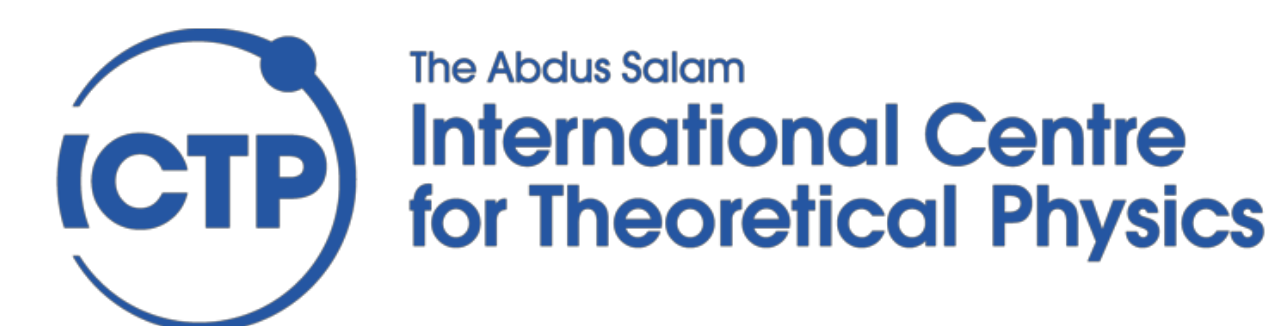


A Low-Cost and Low-Power Messaging System Based on the LoRa Wireless Technology



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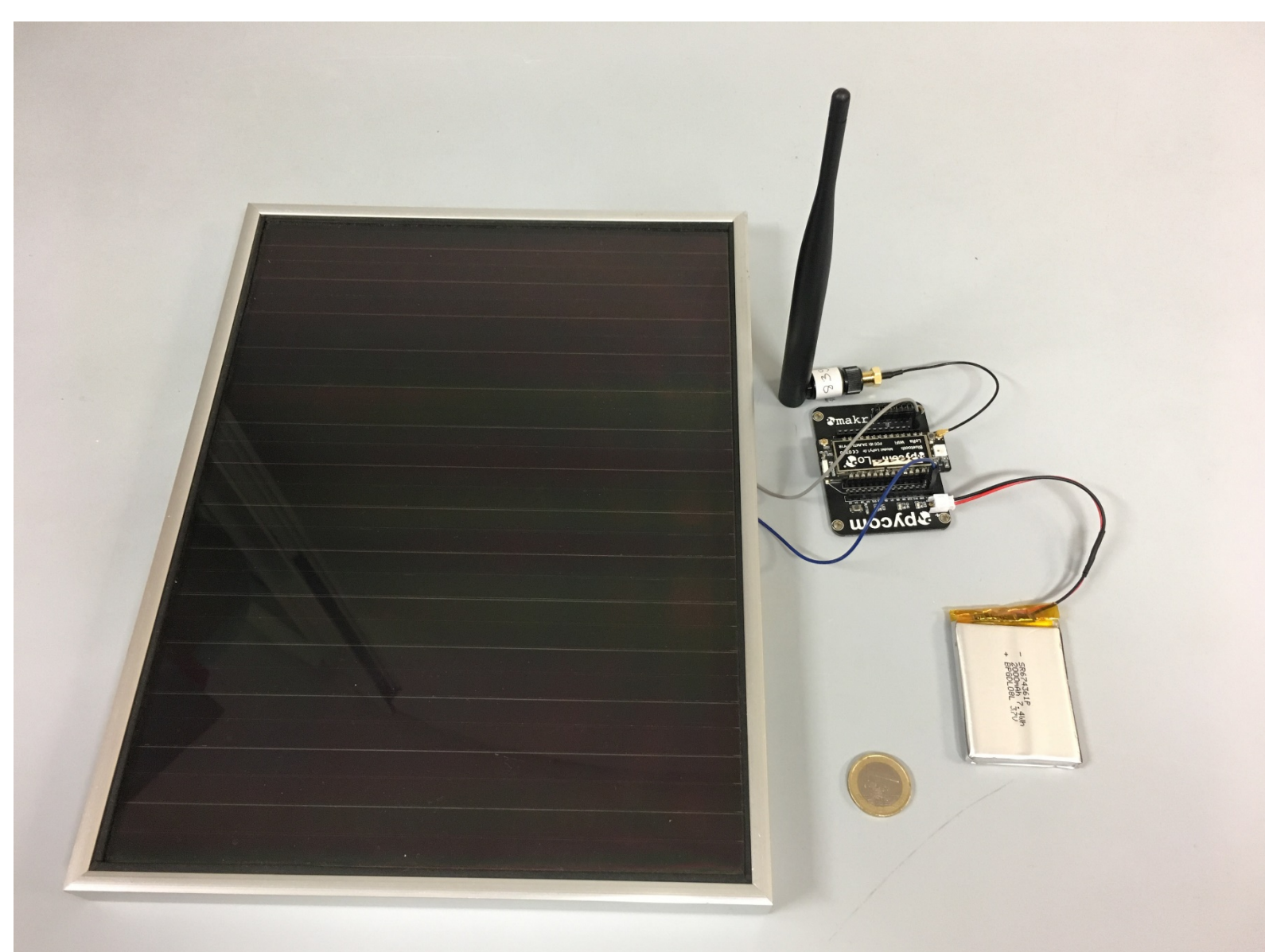


