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The best just got better: DUG releases supercharged results from elastic MP-FWI imaging technology

DUG has released the latest results from its elastic multi-parameter full waveform inversion (MP-FWI) imaging technology via major industry publications worldwide.

DUG Elastic MP-FWI Imaging is not only a complete replacement for the traditional processing and imaging workflows, it also replaces the subsequent inversion workflow for elastic rock properties. It is a unique approach to seismic processing and imaging which turns the traditional paradigm on its head.

In 2022 DUG launched its revolutionary MP-FWI imaging solution. Over 70 successful projects from all over the world have since been completed. The industry is now at the dawn of a new, even more exciting era — an era where elastic least-squares imaging is a reality!

The traditional processing workflow involves the testing and application of dozens of steps such as deghosting, designature, demultiple and regularisation, which are all designed to overcome the limitations of conventional imaging. These workflows are complex, subjective, and very time-consuming due to their serial nature and they rely on many assumptions and simplifications. All of these issues impact the output data quality. The resulting, primary-only data then undergoes a similarly complex model-building workflow to derive an estimate of the subsurface velocity, which is used for depth imaging. Post-migration processing is performed before the pre-stack reflectivity undergoes another workflow to derive rock properties that feed into interpretation, also relying on simplifications of the actual physics. As a result of these workflows projects can take many months to years to complete.

“Elastic MP-FWI Imaging accounts for both compressional and shear waves, handling variations in seismic wave dynamics as a function of incidence angle, including in the presence of high impedance contrasts and onshore near-surface geological complexity,” said Tom Rayment, DUG Chief Geophysicist. “Multiples and converted waves are now treated as valuable additional signal, increasing sampling, resolution and constraining the inverted parameters.”

DUG Managing Director, Dr Matthew Lamont, added: “We have invested over a decade of R&D to realise this opportunity. Our new Elastic MP-FWI Imaging technology is the product of a multi-year, significant and ongoing R&D effort, which has seen the continuous integration of complete-physics FWI imaging including viscoelasticity, anisotropy and multi-parameter updates. When using the full wavefield for simultaneous velocity model building, rock property inversion and true-amplitude imaging, a multi-parameter solution is a necessity.”

As well as three-component reflectivity and velocity, DUG Elastic MP-FWI Imaging enables the estimation of fundamental rock properties like P-impedance, density and Vp/Vs from field data, without the need for a secondary amplitude variation with angle (AVA) inversion step. DUG Elastic MP-FWI Imaging simultaneously resolves not only subsurface structural features but also quantitative rock property information while avoiding the need for extensive data pre-processing and (post-imaging!) AVA-inversion workflows.

“The fact that DUG MP-FWI Imaging is delivering material imaging uplifts using field-data input is very powerful, but to couple this with high-resolution elastic rock property outputs for quantitative interpretation is even more exciting, providing immediate opportunities for new surveys and maximising the value of legacy datasets,” said Martin Stupel, Geophysical Manager, Geophysical Pursuit Inc.

To learn more about DUG Elastic MP-FWI Imaging, visit dug.com/fwi

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About DUG

DUG Technology represents the convergence of scientific excellence and sustainable computing innovation. The company's journey from applied physics specialists to global technology leaders has been marked by continuous breakthroughs in geoscientific computing, including its revolutionary elastic multi-parameter FWI imaging solution. DUG enables organisations worldwide to tackle their most complex data challenges through its reliable cloud-based network of high performance computing facilities, proprietary software solutions, energy-efficient immersion cooling systems and tailored geoscience services.

Delivering a comprehensive geoscience offering backed by over two decades of experience, bespoke support, and a focus on R&D, DUG maximises the value of seismic data enabling clients to minimise risk and make more-informed decisions.

The company's novel immersion cooling technology is sold globally as part of an exclusive licence agreement and is the cornerstone of DUG's mobile, edge-computing solution.

Headquartered in Australia, with offices in Perth, London, Houston, Kuala Lumpur and Abu Dhabi, DUG continues to expand its impact across six continents and diverse industries, remaining committed to delivering sophisticated innovations that drive scientific progress, environmental sustainability and commercial success for its customers.

To learn more, please visit www.dug.com