Error Model Maintenance Committee Update

Andy McGregor

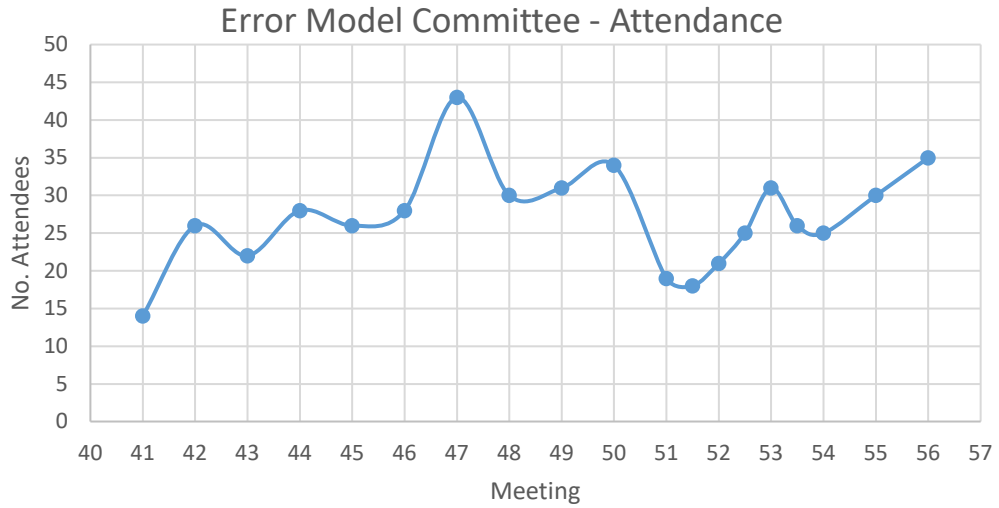
H&P

Speaker Bio

- Andy McGregor
- Technical Director, H&P UK.
  - Inverness, Scotland
  - 25 years in navigation and positioning
  - 18 years in wellbore survey
  - Previously with Tech21, Weatherford, AJC
  - Specialised in survey management, algorithms, error modeling,

Error Model Sub-Committee Meetings

- Two meetings – 13th April and 5th October
- 30 people in person and 5 online yesterday.
- Pre-covid levels

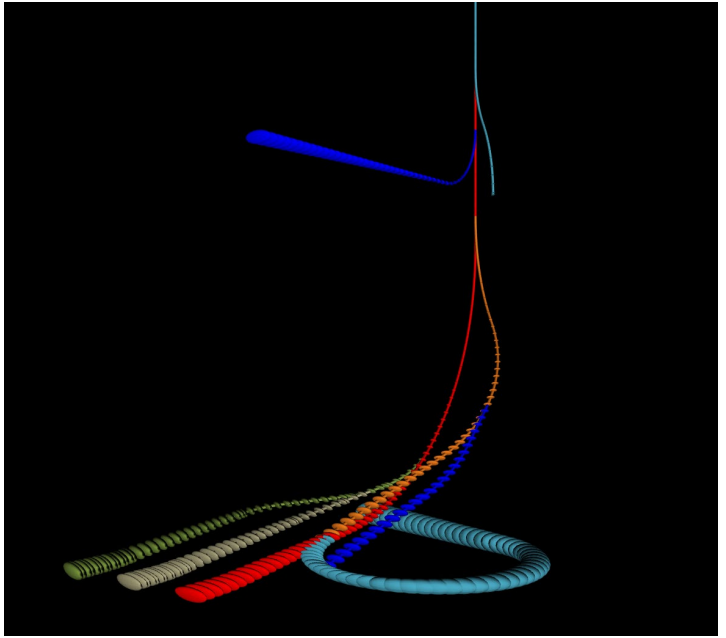


Revision 5 – Website Updates

- Major software teams are starting to implement.
- Presentation created to help explain rational for rev5 to management
- Dated updates to documents, examples, diagnostics etc.
  - Minor corrections to XCLA term (addition of a sin(dAz) term)
  - Conditions on XYM3/4E course length correction only applies for intervals > 0.1m

Other Website Updates

- Recommended practices for handling side-tracks
  - Need full set of agreed diagnostics
  - Additional side-track cases to CA standard set
  - Using rev5 models
  - Continuous gyro and multiple survey legs



Contributors to Error Model

- Addition of Roger Ekseth's thesis (1998) to website
  - One of the foundations for the error model

- Recognise those that made a significant contribution to the development of the error model
- Small group reviewed the literature and identified major milestones
- Also previously ISCWSA had Distinguished Service Awards
  - Web page listing the recipients
- Timeline of ISCWSA achievements
- Importance of cross-industry collaboration

Location Based Geo-mag Uncertainties

- How to identify location based values have been used
- Got deep into audit and issues to do with historic data
- Agreed we need an error model name MWD+XXXX
- So clear in survey program that standard values have not been used.

Relative Instrument Performance Tests

- Jerry Codling presented some comparisons of gyro and MWD
- Identified error characteristics
- Some evidence suggesting misalignments deep in the well could be better modelled
  - XYM1/2 weighting function
- Tentative suggestion that might lead to rev6

Continuous Rotating MWD Weighting Functions

- 6-axis MWD rotating data
- Chad Hanak has derived some new weighting functions
- Terms already in use in SLB model
- Considering adopting into framework
- Derivation to be circulated around major companies who may have similar tools

No	Code	Term Description	Wt.Fn.	Wt.Fn. Source	Type	Magnitude	Units	Prop.	P1	P2	P3
1	ASXY-ROT	MWD: X&Y-Accelerometer Scale Factor	ASXY-ROT	Superior QC	Sensor		-	S	1	0	0
2	AN1	MWD: XY-Shock and Vibe, Term 1	AN1	Superior QC	Sensor		m/s2	R	0	0	0
3	AN2	MWD: XY-Shock and Vibe, Term 2	AN2	Superior QC	Sensor		m/s2	R	0	0	0
4	ANZ	MWD: Z-Shock and Vibe	ANZ	Superior QC	Sensor		m/s2	R	0	0	0
5	AXY-ATTEN	MWD: Accels XY-Attenuation From LP Filter	AXY-ATTEN	Superior QC	Sensor		-	S	1	0	0
6	MSXY-ROT	MWD: X&Y-Magnetometer Scale Factor	MSXY-ROT	Superior QC	Sensor		-	S	1	0	0
7	MXY-ATTEN	MWD: Mags XY-Attenuation From LP Filter	MXY-ATTEN	Superior QC	Sensor		-	S	1	0	0
8	AMXY-PS	MWD:XY-Phase Shift Btwn Mags and Accels	AMXY-PS	Superior QC	Sensor		deg	S	1	0	0
9	EDDY	MWD: XY-Interference from Eddy Currents	EDDY	Superior QC	Mgntcs		deg	S	1	0	0
10	CA1	MWD: XY-Centripetal Accel, Term 1	CA1	Superior QC	Sensor		m/s2	R	0	0	0
11	CA2	MWD: XY-Centripetal Accel, Term 2	CA2	Superior QC	Sensor		m/s2	R	0	0	0
12	DSC	MWD: Depth Shift Compensation	DSC	Superior QC	Sensor		deg	R	0	0	0

Questions