



# OWSG GENERAL MEETING

July 25, 2023

8:00 am CDT Start Time

Jonathan Lightfoot  
Sub-Committee Chair

# AGENDA

- OWSG Mission & Anti-Trust
- Combined Surveys and Related Quality Control
- Upcoming Events
  - API RP78 Ballot Mtg.
  - IADD Rotary Steerable Technical Forum
  - IADD Annual Technical Forum (Abstract Call)
  - IADC TPC 2023 Annual Meeting
- Open Discussion Session





## 8 Attendees – July 25, 2023

Name	Operator Affiliation	Email
Jonathan Lightfoot	Oxy	<a href="mailto:Jonathan_lightfoot@oxy.com">Jonathan_lightfoot@oxy.com</a>
Marianne Houbiers	Equinor	<a href="mailto:mhou@eqinor.com">mhou@eqinor.com</a>
Kevin Sutherland	Chevron	<a href="mailto:Kevin.Sutherland@chevron.com">Kevin.Sutherland@chevron.com</a>
Pete Clark	Chevron	<a href="mailto:peterjclark@chevron.com">peterjclark@chevron.com</a>
David Baker	ConocoPhillips	<a href="mailto:David.Baker@conocophillips.com">David.Baker@conocophillips.com</a>
William (Bill) Allen	BP	<a href="mailto:William.Allen@bp.com">William.Allen@bp.com</a>

Name	Affiliation	Email
Marc Willerth	HP Tech	<a href="mailto:Marc.Willerth@hpinc.com">Marc.Willerth@hpinc.com</a>
Jerry Codling	Halliburton	<a href="mailto:Jerry.Codling@halliburton.com">Jerry.Codling@halliburton.com</a>



## Our Mission

To promote practices that provide confidence that reported wellbore positions are within their stated uncertainty.



# Anti-Trust

*We are meeting to help develop and promote good practices in wellbore surveying necessary to support wellbore construction which enhance safety and competition.*

*The meeting will be conducted in compliance with all laws including the antitrust laws, both state and federal. We will not discuss prices paid to suppliers or charged to customers nor will we endorse or disparage vendors or goods or services, divide markets, or discuss with whom we will or will not do business, nor other specific commercial terms, because these are matters for each company or individual to independently evaluate and determine.*

# Combined Surveys (Discussion)

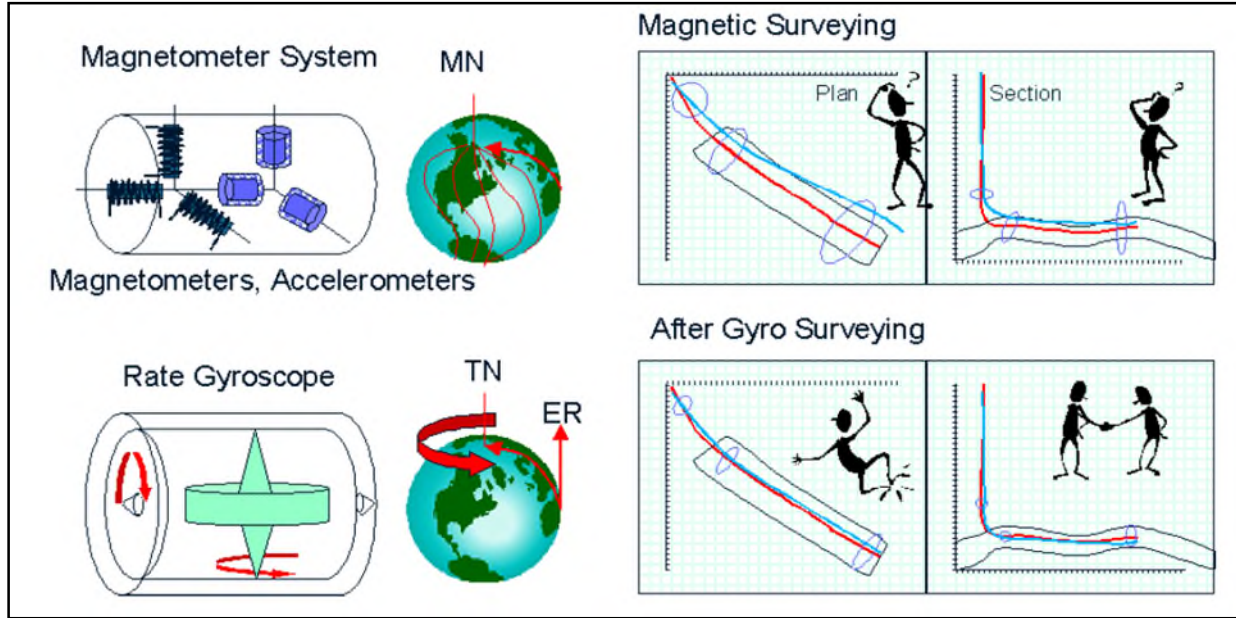
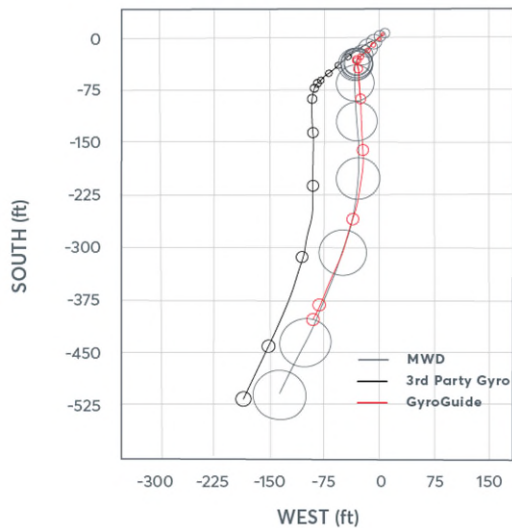


