

ISCWSA / SPE Wellbore Positioning Technical Section

Houston, Texas 30th September 2015

Collision Avoidance Work Group (ISCWSA #42)

Attendees:

Steve Sawaryn	Consultant
Darren Aklestad	Schlumberger
Neil Bergstrom	Devon
Adrian Ledroz	Gyrodata
Jon Bang	Gyrodata
Harry Wilson	Baker Hughes
Dalis Deliu	ConocoPhillips
Nestor	ConocoPhillips
Stefan Maus	Magvar
Jonathon Lightfoot	Oxy
Shawn DeVerse	Surcon
Ross Lowden	Schlumberger
Benny Poedjono	Schlumberger
Son Pham	ConocoPhillips
Andy McGregor	Tech21
Roger B. Goobie	BP
Brett Van Steenwyk	Scientific Drilling
Ian Mitchell	Sperry
Jerry Codling	Halliburton
Phil Harbidge	Schlumberger
William Allen	BP
Andy Sentence	Dynamic Graphics
Andy Brooks	Schlumberger
Pete Clark	Chevron

Summary

The WBPTS Well Collision Avoidance subcommittee meeting was held in the George R Brown Conference Centre, Houston, Level 3 Room 310A, on Wednesday 30th September from 13.30 to 17.00. The focus of the meeting was the common Collision Avoidance model.

The meeting overwhelmingly supported the adoption of a single method, rather than any combination and the final vote was: Pedal Curve Method (PCM): 19, Single Covariance Expansion Method (SCEM): 5 making the PCM the selected candidate for further, in-depth technical scrutiny in line with the collision avoidance group's founding principle "*The best technical result needs to be presented regardless of difficulty, and then communicate and train as appropriate*".

The result must be implementable and address the needs of the significant majority of the existing well drilling activities by the industry's 600+ operators and 100+ directional companies. Proposing a model that lacks consistency, or that is unduly conservative will undermine its credibility and lead to its dismissal or rejection by the industry. The work must now begin to fix the deficiencies that have been identified and develop a fully self consistent model.

1. What probability distribution should be adopted (outside normal which has been challenged).
2. Not just a go/no go but also need a numerical value which quantifies the risk. These will be governed by the choice of constants e.g. Confirmation of the number of SDs.
3. Define the limitations of standards, or algorithms.

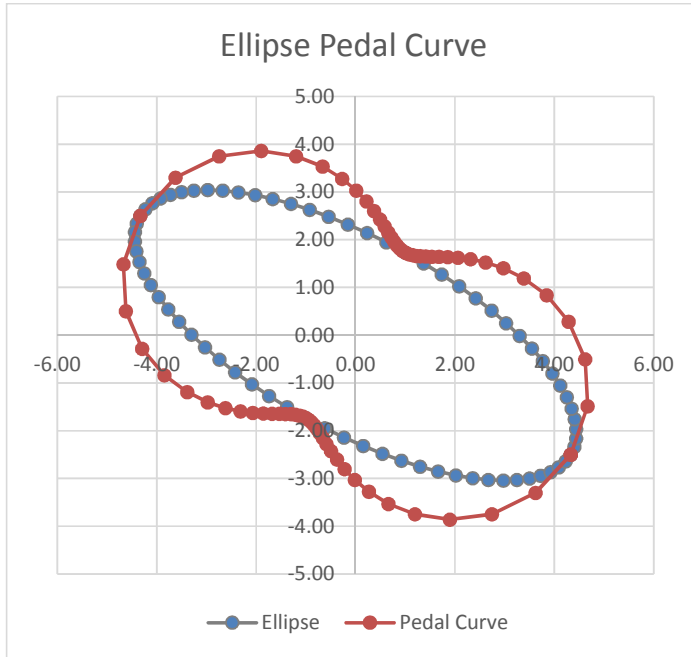


Fig. 1 - Example of an ellipse pedal curve. In some cases the PCM can give unrealistic results, and can be too conservative (related to the lobes between the ellipse and pedal curve).

Results Sub-Group 2

	PCM	SCEM
Tech. & Implementation +ve	Used in most current software	Easy to describe.
“ “ “ “ -ve	Not easy to describe	Used in some software only
Technical +ve	Quantifies Probability of Collision (POC) consistently	Intuitive No anomalous outputs.
“ “ -ve	Not intuitive	Optimistic in terms of probability in some geometries Probability of Collision (POC) is not described consistently
Fixes? (What is needed to fix the deficiencies).	Pick point of interest on offset based on the expansion of the ellipsoid (PCM or not). Education in the presentation and interpretation	

Vote: PCM: 11, SCEM: 2, Both: 0

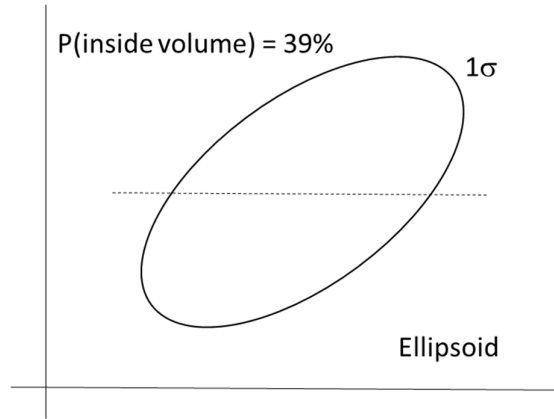
Parking Lot

During the discussion, other topics which arose outside the scope of the immediate discussion were placed in the parking lot.

1. More holistic approach needed
2. SF (Probability) and the number of SDs
3. Allowable distance from the plan
4. Redundancy of the calculation

3D Versus 1D Probabilities

The probability of being within 1 SD in a volume is significantly less than being within 1 SD of a 1D distribution. This influences the interpretation of any results.



Correlation Between Geomagnetic Reference Values

At some point, a decision will be needed on what to set the correlation flag to for global / well correlations.

	Station	Leg	Well
R	0	0	0
S	1	0	0
Per Well	1	1	0
Global	1	1	1 Change to 0?