Capturing Knowledge in SEG-Y_r2.1
Auto-Read via xml file and Inclusion of Positioning Data
AI, ML, workstation, and VDS ready data

Jill Lewis, Past Chair, Technical Standards SEG

1815 – 1852

Augusta Ada King, Countess of Lovelace (*née* Byron)

First Algorithm
(Teacher Mary Somerville)

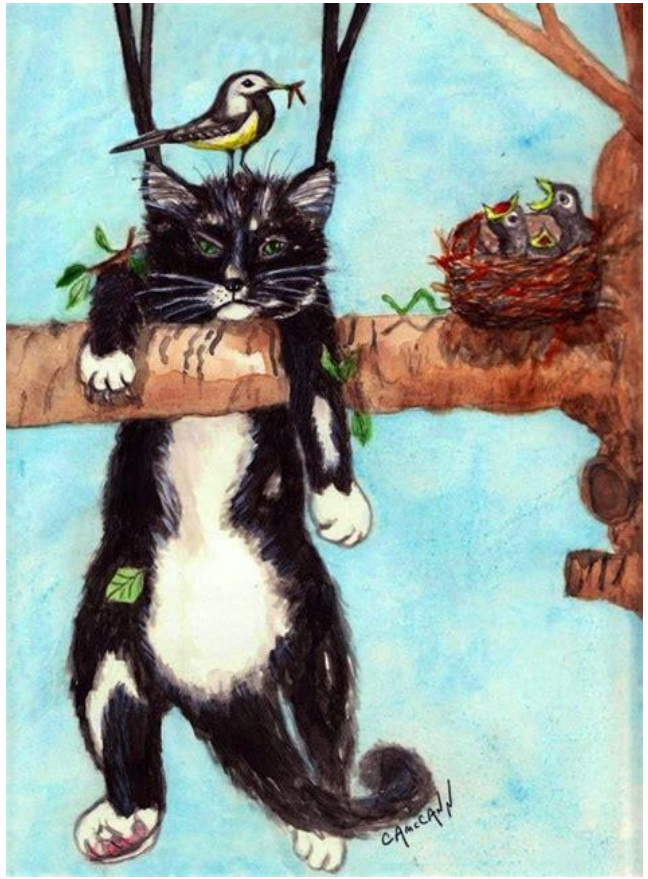
- Jill Lewis – FORMATS - a bit of a hobby you might say
- CEO/M.D. Troika International
- Co-Author SEG formats RODE, SEGY 1, SEGD 2.1, SEGD 3, SEGD 3.1 and SEGY 2.0
- Vice, Chair and Past Chair Technical Standards SEG, Liaison Energistics and IOGP

MOU Signed between SEG and OSDU

THE SEG FORMATS REMAIN THE INTERNATIONAL EXCHANGE STANDARDS

Hoisted By Our Own Petard

- SEGY – 50 Years of Successful Use
- Still fit for purpose – JUST
- SEG-Y_r1 – 22 Years of low level adoption
  - Some header positions used
- SEG-Y_r2 – Six Years of low level adoption
- **SEG-Y_r2.1 – Published**
  - **Captures old data in new format**
  - **Clarifications currently on SEG BaseCamp**



