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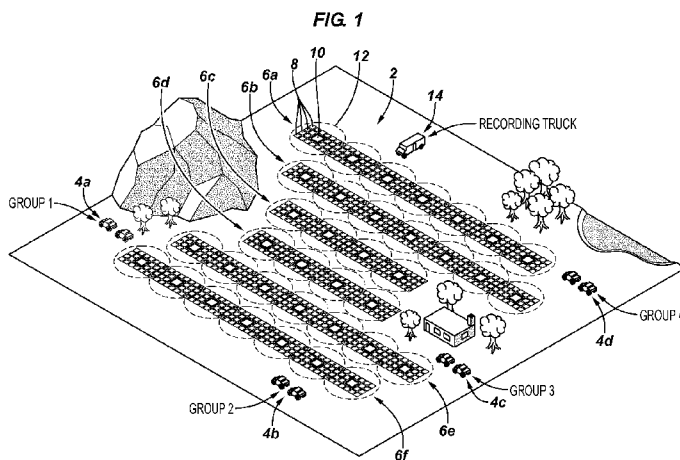
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(54) Title: SYSTEMS AND METHODS FOR SEISMIC DATA ACQUISITION EMPLOYING ASYNCHRONOUS, DECOUPLED DATA SAMPLING AND TRANSMISSION



(57) Abstract: Systems and methods for asynchronously acquiring seismic data are described, one system comprising one or more seismic sources, a plurality of sensor modules each comprising a seismic sensor, an A/D converter for generating digitized seismic data, a digital signal processor (DSP), and a sensor module clock,- a seismic data recording station; and a seismic data transmission sub-system comprising a high precision clock, the sub-system allowing transmission of at least some of the digitized seismic data to the recording station, wherein each sensor module is configured to periodically receive from the sub-system an amount of the drift of its clock relative to the high precision clock.



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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2002/193947 A1 (CHAMBERLAIN DONALD G [CA]) 19 December 2002 (2002-12-19) paragraphs [0005], [0013], [0023], [0033], [0062], [0146], [0154]	1,2
Y	US 2005/047275 A1 (CHAMBERLAIN DONALD G [CA] ET AL) 3 March 2005 (2005-03-03) paragraphs [0014], [0015], [0019], [0046], [0049], [0061]	1,2
A	US 6 002 640 A (HARMON JERALD L [US]) 14 December 1999 (1999-12-14) column 3 - column 4	1,2
A	US 4 281 403 A (SIEMS LEE E ET AL) 28 July 1981 (1981-07-28) abstract	1,2

 Further documents are listed in the continuation of Box C. See patent family annex.

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2002193947	A1	19-12-2002	WO 03102531 A2	11-12-2003
			US 2006018193 A1	26-01-2006
			US 2006018194 A1	26-01-2006
			US 2006007782 A1	12-01-2006
			US 2006018195 A1	26-01-2006
			US 2006018196 A1	26-01-2006
			US 2006002231 A1	05-01-2006
US 2005047275	A1	03-03-2005	NONE	
US 6002640	A	14-12-1999	CA 2238585 A1	15-11-1998
US 4281403	A	28-07-1981	NONE	