1. Background and context

1.1 Introduction

Caribbean countries are predominantly island states with the exceptions being Belize in Central America, and Guyana and Suriname, situated on the South American continent. The countries are situated generally between latitudes 11 and 18 degrees north, from Suriname in the south to the Bahamas in the north. The countries tend to have a topography that is generally rugged and mountainous with small areas of flat land in coastal areas. These islands are geographically within the hurricane belt in the Caribbean.

According to Caribbean Planning for Adaptation to Climate Change (CPACC), the two dozen island nations of the Caribbean, and the estimated 40 million people who live there, are in a state of increased vulnerability to climate change. Higher temperatures, rises in sea level, and increased hurricane intensity threaten lives, property and livelihoods throughout the region. In light of climate change, the increased vagaries of natural disasters there is an increasing need for emergency telecommunications.

When natural disasters and humanitarian crises strike, communities are often devastated and left vulnerable, having little access to some of life's essentials, such as food, clean water, shelter, and basic services. While they must deal with the tragic loss of human life and property, they also have to face the uncertainty of seeing their livelihoods destroyed or severely affected.

Disasters such as earthquakes, floods, cyclones, hurricanes, among others, continue to undermine economic development, social development, and environmental protection. According to the World Risk Report 2016, prepared by the United Nations University, three out of the fourteen (14) countries to benefit from the project are classified in the top 25 positions of countries most at risk:

Rank	Country	World Risk Index	Exposure	Vulnerability	Susceptibility	Lack of Coping capacities	Lack of adaptive capacities
122	Bahamas	4.14 %	10.71 %	38.64 %	18.76 %	52.85 %	44.32 %
168	Barbados	1.32 %	3.46 %	38.26 %	18.20 %	50.29 %	46.29 %
79	Belize	6.55 %	13.31 %	49.22 %	27.34 %	73.87 %	46.46 %
167	Grenada	1.42 %	3.13 %	45.39 %	24.54 %	68.82 %	42.82 %
24	Guyana	11.39 %	22.90 %	49.72 %	27.16 %	78.96 %	43.05
21	Haiti	11.68 %	16.26 %	71.85 %	61.81 %	91.24 %	62.49 %
20	Jamaica	11.83 %	25.82 %	45.81 %	25.43 %	71.30 %	40.70 %
46	Suriname	8.44 %	18.12 %	46.60 %	27.54 %	70.44 %	41.83 %
61	Trinidad & Tobago	7.50 %	17.54 %	42.79 %	19.30 %	67.80 %	41.26 %
Antigua & Barbuda, Dominica, St. Kitts & Nevis , St. Lucia and St. Vincent & The Grenadines are not listed in the World Risk Index							

Existing and emerging ICTs can mitigate the impact of these disasters thus increasing the chance for countries to attain the Sustainable Development Goals by 2030.

Emergency telecommunications serve as a key component in the preparedness and mitigation phases for disaster prediction, detection and alerting, and in the response phase for coordination and communication of relief distribution and management, communicating critical needs and subsequent prioritization of rehabilitation works. In the Emergency Operations Centre (EOC) the communication cell is a designated core operational area. The communication mechanism facilitates information flows throughout the EOC.

When Hurricane Maria smashed into Dominica in the Eastern Caribbean 18th September 2017, phone service went down, virtually cutting off the island. But within hours, amateur radio operators, with very limited

equipment and resources, got on the air and they became the lifeline of communication in providing a vital link to the outside world, for search and rescue, Medical evacuations, logistics, food distribution and coordination.

The recent catastrophic Category 5 hurricanes that struck the Caribbean have shown the deficiencies of Member States of not having National Emergency Telecommunications Plans or not having effective mechanisms or resources to operationalize them.