Image Courtesy of Landmark Graphics

# Combined Surveys (Discussion)

## ELLIPSE OF UNCERTAINTY (EOU) COMPARISON



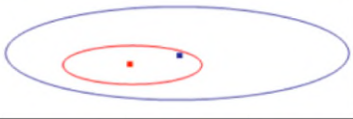
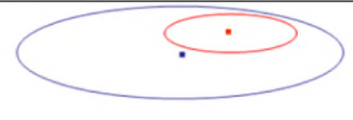
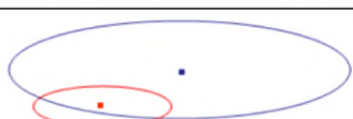
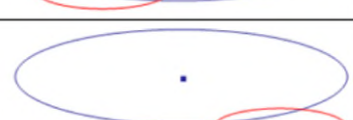

- [E&P Drilling: Gyroscopic Surveying Improves Wellbore Placement in Latin America | Hart Energy](#)

EXPLORATION & PRODUCTION | DRILLING

## E&P Drilling: Gyroscopic Surveying Improves Wellbore Placement in Latin America

Ensuring a well's trajectory makes high-accuracy wellbore surveying one of the most critical aspects of operational and financial success.

# Combined Surveys (Discussion)

Level of Agreement	Description of Agreement Level	Pictorial Description of Agreement Level	Action
Very Good	MWD ellipse fully encompasses gyro ellipse and gyro ellipse encompasses centre of MWD ellipse		No further investigation needed
Good	MWD ellipse fully encompasses gyro ellipse but gyro ellipse does not encompass centre of MWD ellipse		No further investigation needed
Average	MWD ellipse does not fully encompass gyro ellipse but overlaps with it. The centre of the gyro ellipse lies inside the MWD ellipse		No further investigation needed
Poor	MWD ellipse does not fully encompass gyro ellipse but overlaps with it. The centre of the gyro ellipse lies outside the MWD ellipse		Investigate – if unresolved consider re-survey
Unacceptable	Ellipses do not overlap		Re-survey immediately and investigate

- Pictorial Description of Agreement Level
- Action Required (When to Investigate)
- Agreement Levels
- What about Combined Surveys?

de Wardt, John P, Mullin, Steve , Thorogood, John L, Wright, John , and Robert Bacon. "**Well Bore Collision Avoidance and Interceptions - State of the Art.**" Paper presented at the SPE/IADC Drilling Conference, Amsterdam, The Netherlands, March 2013. doi: <https://doi.org/10.2118/163411-MS>





# Combined Surveys and Quality Control (Discussion)

- Any Operators Currently Implementing
- Hurdles to partial or full adoption
- Redundant Survey Public Database to support this survey method
- Opportunity for industry code sharing
- QC Analysis Roadmap of Combined Surveys (SPE 199554 & SPE 105558)
- MAP (Most Accurate Position) Procedure (slb)
  - Survey averaging and EOU Reduction