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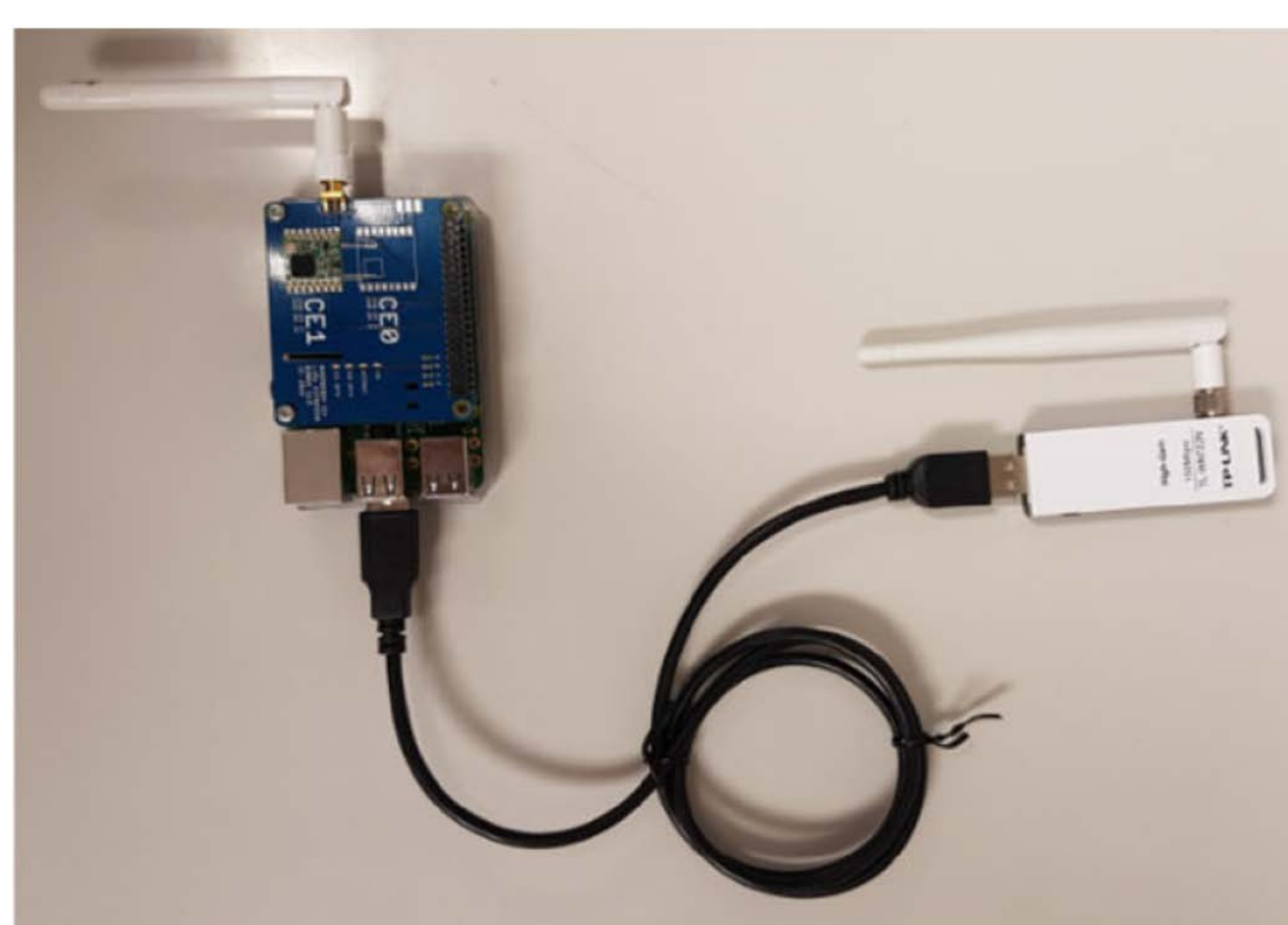
International Centre for Theoretical Physics,
Italy