Capturing Knowledge

AI - Artificial Intelligence

ML – Machine Learning

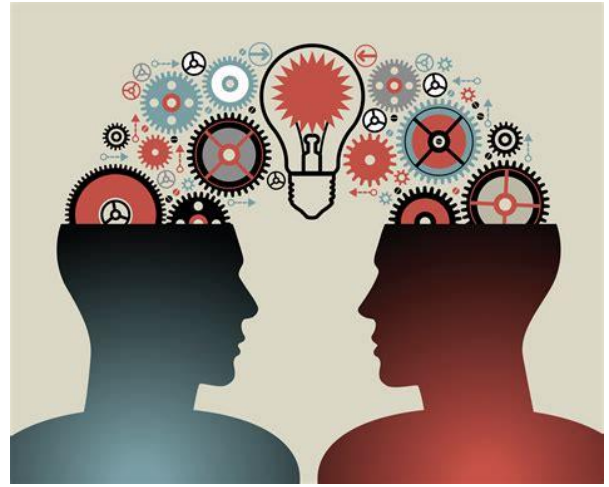
Workstation Loading

VDS / OSDU Ready Data

Position and Samples

in Single Volume

IOGP Direct Involvement



Clarifications have been made

to this Format Revision

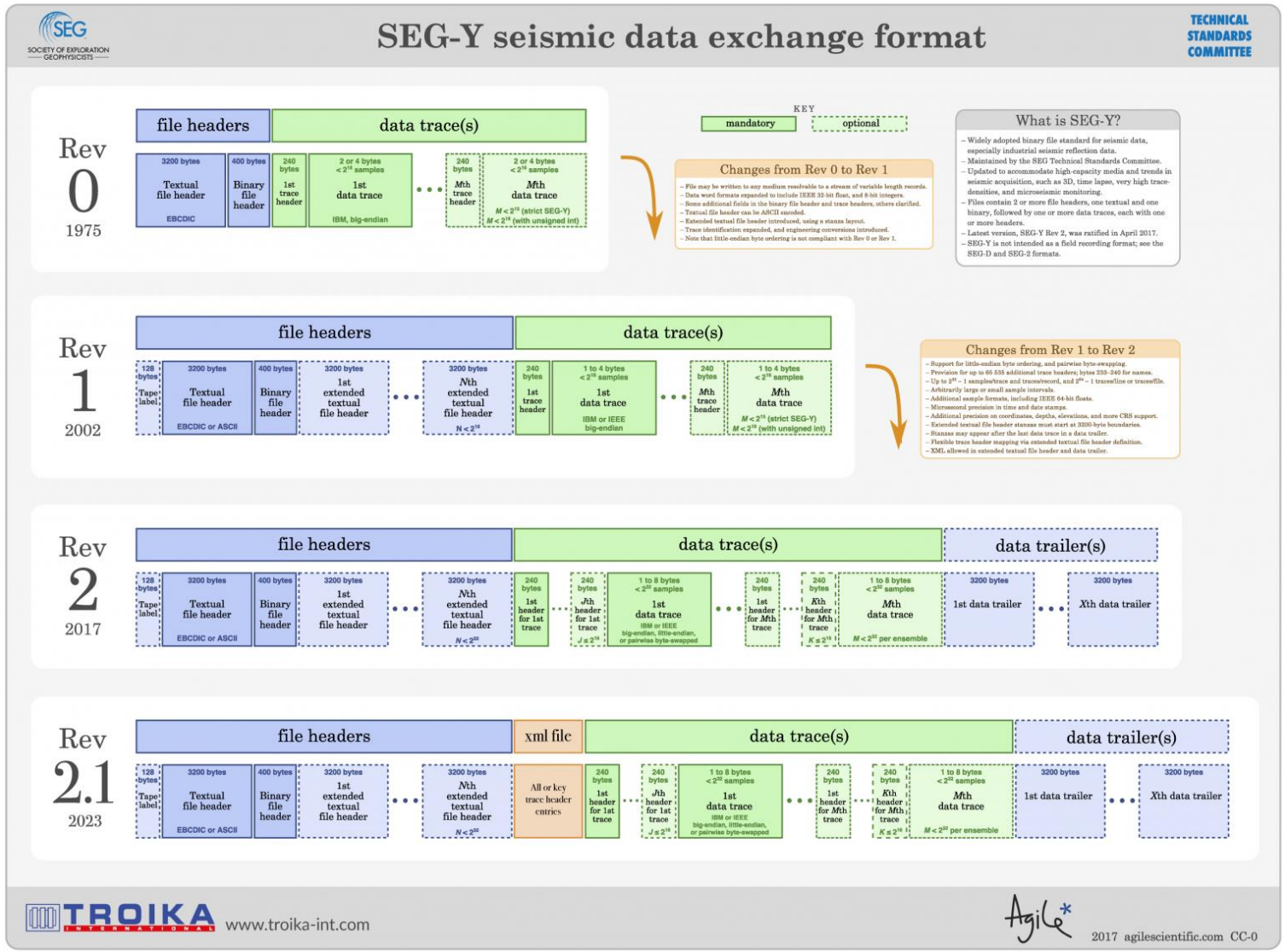
Now Published on SEG BaseCamp

e.g. P1/11 is now referenced via a link

Examples being worked on showing xml files

P6/11, P1/11, SPS and P1/90

Simple Diagram of Updates



Greater Precision

Nanoseconds to add to second of minute – may be negative

IEEE double precision (64bit) microsecond interval

Cable Number for multi-cable acquisition or Recording Device/Sensor ID

SEGY Trace Header Extension 1 –

IEEE double precision: Elevation, Source Depth, Seismic Datum Elevation,

Water Colum, Extended co-ordinates, Extended Distances etc.

