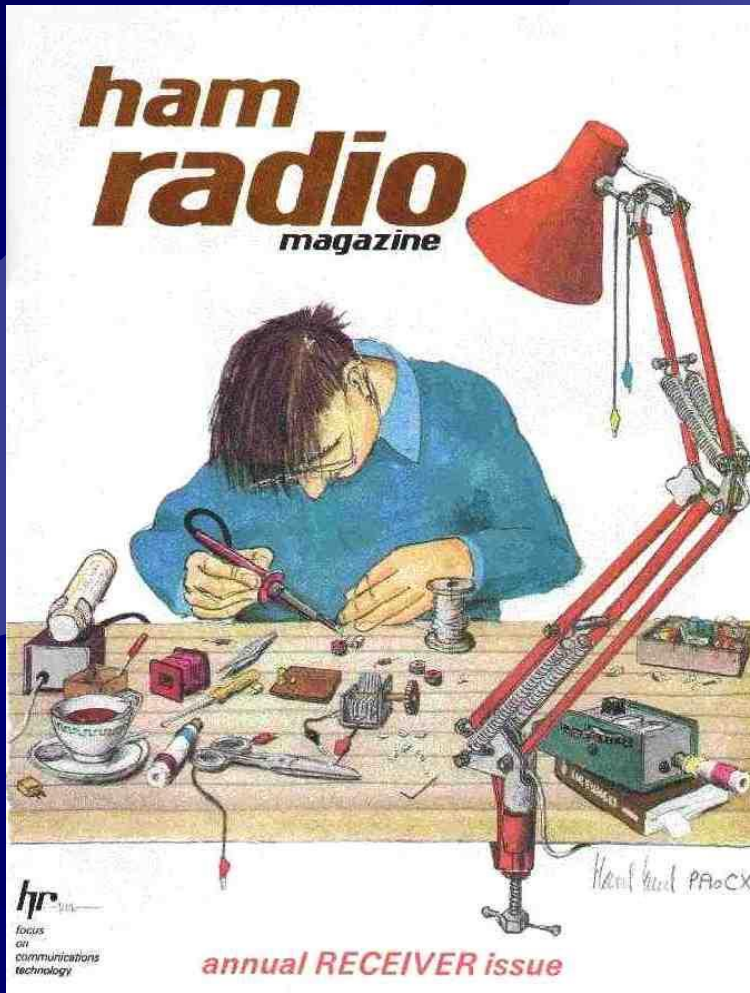


**Multi User Radio Service (MURS):** Similar to FRS. But VHF frequencies in the 150 MHz band is allotted. **NEITHER** any license **NOR** any fee is required. This service also is not introduced in India.

The background features a dark blue field with several light blue gears of various sizes scattered across it. On the left side, there is a vertical strip with a textured, metallic appearance in shades of orange, yellow, and brown, with a gear-like shape at the top left corner.

**27 MHz AM Citizen's Band:**  
**This service is introduced in**  
**India but not popular**  
**because of its very SHORT**  
**RANGE and**  
**HIGH LICENCE FEES Due to**  
**its absolute non-proliferation**  
**across the country**  
**Virtually it has no utility as**  
**of now**

# Hobbyists



A ham with  
A technical  
bend!



# Is Ham Radio obsolete?

## PICTURE TRANSMISSION

Picture transmission through ham radio;

A Japanese ham (Call-sign JE3HHT)

wrote a revolutionary software

(**MMSSTV**) in 2001 which now allows an  
ordinary ham to transmit pictures



Cap'n Fatty & Carolyn  
(somewhere near South Africa)

This is a picture transmitted  
from a  
sailboat (Wild Card)!

# Hams onboard ISS!



A SSTV picture from International Space Station  
Received by a ham

# TEXT TRANSMISSION THROUGH HAM RADIO

Invented by Peter Martinez, G3PLX

PSK31 is a new digital mode which utilizes the processing power of computers and sound cards.

Software on the computer converts inputted text to audio level wave forms which can be fed into most standard SSB radios.

The same software listens to the output of the radio and decodes the audio signals back into text.