Overview:

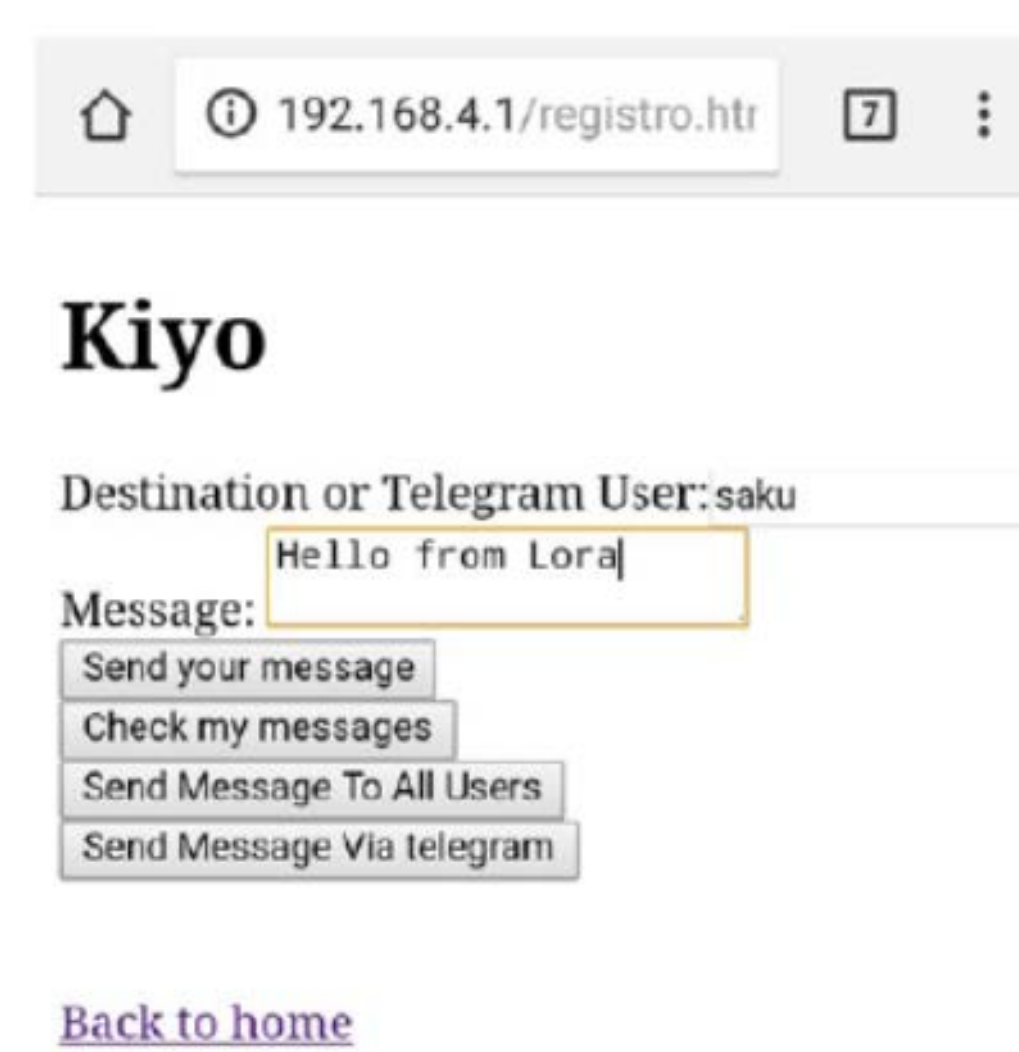
More than one billion people are still not covered by the GSM network, most of them living in isolated communities. We developed a **low-cost and low-power system based on the LoRa protocol** to provide a messaging system without being subject to recurring costs. LoRa networks allow for very long wireless links that can connect villages and towns. In addition to the simple messaging application, LoRa can be used to provide sensor information to communities and to provide disaster alerts. This system falls in the category of community networks, where users build their own network when no infrastructure is available. To better integrate our architecture with standard Internet application we designed a gateway hub to link it with Telegram, a widely used messaging application. We selected Telegram since it offers so called Bots, that is third-party applications that run inside Telegram. Users can interact with bots by sending them messages, commands and inline requests.