Textual Header
(EBCDIC or ASCII)

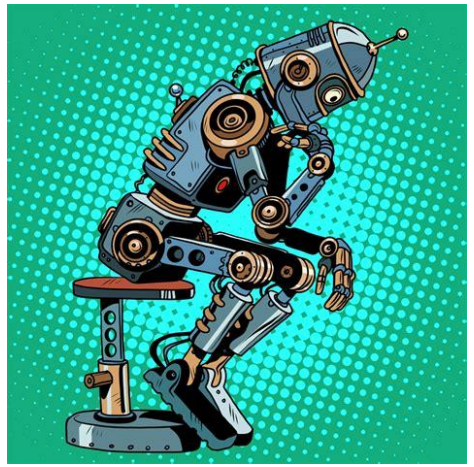
Binary Header
(Flagged for Version Number, All Trace Same Length, Data Type, Additional Textual Headers)

Xml

Positioning Data File

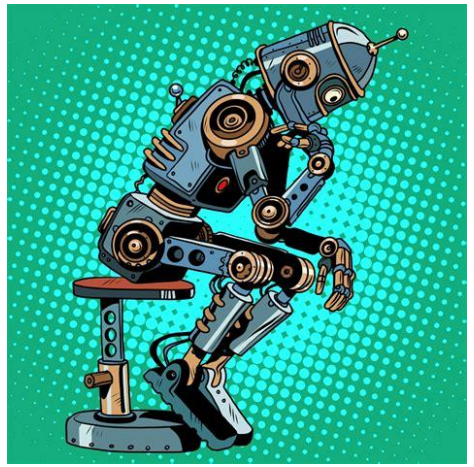
Trace Headers
(With use of XML File Key Trace Header Entries Known)

FOR FIELD DATA



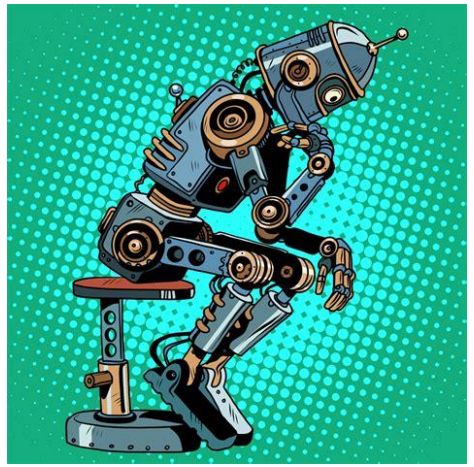
```
<entry name="ffid" byte="9" type="int4"/>
<entry name="chan" byte="13" type="int4"/>
<entry name="espnum" byte="17" type="int4"/>
```

FOR 2D PRE-STACK DATA



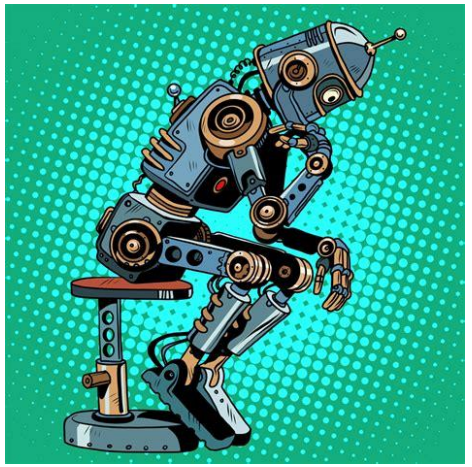
- <entry name="ffid" byte="9" type="int4"/>
- <entry name="chan" byte="13" type="int4"/>
- <entry name="espnum" byte="17" type="int4"/>
- <entry name="cdp" byte="21" type="int4"/>
- <entry name="cdptrc" byte="25" type="int4"/>
- <entry name=”offset” byte=”37” type="int4"/>
- <entry name="co_scal" byte="71" type="int2"/>
- <entry name="sht_x" byte="73" type="coor4"/>
- <entry name="sht_y" byte="77" type="coor4"/>
- <entry name="rec_x" byte="81" type="coor4"/>
- <entry name="rec_y" byte="85" type="coor4"/>
- <entry name="coorunit" byte="89" type="int2"/>