# E-mail through Ham Radio

WINLINK 2000

AIRMAIL (a free software for hams which is just like Microsoft Outlook Express)



# PACTOR-III

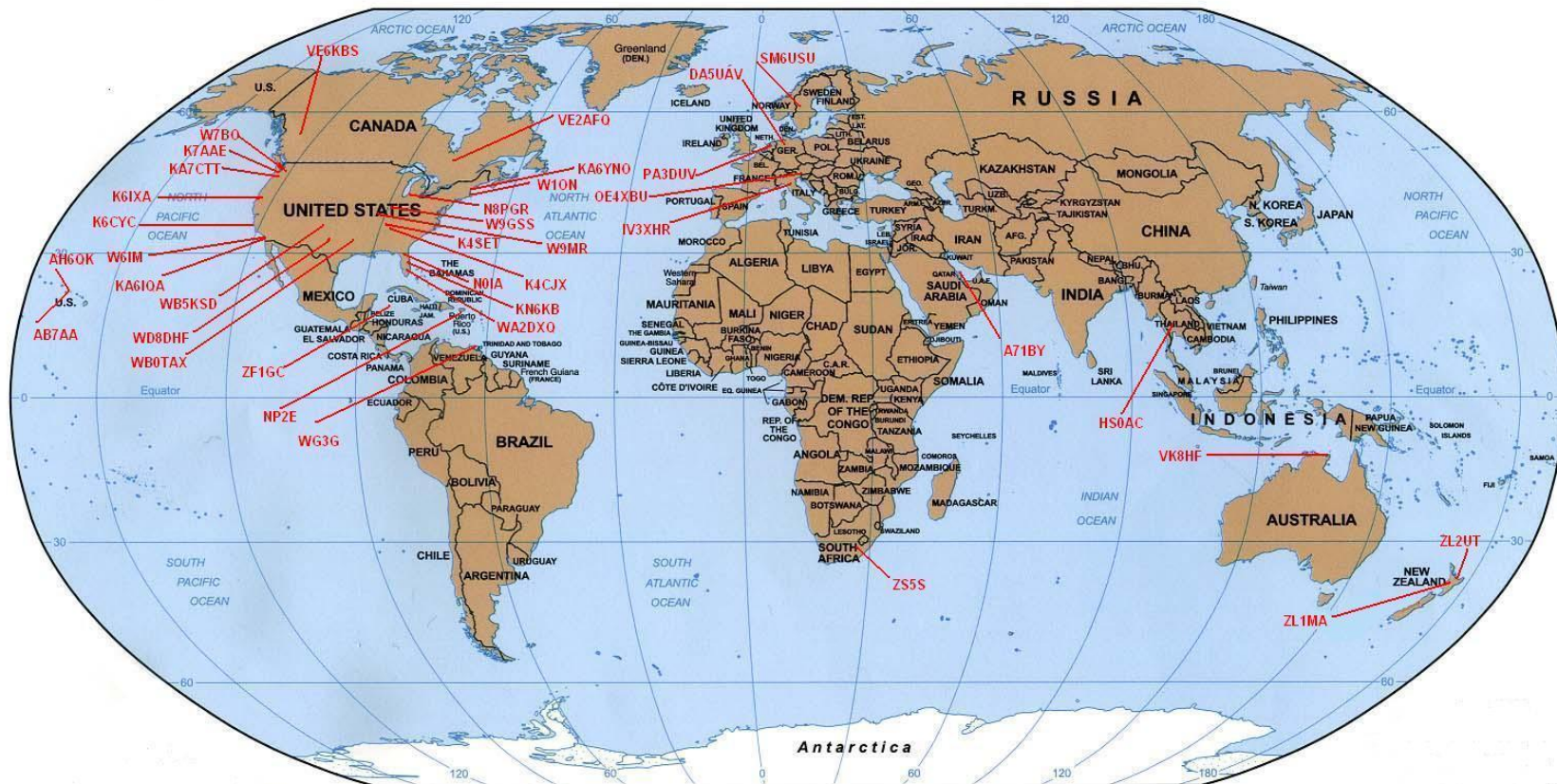


A physician for nuclear medicine by the name of Dr. Thomas Rink (DL2FAK) once established a SCS-Germany with an aim to develop a technology to cater to the emergency need of 25,000 sailor hams on small sailboats. Martin Clas, DL1ZAM, a military engineer and a ham developed the PACTOR-III radio modem. Another ham by the name of Hans-Peter Helfert (DL6MAA) who is a Chemist by profession wrote the software. Jim Corenman who himself is a cruising sailor then wrote a software called AirMail which he gives for free!

# HF (Short Wave e-mail Gateway to help the sailor hams/hams at remote places by providing e-mail relay to their families)

## Winlink Participating stations (PMBOs)

Click on station for details.



# EVOLUTION!





THE USE OF HAM  
RADIO IS DIFFERENT  
FROM THE  
CONVENTIONAL  
MODES OF  
COMMUNICATION

THIS IS MY HAM SHACK!



73 ES TU!