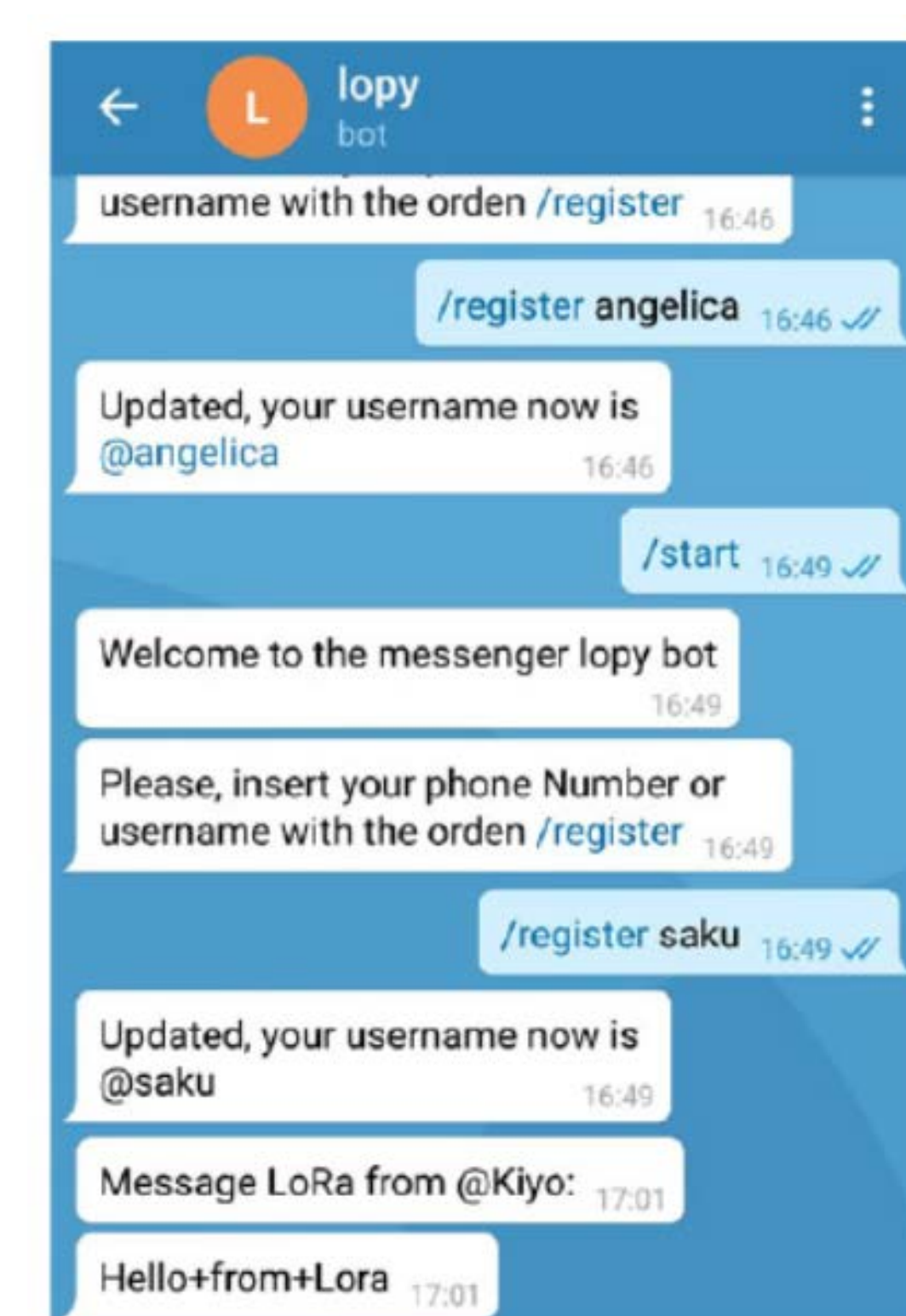
Overall system: LoPy, battery and solar panel.