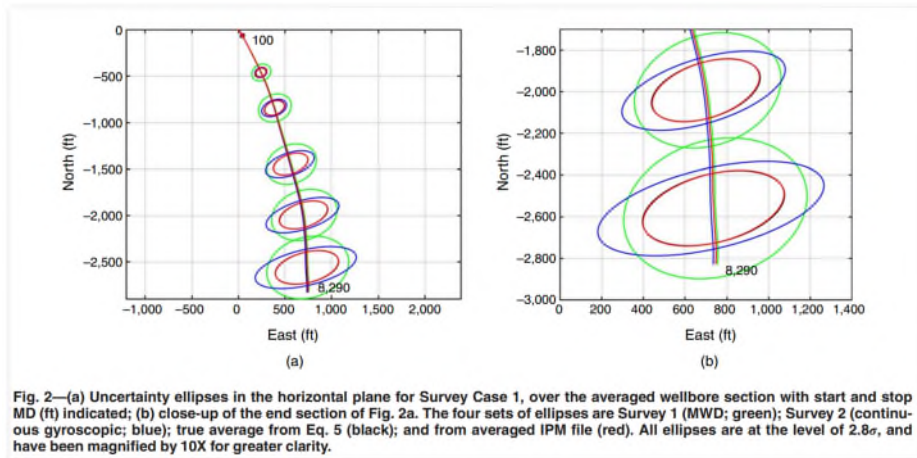
# Combined Surveys and Quality Control (Publications)

- Combined Surveys (Technical Resources)
  - Bang, Jon , Ali, Tarig , and Adrián Ledroz. "**Practical Method to Benefit from the Improved Accuracy of Combining Overlapping Wellbore Surveys.**" Paper presented at the SPE Norway One Day Seminar, Bergen, Norway, May 2019. doi: <https://doi.org/10.2118/195621-MS>
  - Weston, John , and Adrián Ledroz. "**The Combination of Solid-State Gyroscopic and Magnetic Surveys Provides Improved Magnetic-Survey Data and Enhanced Survey Quality Control.**" *SPE Drill & Compl* 35 (2020): 014–025. doi: <https://doi.org/10.2118/194130-PA>
  - Ali, Tarig , Ledroz, Adrián , Weston, John , and William Allen. "**Validation of Error Models – A Key Component of Risk Mitigation in Wellbore Collision Challenges.**" Paper presented at the IADC/SPE International Drilling Conference and Exhibition, Galveston, Texas, USA, March 2020. doi: <https://doi.org/10.2118/199554-MS>
  - Ekseth, Roger, Torkildsen, Torgeir, Brooks, Andrew, Weston, John, Nyrnes, Erik, Wilson, Harry, and Kazimir Kovalenko. "**High-Integrity Wellbore Surveys: Methods for Eliminating Gross Errors.**" Paper presented at the SPE/IADC Drilling Conference, Amsterdam, The Netherlands, February 2007. doi: <https://doi.org/10.2118/105558-MS>
  - ElGizawy, Mahmoud, Lowdon, Ross, Aklestad, Darren, Strain, Paul, and Fraser Boyce. "**Combining Best-in-Class Surveying Measurements to Provide the Most Accurate Wellbore Position.**" Paper presented at the SPE/IADC International Drilling Conference and Exhibition, Stavanger, Norway, March 2023. doi: <https://doi.org/10.2118/212547-MS>
  - ElGizawy, Mahmoud , Aklestad, Darren , and Ross Lowdon. "**Step Change in Wellbore Positioning Accuracy.**" Paper presented at the SPE/IADC Middle East Drilling Technology Conference and Exhibition, Abu Dhabi, UAE, January 2018. doi: <https://doi.org/10.2118/189432-MS>
  - [25.1 Combined Surveys - Introduction to Wellbore Positioning Web - 1 \(manula.com\)](#)

# Combined Surveys and Quality Control (IPM Development)

- Combined Surveys (Technical Resources)
  - [SA-DC##160021 307..316 \(silverchair.com\)](http://silverchair.com/SA-DC##160021307..316)

[New Instrument Performance Models for Combined Wellbore Surveys: A Move Toward Optimal Use of Survey Information | SPE Drilling & Completion | OnePetro](#)



## New Instrument Performance Models for Combined Wellbore Surveys: A Move Toward Optimal Use of Survey Information

Adrián Ledroz, Jon Bang, and John Weston, Gyrodata

NOVEMBER 02 2016

### New Instrument Performance Models for Combined Wellbore Surveys: A Move Toward Optimal Use of Survey Information ✓

Adrián Ledroz; Jon Bang; John Weston

SPE Drill & Compl 31 (04): 307–316.

