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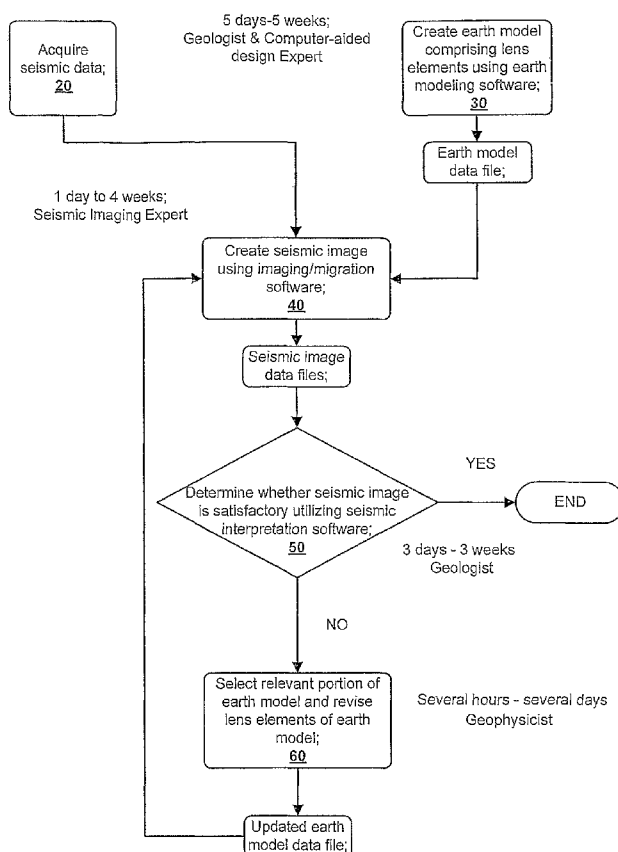
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[Continued on next page]

(54) Title: METHODS FOR EARTH MODELING AND SEISMIC IMAGING USING INTERACTIVE AND SELECTIVE UP-DATING



(57) Abstract: A method for creating an enhanced seismic image is described. Seismic data is acquired from a seismic survey conducted over a subterranean region. The seismic data is transformed into energy components, preferably Gaussian beam components. An earth model is created which is comprised of lens elements. The set of energy components is propagated or migrated through the lens elements to form image components which are combined into a seismic image. A target is identified in the seismic image for image enhancement. Ray tracing may be used to select the trial set of lens elements to be updated and to select a subset of energy components. The subset of energy components is propagated through updated earth model to form updated image components. The seismic image is updated by replacing image components with updated image components which are formed from the subset of selected energy components. This subset is ideally greatly reduced in size relative to the overall number of energy components, i.e., beam components.



FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/31558

A. CLASSIFICATION OF SUBJECT MATTER

IPC: G01V 1/28(2006.01)

USPC: 367/073

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 367/07367/37,61;702/16,18

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 practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Alkhalifah, Tariq. "GAUSSIAN BEAM DEPTH MIGRATION FOR ANISOTROPIC MEDIA." Geophysics, Vol. 60, No. 5 (Sept-Oct 1995), see entire document.	1-9, 11-20
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Y		10
Y	US 5,640,368 A (Krebs) 17 June 1997, see entire document.	10
A	US 4,964,088 A (Chittineni) 16 October 1990.	1-21
A	US 5,260,911 A (Mason et al.) 09 November 1993.	1-21

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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document member of the same patent family

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Continuation of B. FIELDS SEARCHED Item 3:

USPAT; US-PGPUB; USOCR; EPO; JPO; DERWENT; IBM_TDB

seismic,earth,velocity,model,update,ray,cell\$2,path,energy,beam,tracing,imaging,image,migrate,migration,point,directed-aperture