Prototype used as a gateway LoRa, based on a RaspberryPi.



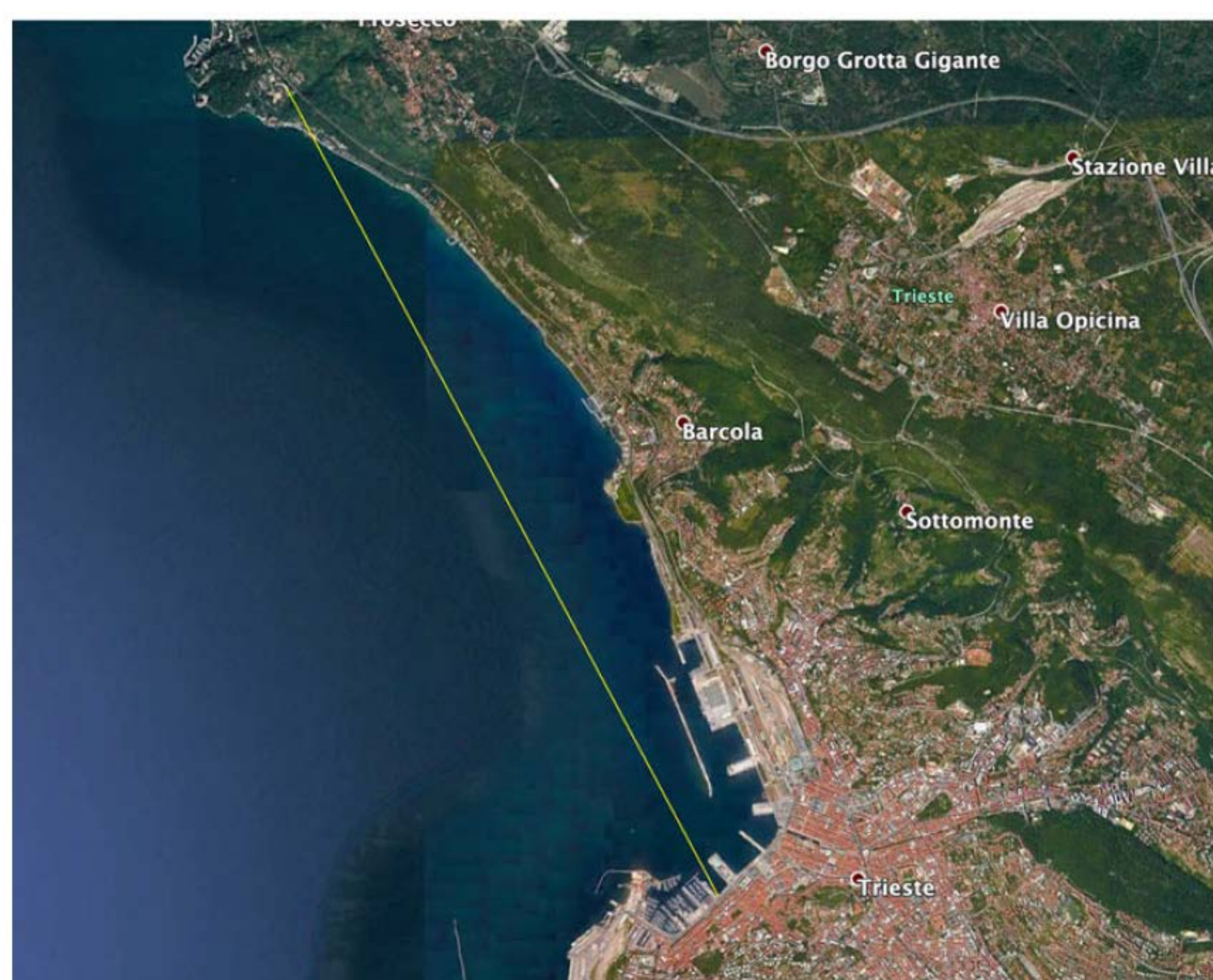