Paper Number: SPE-178826-PA

<https://doi.org/10.2118/178826-PA> Article history



# Combined Surveys (ISCWS eBook)

For many years, we have taken MWD surveys then perhaps run a gyro afterwards and thrown away the MWD and replaced it with the gyro. There is no need to waste data like that. One of the simple rules of statistics is that the standard deviation of a combined measurement is the square root of the sum of the squares of the individual measurements divided by the number of measurements.

$$\sigma_c = \sqrt{\frac{\sigma_1^2 + \sigma_2^2 + \sigma_3^2 + \sigma_4^2 + \dots + \sigma_n^2}{N}}$$

In other words, if we had two similarly accurate instruments which we could demonstrate were uncorrelated in their error sources and we took an average of their observations, the uncertainty would reduce by 1/1.414 or approximately 30% reduction. On certain high accuracy jobs, we can combine multiple gyro runs along with the MWD, (in-runs and out-runs) and fit a best fit curve through the data to produce a synthetic trajectory which is more accurate than any of the original surveys on their own. Right now, we don't have a formal error model for combined surveys, but it would not be difficult to derive as it would simply be a combination of the covariance matrices of the individual surveys. Nevertheless, it is often very worthwhile to combine the available surveys just to improve confidence in the well path position even if we do not see the benefit in the calculated ellipse of uncertainty.

[Acknowledgements - Introduction to Wellbore Positioning Web - 1 \(manula.com\)](https://www.iscwsa.net/media/files/page/f1c1e97e/introduction-to-wellbore-positioning-ebook-v9-10-2017.pdf)

<https://www.iscwsa.net/media/files/page/f1c1e97e/introduction-to-wellbore-positioning-ebook-v9-10-2017.pdf>



# Upcoming Events



# API RP 78 Wellbore Positioning and Surveying

- 4<sup>th</sup> Technical Draft Complete
- Posted on RP78 Task Group SharePoint Site
- Balloting Process Meeting (Virtual & In-Person)  
Location: API Hosted @ Lone Star College University Park
- Meeting Date: Thursday July 27, 2023 (9 am to Noon)
  - Will Tank (Chair)
  - Jonathan Lightfoot (Vice-Chair)
  - Ben Coco (API Task Group Leader)
  - Pete Clark (Technical Advisor)

# API RP 78 Task Group Meeting – Lone Star College

### CONFERENCE CENTER RESERVED PARKING LONE STAR COLLEGE UNIVERSITY PARK CAMPUS—281.290.2872

Commons/Conference Center Parking: 20515 SH 249  
Houston, TX 77070

**From Beltway 8 via SH 249:**  
Take Compaq Center Drive Exit to Entrance #3 Overpass  
Go through 2 traffic Lights, turn right after 2nd light

**From Tomball via SH 249:**  
Turn Right at Entrance #3  
Go through 2 traffic Lights, turn right after 2nd light

**From Louetta Road:**  
Take Entrance #11  
Go through 2 Traffic Lights  
Make U-turn at 2nd Light, Turn Right after making U-turn

Park in CCP lot, using surface lot or underground garage. **DO NOT PARK IN RESERVED SPACES.** Walk up covered breezeway, Conference Center on left, Overflow parking in PG 10.

**CCP: Reserved Conference Center Parking**  
(Underground Parking also available—No Elevator Access, Stairs Only)

**C: Commons/Conference Center Building—1st Floor**  
**PG 10: Parking Garage 10 (Overflow/Staff)**

### LONE STAR COLLEGE—UNIVERSITY PARK Conference Center Map

Walk from Conference Center Parking Lot. Remember to display your Parking Pass.





- Society of Petroleum Engineers
  - [Annual Technical Conference and Exhibition 2023](#)
    - San Antonio, Texas, USA
    - 16-18 October 2023
    - ISCWSA Sub-Committee Meetings – October 18<sup>th</sup>, 2023
    - [ISCWSA Meeting 58 - October 19<sup>th</sup>](#)

## [Event - ISCWSA #58 - San Antonio, Texas](#)

OCT. 18 - OCT. 19, 2023

ISCWSA #58 - San Antonio, Texas

San Antonio

San Antonio, Texas  
United States of America

### DESCRIPTION

The 58th General Meeting of the ISCWSA will be held in San Antonio, Texas in conjunction with the SPE ATCE.