1.2 Present situation

There is a growing and abiding consensus in the Caribbean Region that Climate change is one of the greatest challenges of our time and that as small island developing states (SIDS), they are vulnerable to the adverse impacts of climate change. In 1994, Barbados hosted the Global Conference on the Sustainable Development of Small Island Developing States. The resulting Barbados Programme of Action (BPoA) focused on sustainable development through adaptation to climate change impacts. Since then, the Caribbean Region has promoted the issue of climate change and its impact and contributing significantly to the Samoa Summit of 2015 and the Samoa Pathway.

In recent times the Caribbean countries have seen the effects of disasters such as the 2010 Haiti earthquakes, the effects of climate variability and increased tropical storms and hurricane intensity as was typified by storms and hurricanes or the effects of flooding and coastal erosion that have had severe negative impacts on all aspects of economic and/or sustainable development and especially in areas as food security, telecommunications, vital infrastructure, and the environment and, coastal and marine life.

An increase in such impacts are already being experienced, including persistent drought and extreme weather events, sea level rise, and coastal erosion, further threatening food security and efforts to eradicate poverty and achieve sustainable development. In 2013 a freak storm devastated Dominica, St. Lucia and St. Vincent on Christmas Eve; In 2015 Tropical Storm Erika ravaged Dominica with unprecedented precipitation (15" rainfall in 6 hours); In 2016 Hurricane Matthew caused severe damage to the northern Caribbean and in particular Haiti and in 2017 Category 5 Hurricanes Irma and Maria and Jose brought most of the Norther Caribbean to its knees with significant loss of life and property, widespread devastation and ruined economies and livelihoods. Therefore adaptation to climate change represents an immediate and urgent regional priority.

The National Disaster Offices whose principal role is to reduce the loss of life and property by ensuring that adequate preparedness, response and mitigation measures are in place to deal with the impact of hazards have varying but limited Emergency Communications capabilities in each country.

Mitigation measures to cope with climate change must of necessity therefore include economic, social and technological changes – in this case Emergency Telecommunications.

1.3 Justification

Given the aforementioned problem analysis the Caribbean Region therefore understands the economic, social and moral imperative for developing regional cooperation and collective regional strategy to address emergency preparedness and the implementation of a low cost and reliable configuration of disaster emergency communications networks and importantly, to have well-defined National Emergency Telecommunications Plans to facilitate coordination, response and recovery logistics.

The critical importance of using telecommunications/ICTs to respond to these devastating phenomena is widely recognized. Because of the role that telecommunications/ICTs play in the phases of a disaster prediction, detection, mitigation and relief, it is important to develop disaster telecommunications preparedness plans and strategies, including taking account of the need for resilient and redundant infrastructures and systems as part of disaster risk reduction and early warning and ensuring that the appropriate Emergency Telecommunications Framework is in place.

The project will draw synergies and experiences from similar ITU project initiative in the Pacific Region and is supported strategically by the Buenos Aires Action Plan (BaAP) adopted at the ITU's World Telecommunications Development Conference (WTDC-17) held in Buenos Aires, Argentina in October 2017, which adopted the Americas Regional Initiative to be implemented from 2018 to 2022.

Moreover, the WTDC-17 adopted *"Objective 4: Inclusive digital society: Foster the development and use of telecommunications/ICTs and applications to empower people and societies for sustainable development."* This objective instructs through Output 4.1 – Products and services on concentrated assistance to LDCs, SIDS and LLDCs and countries with economies in transition to foster availability and affordability of telecommunications/ICTs. This is further facilitated by regional initiatives will contribute to Outcome 4.1, consistent with WTDC Resolution 17 (Rev. Buenos Aires, 2017):

AMS1: Disaster Risk Reduction and Management Communications

Objective: To provide assistance to Member States during all phases of disaster risk reduction, i.e. early warning, disaster response and relief and rehabilitation of telecommunication networks, particularly in Small Island Developing States (SIDS) and the Least Developed Countries (LDCs).