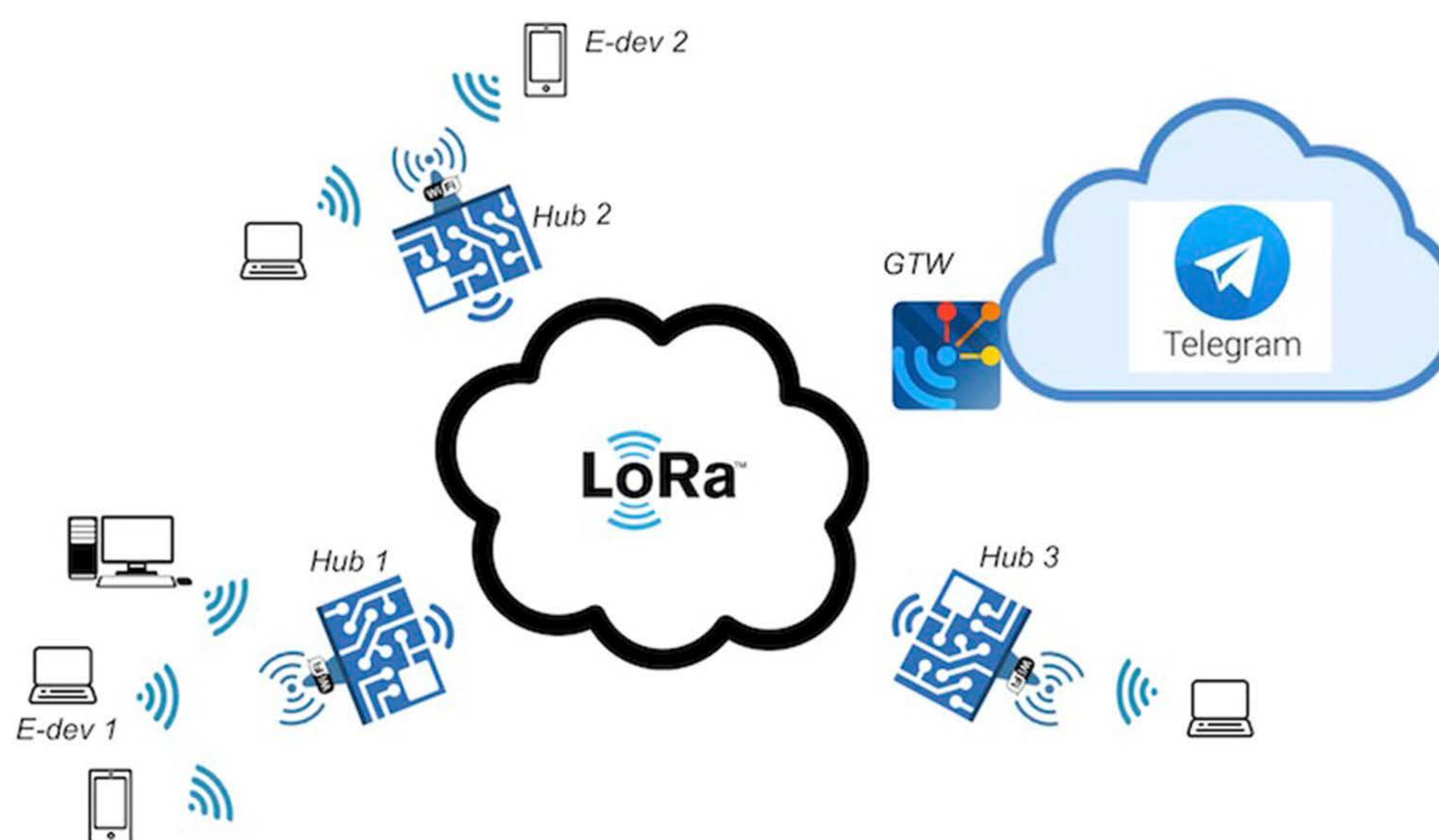
Screen capture of the web based interface.



