using current telemetry methods is severely limited given the roughly 100KB maximum data transmission rate of current telemetry methods. This, in addition to the shear distance from the surface to the drill bit, often results in a drastic lag time in the geosteering response.

Third, given the slow data transmission rate, the drilling team often is forced to wait until the drill bit actually contacts a surface before taking corrective action. As a result of these lag inducing factors, the wellbores are often tortuous and fail to remain in the optimal section of the reservoir. Fourth, in very layered reservoirs, current geosteering approaches simply lack the precision required to achieve the accuracy necessary for optimal wellbore placement. Lastly, conventional geosteering assemblies are not forward-looking; instead, they simply react to the received downhole data.

Accordingly, in view of these disadvantages, there is a need in the art for a highly-responsive, forward-looking and precise geosteering assembly, thus resulting in optimal placement and quality of the wellbore.

SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided a downhole assembly comprising processing circuitry to geosteer the downhole assembly, the processing circuitry performing a method comprising: determining a modeled well path of the downhole assembly through a formation; determining an actual well path of the downhole assembly through the formation; comparing the modeled well path to the actual well path of the downhole assembly; and adjusting the actual well path of the downhole assembly as necessary to correspond to the modeled well path of the downhole assembly.

According to a second aspect of the present invention, there is provided a geosteering method for a self-guided downhole assembly positioned within a formation, the method comprising: determining a modeled well path of the downhole assembly through the formation; determining an actual well path of the downhole assembly through the formation; comparing the modeled well path to the actual well path of the downhole assembly; and adjusting the actual well path of the downhole assembly as necessary to correspond to the modeled well path of the downhole assembly.

According to a third aspect of the present invention, there is provided a self-guided geosteering assembly comprising: a computer guidance system; a stratigraphic sensing tool electrically coupled to the computer guidance system to determine a characteristic of

formation surrounding the geosteering assembly; an earth location tool electrically coupled to the computer guidance system to determine a location of the geosteering assembly; and a directional controller electrically coupled to the computer guidance system to steer the geosteering assembly in response to signals received from the computer guidance system.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a self-guided geosteering assembly according to an exemplary embodiment of the present invention; and

FIG. 2 is a flow chart illustrating an exemplary geosteering methodology of the present invention.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Illustrative embodiments and related methodologies of the present invention are described below as they might be employed in a self-guided geosteering assembly and method to optimize the placement and quality of wellbores. In the interest of clarity, not all features of an actual implementation or methodology are described in this specification. In addition, the "exemplary" embodiments described herein refer to examples of the disclosed invention. It will of course be appreciated that in the development of any such actual embodiment, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the