

# ALT - FAC 40 - slimhole acoustic televiewer

The tool generates an image of the borehole wall by transmitting ultrasound pulses from a rotating sensor and recording the amplitude and travel time of the signals reflected at the interface between mud and borehole wall. The amplitude of these reflections is representative for the properties of the rock surrounding the borehole. The travel time represents the borehole shape and diameter and is used to provide exceptionally accurate borehole diameter measurements which makes the tool ideal for casing inspection or for uses where a very precise borehole volume measurement is required.

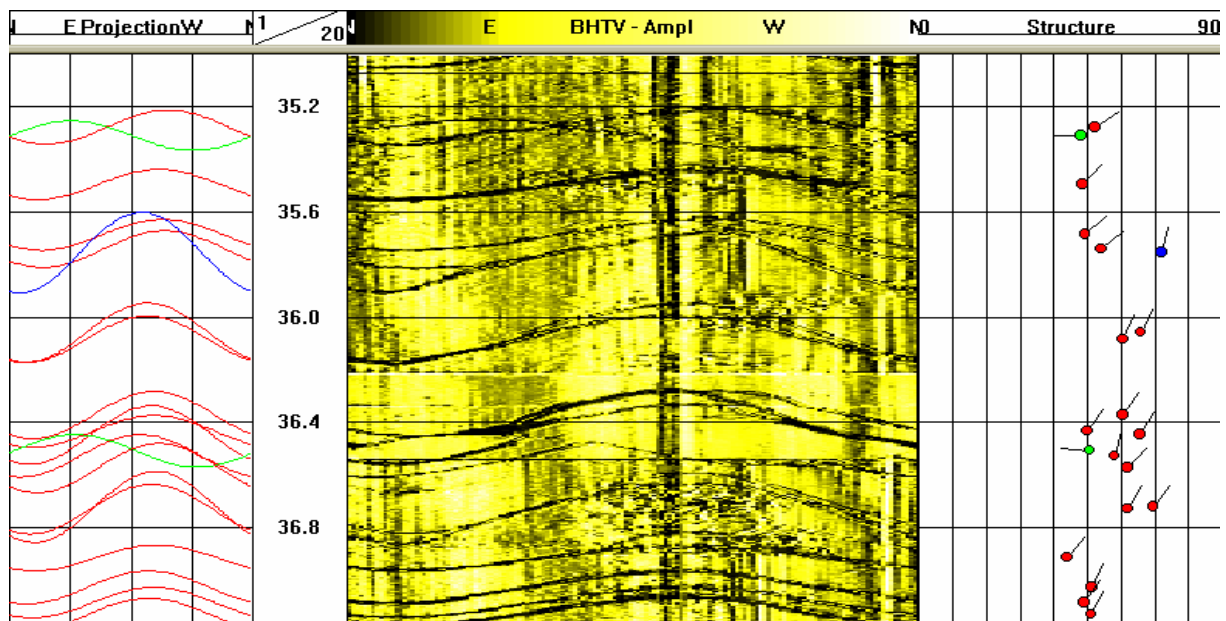
## Applications :

The purpose of the ultrasonic borehole imaging tool is to provide detailed, oriented, structural information on the basis of pulse-echo ultrasonic measurements. Possible applications are:

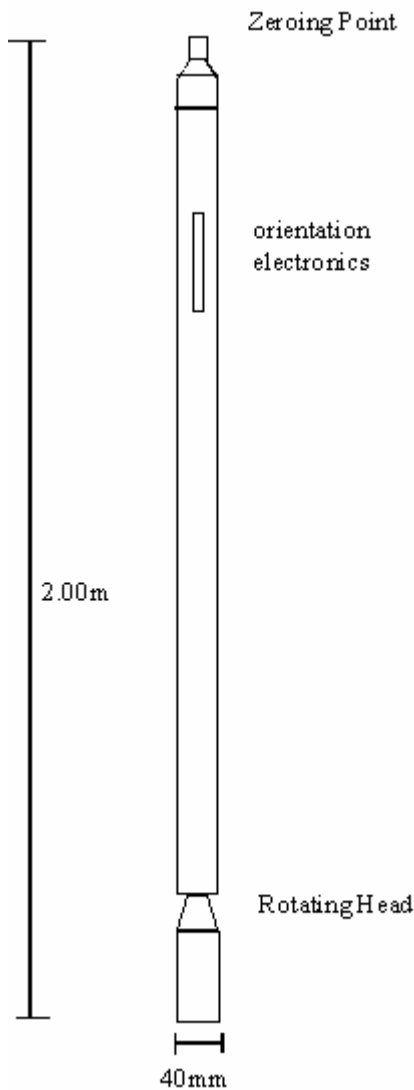
- fracture detection and evaluation
- detection of thin beds
- determination of bedding dip
- lithological characterisation
- casing inspection
- high resolution caliper measurements