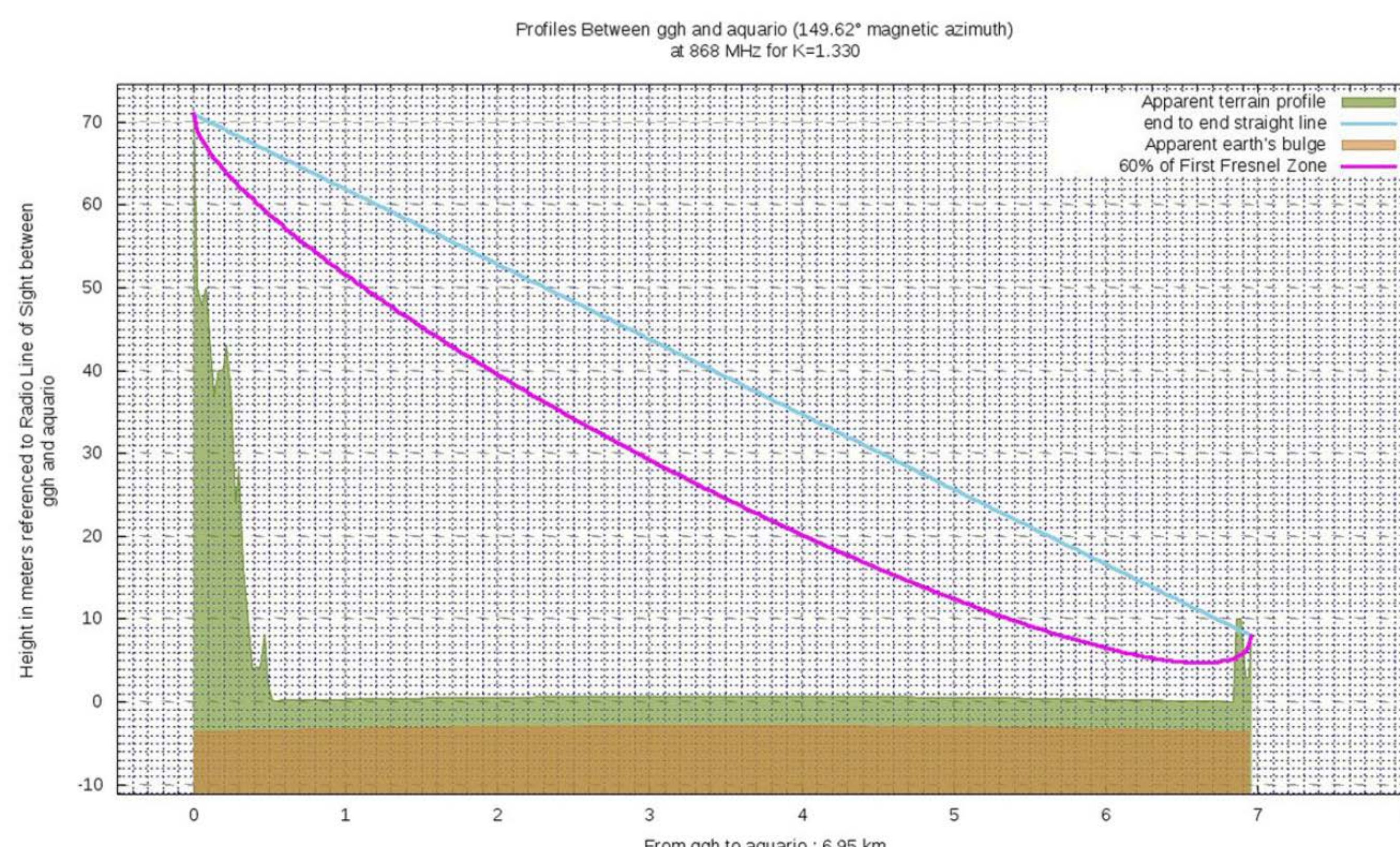
Screen capture of the Telegram Bot.

1	Source addr (8 bytes)			
2	Dest. Addr. (8 bytes)			
3	Seqnum (2B)	Acknum (2B)	flags	Checksum (3B)
4	...data...			
16	...data...			

Structure of the packet used by the stop-and-wait ARQ.



Link between a device on the rooftop of one of the buildings of the ICTP research center in Trieste and the port area of Trieste.



Terrain profile between the two locations.