The Caribbean in emphasising the need for action, The International Telecommunication Union (ITU), Caribbean Telecommunication Union (CTU), The Inter-American Communication Commission (CITEL), and the Regional Technical Communication Commission of Central America (COMTELCA) signed a Letter of Intent (LOI) to establish an Agreement on "The use of ICTs for emergency and disaster situations in the Americas region". The purpose of this LOI is to reaffirm the intent of the Signatories to develop a cooperation mechanism between them for the implementation of projects on the use of ICTs for emergency and disaster situations in the Americas region.

The Caribbean Telecommunications Union (CTU) held its 16th Caribbean Ministerial Strategic ICT Seminar during the week of 27th November to 1st December 2017, Bahamas. Sensitive to the devastation and the loss of lives from a number of recent hurricanes in region, the CTU has identified emergency communication as a critical action item for 2018 and beyond thus further emphasizing and justifying the importance of this project.

It must also be highlighted that this project presents itself as a justified continuum to an ongoing ITU initiative: **Assessment of Emergency Telecommunication plans and systems in the Caribbean Region** which was started 2017 by ITU in Collaboration with CARICOM's Agency for Disaster Management, CDEMA. The project has undertaken so far, a review of currently existing policy/legislative/regulatory frameworks that Caribbean Countries have developed related to (a) the status of the emergency telecommunication plans and systems (b) the identification of national and international standard operating procedures and best options to deal with (a). Then it is undertaking a comparative analysis of international best practices on (a) & (b) with a summary of the main findings. The final part will produce recommendations of a model policy/legislative/regulatory framework to facilitate the establishment of emergency telecommunication plans and systems through the use of different ICT technologies.

The Caribbean is also considering the buttressing of its Emergency Telecommunications infrastructure as part of a wider development of overall Telecommunications infrastructure. In that regard there is already consideration by ITU with its Partners CTU, ITSO and CDEMA of projects such as:

➢ **"Development of Satellite Communication Capacity and Emergency Communications Solutions for the Caribbean States"** and

➢ **"Development of a Framework and Platform for Open Access to International Optical Fibre Networks at affordable rates for Sustainable Development"**

It is intended that these two proposed medium term projects will form the build blocks of an all-encompassing strategy towards overall development of Communications infrastructure and particularly its resilience in the face of emergencies and Climate Change.

Considering the premium placed on ensuring project sustainability, the aforementioned ongoing project "Assessment of Emergency Telecommunication plans and systems in the Caribbean Region" dovetails into this proposed project "establishment of a Regional Emergency Telecommunications Network in the Caribbean Region" as well as another proposed project "Emergency Telecommunications in the Caribbean – Emergency Communications Plans" as a sustainability model that will create the framework for a continuum that is readily adaptable within the socio-economic development context of the Caribbean Region.

1.4 Strategy and Scope

As shown in Section 1.1 of this Project Document, Caribbean Countries are very much exposed to emergencies and disaster occurrence risks. Many times each year, the response requirements of disaster events exceed a single nation's or several nations' disaster management abilities. The governments of the affected countries call upon the resources of the international response community, regional response agencies and neighboring islands. Therefore, acquisition of one emergency tool kit for each of the 14 beneficiary countries in proximity to each other would improve the capacity to respond to emergencies in cases of disaster.

Each beneficiary country already has a national disaster response agency/entity that works in direct cooperation with the government telecommunications entities (Administrations). Therefore, ITU will procure the equipment described further below, and will donate it to each Administration, which will be responsible for ensuring its proper use and maintenance by the nationally organized emergency/disaster response structure.

As Winlink is a solution developed within and used mainly by the Amateur Radio community, most of the instructional material is available from the IARU, which has expressed its willingness to contribute to the success of this initiative.

In addition, ITU, CTU CITEL and COMTELCA will jointly coordinate and develop additional content and instructional material for a tailor-made regional emergency telecommunications training program to be delivered to beneficiary countries. Each of the organizations above and the beneficiary countries will coordinate for the delivery of the training.

The Project will be implemented in the beneficiary countries as a part of the Letter of Intent signed at the WTDC-2017 among ITU, CTU CITEL and COMTELCA.

