



Abstract - Due that Colombia has steep topography, the seismological data transport has been a challenge in order to provide it in Bogotá - Colombia, where the Colombian Seismological Network from Colombian Geological Survey (SGC) has its headquarter. In 1993, when it began to deploy infrastructure and seismological equipment, the telecommunications in the country had had an incipient development, so the robustness and strongest way to reach wide country for 24/7 earthquake monitoring was by satellite. However, the technology evolution has made the Colombian telecommunications companies reach far places and become them more reliable. This work has the purpose of test and analyse the cellular MESH topology in order to implement them in the earthquake monitoring; Those kinds of technologies should have stable latencies, connections, and no data lost specially when an important earthquake occurs. The result of this test and analysis allow to know those technologies can be used in earthquake monitoring either critical or post processing seismological stations and densify the wide country, allowing improve the magnitude and location accuracy.

Colombian Topography – Colombia has (El Macizo Colombiano), where Andean mountains is divided in three others which are presented in most populated Colombian Territory; this steep topography was the most problem to interconnect cities and towns because a data communications links implies multiple repeaters of microwaves in the higher Colombian mountains, where the strong weather conditions degrades the transmission equipment and also the radio link parameters, this make unstable link, variable latencies and multiple disconnections, this steep topography also make difficulties to has commercial AC energy, so almost of those repeaters have to be energised by solar panels and save energy in batteries incrementing the possible problems due hard weather conditions.

Test Description- In 2015, the SGC deploy four light infrastructure seismological stations with cellular data communication in the region known as "La Loma" and Valledupar; the data transmission since their installation has been uninterrupted and monitored by an SNMP service, this one allow to know the transmission and power parameters for each cellular radio updated each five minutes.

The experiences gotten from those tests have the purpose to feedback ourselves in order to densify seismological information with accelerometrically stations which are installed country wide and also for after shake portable seismological stations.

Parameters explanations-

Sx I: Indicates the absolute value of received signal strength.

ECIO I: Indicates the absolute value of signal quality with a ratio of the average energy to co-channel interferences.

Power: Indicates de power supply voltage.

Temp: Indicates the device temperature.

LAT: Indicates the latency between RSNC server and cellular terminal.



Colombian Geological Survey (SGC) - Colombian Geological Survey holds the Colombian Seismological Network (RSNC), a government entity that monitoring seismological events in the wide country, due the incipient communications technologies that Colombia had in the early 90's, the appropriate technology for this mission that needs to deploy seismological stations in the wide country and concentrate the seismological information in Bogota was by satellite, this technology has high data availability and stability because there is nothing else between remote station and SGC headquarters in Bogotá than the satellite. Nowadays, the country has been interconnected by optics fibres and microwaves, so the internet connections have made possible to use other technologies for data transport and the 3G, HSPA+, and LTE developments have made possible to deploy light infrastructure near of the populated towns and villages in order to densify the seismological network and improve the earthquake localisation and magnitude accuracy.

Conclusions-

- At the cities like Bogota and Valledupar, the cellular data transmission works fine due the stability in the connection, however, it is not at rural and villages stations.
- The cellular data transmission is a good alternative to centralize data in order to densify seismological information, however, nowadays in Colombia it is not the best option for critical missions station due unstable connection in towns and villages where they are.
- In the week days and work hours, the ECIO parameter rise, it is due so much people use cellular, so the signal quality decrease,