FOR 3D PRE-STACK DATA



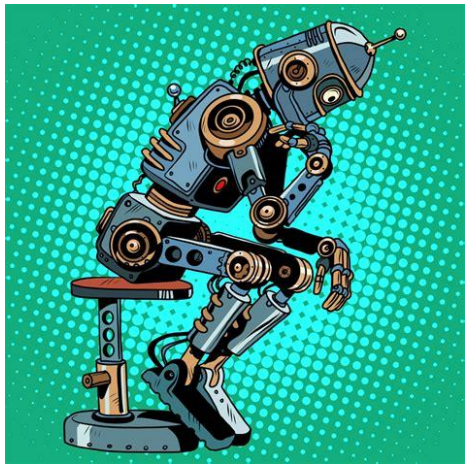
- <entry name="ffid" byte="9" type="int4"/>
- <entry name="chan" byte="13" type="int4"/>
- <entry name="espnum" byte="17" type="int4"/>
- <entry name="cdp" byte="21" type="int4"/>
- <entry name="cdptrc" byte="25" type="int4"/>
- <entry name=”offset” byte=”37” type="int4"/>
- <entry name="co_scal" byte="71" type="int2"/>
- <entry name="sht_x" byte="73" type="coor4"/>
- <entry name="sht_y" byte="77" type="coor4"/>
- <entry name="rec_x" byte="81" type="coor4"/>
- <entry name="rec_y" byte="85" type="coor4"/>
- <entry name="coorunit" byte="89" type="int2"/>
- <entry name=”inline” byte=”189” type=”int4”/>
- <entry name=”xline” byte=”193” type=”int4”/>

FOR 2D POST-STACK DATA



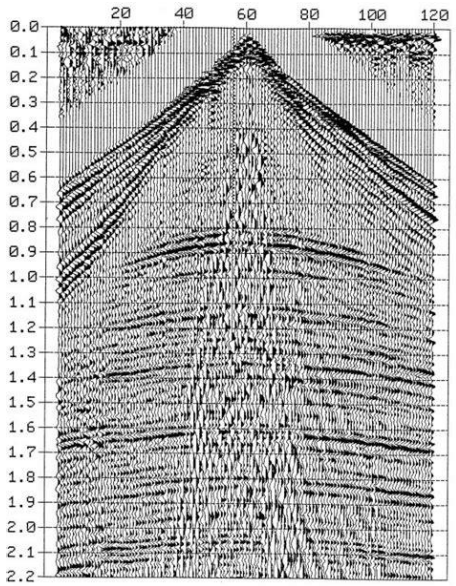
- <entry name="cdp" byte="21" type="int4"/>
- <entry name="co_scal" byte="71" type="int2"/>
- <entry name="coorunit" byte="89" type="int2"/>
- <entry name="cdp_x" byte="181" type="coor4"/>
- <entry name="cdp_y" byte="185" type="coor4"/>

FOR 3D POST-STACK DATA



- <entry name="cdp" byte="21" type="int4"/>
- <entry name="co_scal" byte="71" type="int2"/>
- <entry name="coorunit" byte="89" type="int2"/>
- <entry name="cdp_x" byte="181" type="coor4"/>
- <entry name="cdp_y" byte="185" type="coor4"/>
- <entry name=”inline” byte=”189” type=”int4”/>
- <entry name=”xline” byte=”193” type=”int4”/>