1.5 Description of the solution to be implemented

The solution consists of implementing a Regional Emergency Telecommunications Network in beneficiary countries, providing the Emergency Operations Centers (EOC) of ITU Member States with the necessary equipment (RMS server and client function) to connect to the network Winlink 2000, under the characteristics of redundancy and autonomy. It will be important for the Regional Emergency Telecommunications Network to have sufficient redundancy level in covering more than one server per country, in case one or more of the countries is affected by a large natural disaster (earthquake, hurricane, etc.) that affects conventional communications, the remaining servers can support the affected server(s).

The Winlink 2000 system consists of a group of common message servers (CMS) placed in various places around the world. These servers connect over the Internet to radio message servers (RMS) in many geographic locations to form a star network configuration. The radio message servers are the VHF, UHF or HF RF gateways. The final component is the client computer (in this case EOC computer) that runs software to send / receive messages over the radio network. Like regular mail, Winlink 2000 messages are sent to a specific address and may contain attachments such as images, weather maps, spreadsheets, ICS forms, etc. Emails can be sent between normal Winlink and SMTP / POP3 stations.

The Regional Emergency Telecommunications Network in the beneficiary countries will install Internet to radio message servers (RMS) in the Emergency Operations Centers (EOC) of each beneficiary country. The Emergency Operations Centers (EOC) are part of and are operated by the Civil Protection entities in each country.

Each Emergency Operations Center (EOC), 14 in total, will be equipped with:

- 1 HF radio
- 1 VHF radio
- 1 dipole Multiband antenna
- 1 VHF Antenna
- 1 Automatic Tunner Antenna
- 1 SCS PACTOR IV Dragon DR-7800 Modem
- Coaxial cable required for the height that the antenna is installed
- 1 computer battery holder in case the AC power is interrupted
- 1 PC computer with keyboard and mouse
- 1 software for the server administrator.

The technical specifications will be defined in detail as part of the activities to be developed within the project.

For this, each Emergency Operations Center (EOC) equipped shall provide:

- Construction of the base of the antenna, the support of electric power, and in case of a disaster to have backup power (a bank of batteries, solar panels, electrical plant, etc. to be running 24 x 365);
- A 24 x 365 operator (must be radio amateur, IARU can provide the respective training). As the RMS will be installed in the EOC premises and it has to be operated by a licensed radio amateur, it requires the coordination between governmental authorities and national radio amateur associations.
- Internet access, so that any message received by radio can be sent via telnet to the global message servers.

In beneficiary countries, after deployment of the RMS servers, Winlink 2000 coverage will be:

Caribbean Islands
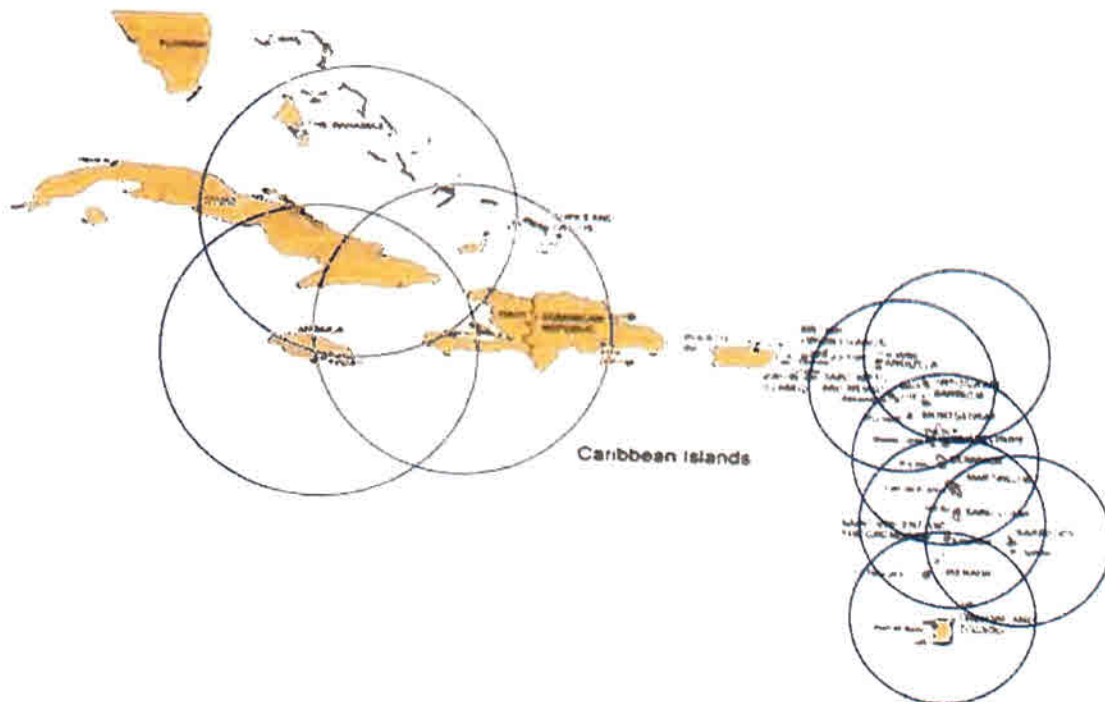
1.5 Impact

The implementation of this Project will help beneficiary countries to increase their level of preparedness for the management of emergencies or disasters (before, during and after), but first and foremost saving lives,

particularly through use of telecommunications/ICTs. It will contribute to a better national response to emergencies and disasters, due to the need for Administrations to coordinate actions at national level with the existing disaster response agencies/entities.

The results of the implementation will also positively impact regional coordination for a better regional response to disaster when national capacities are overwhelmed.

2   Objective

The objective is to assist beneficiary countries in enhancing their emergency telecommunications capabilities and to improve regional disaster response by providing them the equipment to be part of the Regional Emergency Telecommunication Network.

3   Expected Results / Key performance indicators

The Project will acquire at least one tool kit for each of the beneficiaries to help increase their capability to better manage all the phases in emergency and disaster response.

Expected Result	Key Performance Indicator	Goal
Improvement of countries' capabilities to better manage emergency and disaster response	✓ Equipment acquired and donated to beneficiaries. ✓ Training program delivered.	100% of beneficiaries satisfied with the equipment donated and indicated number of professionals trained.
Emergency Operations Centers Equipped	✓ Centers are in operation by the end of the project	14 Centers are equipped with the set of equipment
Regional emergency telecommunications network established for beneficiary countries.	✓ The network is operational and connects 14 countries	The established network enables countries to communicate in the case of disaster

4   Main Activities

Result	Activity	Main Responsible
Beneficiary countries fulfilled their preparations mentioned in section 1.4	✓ Confirm with the beneficiary countries on their preparedness	ITU
Technical specifications defined	✓ Elaboration of technical specifications	ITU
Equipment purchased	✓ Procurement	ITU
Installation of emergency operation centres (EOC) completed and EOCs established	✓ Delivery, installation and commissioning of the equipment.	ITU

Staff trained	✓ Plan for training sessions ✓ Recruit consultant for training ✓ Preparation of the training material ✓ Delivery of the training sessions	ITU
EOCs as well as the network made operational	✓ Ownership of the equipment transferred and EOC established to each beneficiary.	ITU
Project closed	✓ Closing the project	ITU

5   Inputs

5.1 ITU

CASH CONTRIBUTION	ITU will contribute with CHF 200,000

IN KIND CONTRIBUTION	Information on current practices related to emergency telecommunications, access to relevant existing ITU materials, including training courses and publications. ITU will exercise all its reasonable skills, care and diligence to ensure the success of the project. ITU will also designate a Project Manager to manage, monitor and evaluate its implementation.

