Table 1 Microprocessors features to be compared

Model	Manufacturer	Max Clock	Architecture	Pins	Power Consumption
MCF54455	Freescale	266 MHz	32 bits	132	672 mW
LM3S8962	Texas Instruments	50 MHz	32 bits	42	158 mW
MSP430F5438A	Texas Instruments	24 MHz	16 bits	87	26,7 mW
PIC24FJ64GB002	Microchip	32 MHz	16 bits	15	37 mW

Table 2 Power consumption according to manufacturer of the main components selected for the seismic acquisition equipment

Type	Manufacturer	Model	Power
Sensor	Input/Output	SM6	0 mW
AD Converter	Texas Instruments	ADS1246 (x3)	6,9 mW
Microprocessor	Texas Instruments	MSP430F5438	26,7 mW
GPS	GlobalTop Technology	FGPMMOPA6H	82,5 mW
RF module	Y-Lynx	YLX-TRM8053-500-05	2145 mW

Table 3 Consumption and autonomy of equipment depending on the selected configuration

Nº channels	Rate of active communications		Sampling	Power	Autonomy 1 pack of batteries	Autonomy 2 packs of batteries
1 channel	Without RF		50 sps / 100 sps	137 mW	117 days	234 days
	With RF	(10 %)	50 sps	355 mW	45 days	90 days
		(18 %)	100 sps	530 mW	30 days	60 days
3 channels	Without RF		50 sps / 100 sps	149 mW	107 days	215 days
	With RF	(27 %)	50 sps	739 mW	21 days	43 days
		(53 %)	100 sps	1307 mW	12 days	24 days

Table 4 Summary of the main features of the designed volcanic seismic acquisition equipment

Number of channels	1, 2, 3 channels
Resolution	24 bits
Sample per second	50 or 100 sps
A/D converter type	delta-sigma (ΔΣ)
Sensor	SM6 of 4.5Hz electronically modified to 1 Hz internal or external sensor
Communication	Radio-Frequency module of 868-870 MHz
Transmission power	Until 500 mW
Memory store	SD memory of 32 GB of 4 class
GPS synchronization	FGPMMOPA6H de GlobalTop Technology
Input range of voltage	3.3V … 11.5V
Current at 3.7V	40 mA
Internal batteries	Li-ion of 3.7V
Autonomy	3,5 months (without communications)
Materials	PVC IP67 box
Dimensions	27 x 24.6 x 12.4 cm
Weight	3,7 kg batteries included
7 months autonomy with a second pack of batteries Possibility to use different type of modules RF GPS configuration to use 1 time/day, 1 time/hour, continuous, or disabled	

Table 5 Seismic acquisition systems comparison

System	Power	Autonomy	Channels	Samples per second	Resolution
Reftek125A of Refraction [6]	375 mW	-	3	25, 50, 100, 125… 1000	24 bits
Unite of Sercel [31]	-	130 hours	3	-	-
Spidernano of Worldsensing [29]	500 mW	5 days	3	250, 500 ,1000	24 bits
Research paper of Harvard, New Hampshire and North Carolina [30]	-	7 days	1	100	24 bits
Designed system	149 mW	215 days	3	50, 100	24 bits