Depending on Data Type but Typically



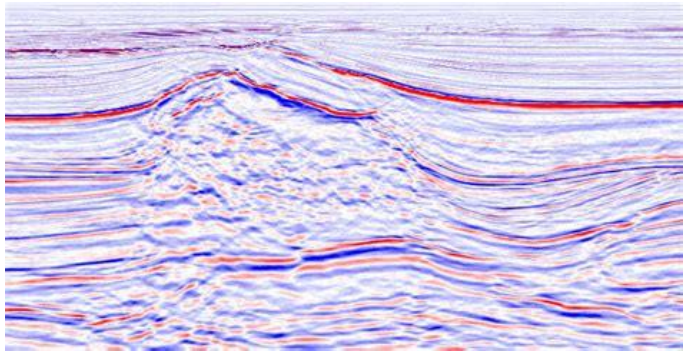
Minimum -2 Binary header items

Flag for format version

Flag for traces lengths all the same

16 items to auto-read

Xml File and Positioning Data



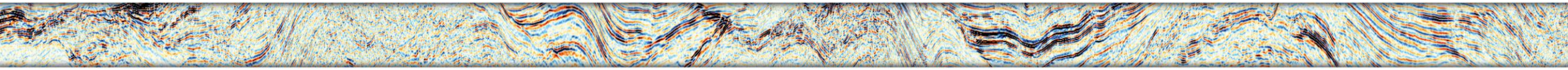
Cloud Ready Data

Random Access to Sample Level

Parallelization of Reading Large Data Volumes

Auto / Computer Readability

Conclusion

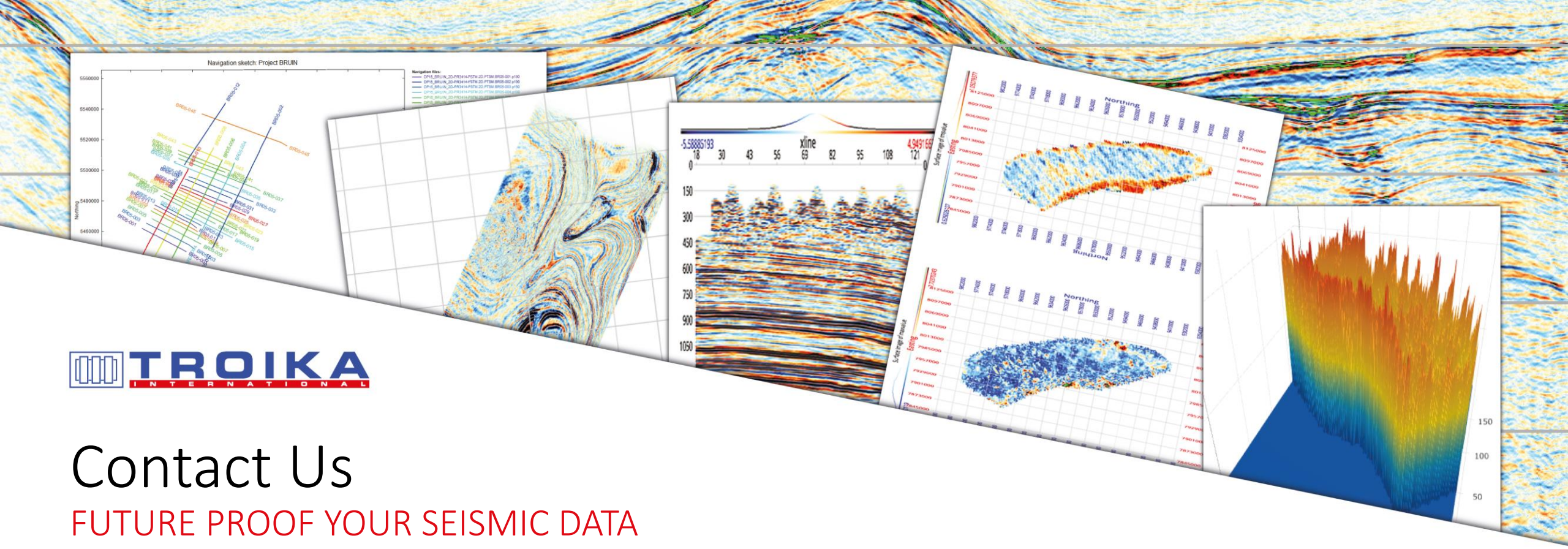


Standards - not difficult just need attention to detail and software to be prescriptive

Open - As an industry open standards are required due overseas contracts and longevity of projects and data

Open - Required for data exchange and to ensure that industry is not entrapped into a proprietary solution, technology is always on the move

Data Integration - The potential is fantastic but let us learn from history



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