5.2 BENEFICIARY COUNTRIES

CASH CONTRIBUTION	

IN KIND CONTRIBUTION	1. Commitment on the sustainability of the EOC 2. Human resources to maintain and operate the deployed equipment 3. Facility (physical location & related infrastructure) such as: • Construction of the base of the antenna, the support of electric power, and in case of a disaster to have backup power (a bank of batteries, solar panels, electrical plant, etc. to be running 24 x 365); • A 24 x 365 operator (must be radio amateur, IARU can provide the respective training). • Internet access, so that any message received by radio can be sent via telnet to the global message servers.

6 Roles and Responsibilities

6.1 ITU

ITU will:

- provide the staff resources for the coordination and management of the project and be responsible for the overall management of the project implementation, supervision, monitoring, coordination and evaluation;
- provide its expertise and international experience to reasonably enable realization of the project objectives in an effective and efficient manner;
- provide financial resources for the budget of the project and manage / disburse such funds for the purposes of this project;
- determine the terms of reference for, identify, select, contract and procure equipment, experts and trainers necessary for the implementation of the project;
- correspond with all related parties to contribute toward the successful implementation of the project.
- carry out the activities described above (under item 4);
- produce periodic project progress reports; and
- produce project closure report with financial statement at the completion of the project.

6.2 BENEFICIARY COUNTRIES

The beneficiary countries will:

- cooperate with ITU and participate in the conduct of project activities described under section 4;
- designate a qualified focal point to work with ITU during the implementation of this project to play a key role both for ownership of the project and for effective transfer of the know-how;
- Provide human resources to efficiently operate the EOC.
- Provide physical space, as properly required by the project nature and for the establishment of the EOC;
- provide premises necessary to carry out the trainings contemplated under this project, including, without limitation, the necessary physical and communications facilities, hardware, software, equipment, networks, connections and utilities;
- secure the timely issuance by the relevant governmental authorities or other third parties of any and all authorizations, licenses, permits, permissions, certificates, visas and other instruments which may be necessary or required to be obtained in connection with the implementation of the project (including, but not limited to, ITU's exemption from taxes, customs duties, and prohibitions and administrative or technical restrictions on importation the equipment to be used for the purposes of this project.)
- provide administrative support and staff required during the Project implementation and any other assistance to the Project; and
- commit enough resources to maintain and keep the deployed equipment in operation at all times following the completion of the project.

7 Risk Management

Description	Probability	Impact	Mitigation Action
Projects with multiple Member States can present some coordination difficulties	M	H	Continuous monitoring and close coordination.
Beneficiary countries need to allocate appropriate space and staff for deployment and	M	H	Coordination with regional organizations

functioning of the system.			
Insufficient funds available for the replication of the project in other parts of the Americas region	M	H	Working closely with regional organizations to ensure sufficient funds are allocated to implement similar Projects.

High=H; Medium=M; and Low=L

8 Project Management

ITU will assign a Project Manager (PM) who will be responsible for the overall management of the project. ITU PM will work closely with CTU as well as in coordination with the competent services of the ITU in Geneva to ensure a smooth implementation of the project.

ITU Project Manager will work together with the representatives assigned by each Partner in the preparation of the Progress Reports, detailing the progress made in the framework of this Project and those will be presented on a quarterly basis to the Project Support Unit (PRJ) at ITU headquarters.

The ITU, as the main executing agency, will oversee and manage the total implementation of the project based on its rules, regulations and procedures.

9 Monitoring and Evaluation

The progress of the Project will be monitored through the specific periodic reports prepared by ITU Project Manager, according to the control points and milestones agreed in the Project plan. Progress reports will include the status of implementation in each beneficiary country, its results and indicators, as well as a financial summary.

10 Sustainability

The mechanism of custody, maintenance and administration on the use of the equipment acquired would be managed by each beneficiary country that will ensure its proper functioning during its useful life.

11 Budget

The following table provides the estimated budget for this Project, by expense category. The breakdown by expense category is based on the best information available at the time and is subject to change during project execution. To ensure successful implementation of the Project, the ITU Project Manager will have the flexibility to transfer funds between budget categories as necessary.