The General Meeting is planned to take place on Thursday October 19th, with Sub-committee workgroup meetings on Wednesday October 18th. Please communicate with the appropriate Subcommittee Chair to volunteer.

If you would like to make a presentation, please submit your Abstract to the Program Chair using the link in the top bar of this webpage.

We are also looking for SPONSORS for this event. Please contact us directly if you would like further information on how to sponsor this event which will showcase your commitment to best practices in Wellbore Positioning, to the most important people in the world - YOUR customers.

Return here for more details as they become available.

### DATE AND TIME

Wed, Oct. 18

-

Thu, Oct. 19, 2023

### LOCATION

San Antonio

San Antonio, Texas  
United States of America





- IADD Upcoming Events

- Rotary Steerable Technical Forum – August 31, 2023
- Some Like it Hot – September 21, 2023
- Annual Technical Forum (ATF) – October 25 & 26

## Rotary Steerable Technical Forum (iadd-intl.org)

7:30 to 9 a.m.: Registration; Inside Exhibits open; Breakfast

9 to 9:30 a.m.: Welcome; “What is a Rotary Steerable?” Cale Haas – Valence

9:30 to 9:50 a.m.: History of Rotary Steerables; how far we’ve come

9:50 to 11 a.m.: Session 1: Operators Panel: what’s keeping us from moving forward to the next performance breakthrough; what would you like to see going forward?  
Calen Collins – Oxy & Nick Goree - Earthstone Energy

11 a.m. to 12:30 p.m.: Lunch; Inside Exhibits open; RSS State of the Union Address  
David Bat – Kimberlite Research

12:30 p.m. to 1:15 p.m.: Session 2: Drilling Towards Performance/Pushing the Limits

1:15 to 2:30 p.m.: Session 3: Failure Prevention/Increasing Reliability

2:30 to 3 p.m.: Break; Inside Exhibits open

3 to 4:15 p.m.: Session 4: case studies with operator co-speaker

4:15 to 4:30 p.m.: Wrap up

4:30 to 7:30 p.m.: Happy Hour; outside exhibits open



**Date: Thursday, August 31, 2023**

**Location:**

**Downtown Aquarium Landry's  
410 Bagby St,  
Houston, TX 77002**

## Some Like It Hot Geothermal Drilling Technical Forum

- Date: Thursday, September 21, 2023
- Location:  
Nabors Industries Ltd.  
515 Greens Rd Ste 1200  
Houston, TX 77389





IADD Annual Technical Forum  
(2-Day Event)  
Call for Presentation Abstracts  
October 25<sup>th</sup> & 26<sup>th</sup>

Oxy Woodlands Tower Conference Center  
Steering Committee Participation  
Exhibition (Limited Space)

A promotional poster for the IADD Annual Technical Forum. The background is dark blue with a silhouette of an oil rig on the right and a network of white lines and hexagons on the left. The text is in white and green.

**ANNUAL TECHNICAL FORUM**  
Save the Date | October 25-26, 2023

Oxy - The Woodlands  
1201 Lake Robbins Dr,  
The Woodlands, TX 77380

The logo for IADD, International Association of Directional Drilling, featuring the acronym 'iadd' in a stylized font with a globe icon and the full name below it.



## IADC Technical Publications Committee (TPC) 2023 Annual Meeting

San Luis Resort  
5222 Seawall Blvd.  
Galveston, TX 77551  
Thursday – Friday, October 12<sup>th</sup> & 13<sup>th</sup>

Seeking Volunteers  
Contact Mary Dimataris if you would like to attend,  
[mdimataris@outlook.com](mailto:mdimataris@outlook.com)



# Practical Wellbore Hydraulics and Hole Cleaning

The latest IADC DrillingIN Video Podcast features Mark Ramsey discussing his book: *Practical Wellbore Hydraulics and Hole Cleaning*.

<https://www.youtube.com/watch?v=PZHhY1HztfE&pp=ygUWRHJpbGxpbnmdpbiBtYXJrIHJhbXNleQ%3D%3D>



# Discussion Future Topics Questions



# Thank you

Next OWSG Meeting: September 26, 2023