Wireless Seismic Systems – High Expectations Being Achieved*

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Abstract

Much has been written over the last few years heralding the introduction of land seismic systems that are minimum cable or wireless systems. These systems may or may not depend on radio links for executing various operational tasks such as data transmission, status reporting and testing, timing communication, etc. The rationale for the interest in and development of wireless systems has been widely discussed in numerous industry venues. In general, the industry's high expectations have become that these systems will produce several advantages over conventional cable systems while still being unable to overcome some disadvantages, at least in the foreseeable future (Table 1).

This presentation provides fact-based insights into what well-engineered wireless acquisition systems are actually capable of delivering. Four experiences of three operators using a wireless system in the Libyan Desert, under heavy jungle canopy and in shallow water in Papua, across international borders in Argentina and Chile, and over very hilly farmland in Turkey are summarized as to how they meet or do not meet the great expectations. BP was the operator in Libya and Papua, Apache Corporation in Argentina and Chile, and Viking Geophysical Service in Turkey.

All four experiences have concluded that the wireless system employed was more mobile (easier to deploy, roll, and retrieve) and more flexible in layout geometry and less constrained by obstructions than a conventional cable system. Likewise, in all cases the wireless system had environmental benefits over a conventional system. In the two cases where productivity and maintenance were tested, the wireless system proved superior to a cable system. Finally, in the three cases where the operators had a basis for comparison, the wireless system was less expensive to operate than a cable system required doing the same job. The results for the 15 characteristics listed in Table 1 are summarized in Table 2. What is a bit surprising is that the perceived disadvantages have not been as well-supported as might have been anticipated by some. The limited life of batteries and the inability to view data in near-real time were shown to be a non-issue by these examples.

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Apache lost some stations when animals kicked over the recorder. Since a power-saving recording script was being used, the recorder would not turn on without a GPS lock. Despite this, fewer than 2% of the stations failed in the Apache survey, due to all causes. BP in their two projects did not find the GPS lock issue to be a concern.

The four projects described here have provided insight into what wireless systems are delivering today. It is understood that cable-based systems will not be replaced by wireless systems overnight. It is readily apparent, however, that wireless systems are proving to be more cost-effective than cable-based systems and will eventually dominate the industry when it becomes comfortable with not reviewing the seismic data in near-real time.

Expected **ADVANTAGES of Wireless Systems**	
	Specific Advantage
1	More productive
2	More mobile - easier to deploy, roll, retrieve
3	More flexible in layout geometry & less constrained by obstacles & obstructions
4	Easily combinable with cable-based systems
5	Completely expandable
6	Simpler to use
7	More reliable
8	Easier to maintain
9	Comparable in delivered data quality
10	Improved HSE benefits
11	Cheaper to operate

Table 1. Expected Advantages of Wireless Systems and Expected Disadvantages of Wireless Systems.

Expected **DISADVANTAGES of Wireless Systems**	
	Specific Disadvantage
1	Limited life of batteries
2	Inability to deliver data in near-real time
3	Ease of theft of unit
4	Required timelock & location info from satellites

Table 2. Experienced Advantages of Wireless Systems and Experienced(?) Disadvantages of Wireless Systems.