Budget Table

Budget category	Amount in CHF
Mission Expenses	15,000
Purchase of Equipment	175,000
SSA Consulting	10,000
TOTAL	200,000

Table 2 below identifies the main tasks necessary for the successful implementation of the Pilot Project on establishment of a Regional Emergency Telecommunications Network in the Caribbean Region.

Table 2 – Work Plan

ACTIVITIES	March 2018	April 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	March 2019	April 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sept 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	March 2020
Confirm preparations of the beneficiary countries	X	X																							
Elaboration of technical specifications			X	X																					
Procurement of the equipment					X	X	X	X	X																
Technical and administrative clearance of the equipment								X	X	X															
Shipment and delivery of the equipment										X	X	X													
Installation, commissioning and testing of the equipment												X	X	X	X	X	X	X							
Basic training on the use of the equipment																		X	X	X	X				
Final Project Report																						X	X		
Project closure																								X	X

Annex 1

What is it Winlink 2000?
Winlink 2000 is a worldwide system for sending and receiving e-mail via the radio. Since the connection from the client computer to the Winlink server does not depend on the Internet, Winlink is widely used by relief groups including International Red Cross.

How does it work?
The Winlink system consists of a group of common message servers (CMS) placed in various places around the world. These servers connect over the Internet to radio message servers (RMS) in many geographic locations to form a star network configuration.

The radio message servers are the VHF, UHF or HF RF gateways in the Winlink system. The final component is the client computer (that is, a computer) that runs software to send / receive messages through radio.

Like regular mail, Winlink messages are sent to a specific address and may contain attachments such as images, weather maps, spreadsheets, ICS forms, etc. Emails can be sent between normal Winlink and SMTP / POP3 stations. Email servers like gmail.com.

Diagram of the network
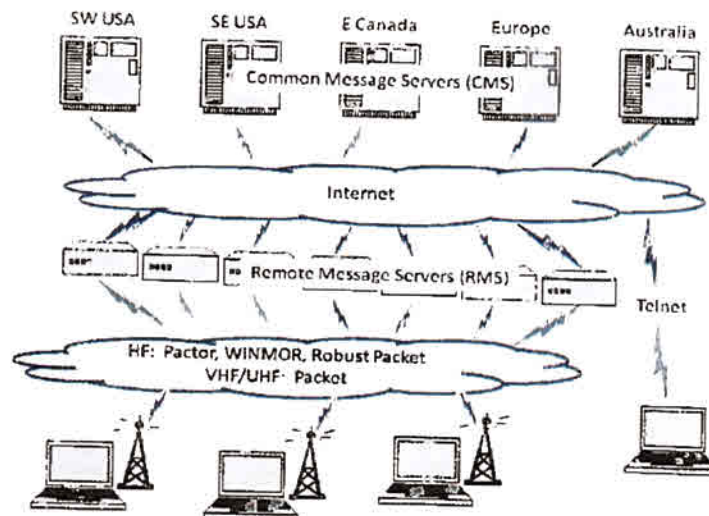
Advantages of the system
Winlink's ability to transfer messages between the system with different capabilities (VHF / UHF, HF and standard email) greatly increases interoperability in an emergency system. It identifies the location of users.

In addition, since Winlink is a storage and shipping system, the stations do not have to make simultaneous connections; this eliminates the time constraints on communication.

It is also possible to establish direct peer-to-peer connections between two client computers (radio stations) that are within the range of radio propagation without going through an RMS.

Emails sent through Winlink must follow the usual rules for amateur radio communication, therefore, they cannot be used for commercial operations.

Winlink uses amateur radio frequencies so it is not necessary to provide additional frequencies.

In a given case that the place where the server is installed for various reasons does not have access to the internet, it has the ability to forward the message that it has received automatically, via radio to a range of 1500 to 2000 km (under optimal conditions) until it finds the server which has access to the internet, so that the latter provides it **to the end user.**