## Technical specifications

- diameter 40mm
- frequency 1.4 MHz
- fixed and automatic gain control
- acoustic beam width <3mm x 3mm
- acoustic head 12 revolutions per second max.
- acoustic head 288 samples per revolution max.
- acoustic caliper better than 0.3mm resolution
- variable sample time window offset
- 3 axis magnetometer, 2 accelerometers
- digital data transmission, 250 Kbits per second peak



## Facsimile Acoustic Televiewer



ALT has combined forces with two of Europe's leading applied physics and geophysics institutes; TNO of Delft, The Netherlands and DMT of Bochum, Germany, to bring to market a new technologically advanced, slimhole, borehole acoustic televiewer system. The Facsimile 40 tools represent the culmination of over 10 years experience gained in televiewer design and operations by DMT and state-of-the-art acoustic sensor technology from TNO. This, in combination with ALT's advanced digital communications electronics and data management software, makes the Facsimile system one of the most versatile in its class.

The revolutionary sensor technology enables the tool to achieve superior image resolution over a large effective borehole diameter, ranging from 46mm to plus 400mm, depending upon mud conditions. This factor also means that the tool still delivers good image quality even when ex-

centralised, a feature that is of immense practical value in boreholes where precise centralisation of the tool is difficult to obtain.

Enhanced image resolution is a key feature of the tool made possible by the unique focusing system employed. Features as small as 2mm can be resolved and fractures as small as 0.1mm in width can be detected. Resolution and flexibility is also further enhanced by the ability to change the speed of the transducer smoothly from three, through to twelve revolutions per second and to change the number of samples taken per revolution from as little as 72 up to a maximum of 288. In a varying borehole environment data integrity can also be enhanced by varying the sample time window offset and length, and receiver gain. These factors insure that a high quality 360 degree image is achievable under difficult or varying borehole conditions.

It is worthy to note that the Facsimile tools also include a full orientation device consisting of a precision 3 axis magnetometer and 2 accelerometers, thus allowing for both accurate borehole deviation data to be obtained during the same logging run, and for accurate and precise orientation of the acoustic image.

When a Facsimile tool is combined with the ALT Digital Multi Tool Logging System (ALTLogger) data transmission speeds of up to a tested 250 KBits per second can be achieved. This factor means that for a given sampling rate far greater logging speeds can be achieved. The ALTLogger allows for true multi tasking due to the use of the new 32 bit MS Windows NT operating system as the basic software platform. The system allows any number of applications to link together with the real time data path. The applications may perform any tool specific task including screen display, printing data, conversion to specific formats, save and data processing (through WellCAD for instance). Applications linked to the data path can also be developed by the end user. Applications also do not have to be run on the logging machine but can be run on a remote computer through real time network connection.

The ALT acquisition system has also been designed from the beginning to accommodate a multi tool system. The modular design allows for up to ten tool specific adapters to coexist. From a user's perspective the tool adapters are transparent on the system and changing tools involves no more than selecting the proper configuration file on the logging computer.

## Technical Specifications

<b>Diameter:</b> FAC40	40mm
<b>Length:</b>	2.40m (depending on internal deviation tool configuration)
<b>Max. temp:</b> FAC40	70C
<b>Max. pressure:</b> FAC40	240 bar
<b>Borehole diameter:</b>	46mm - +400mm depending on mud conditions
<b>Gain:</b>	fixed gain, 0-63dB in 1 dB steps or automatic gain control
<b>Frequency:</b>	1.4 Mhz
<b>Beam width:</b>	< 3 x 3 mm
<b>No. of sample/ revolutions:</b>	72, 144, 288
<b>Transducer rotation rate:</b>	3 to 12 Revs/Sec
<b>Orientation:</b>	3 axis magnetometer, 2 accelerometers
<i>inclination accuracy :</i>	<i>+/-0.2 degree</i>
<i>azimuth accuracy :</i>	<i>+/- 5 degree</i>
<i>(accuracy depending on borehole configuration and latitude)</i>	

## Surface Acquisition system

ALTLogger : ALT digital multi-tool logger system (see separate specification sheet for details)

## Software

The presentation and processing software is offered for PC users as a separate module to ALT's WellCAD software

## Software Attributes

- log and log image processing
- log image display
- borehole deviation processing
- log image interpretation for structural analysis (interactive)
- log combination, correlation and presentation
- log depth matching
- log data quality control
- evaluation and presentation of structural data
- derivation of geotechnical parameters
- derivation of hydrogeological parameters
- printing
- combination and correlation with optical core scanner (see separate specification sheet from DMT)
- combination and correlation with optical televiewer data when logging conditions allow
- core orientation
- automatic log classification to derive lithology logs

## Contact information

The Facsimile 40 tool is manufactured by ALT sàrl under licence from TNO. For further information contact ALT at the following address:

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