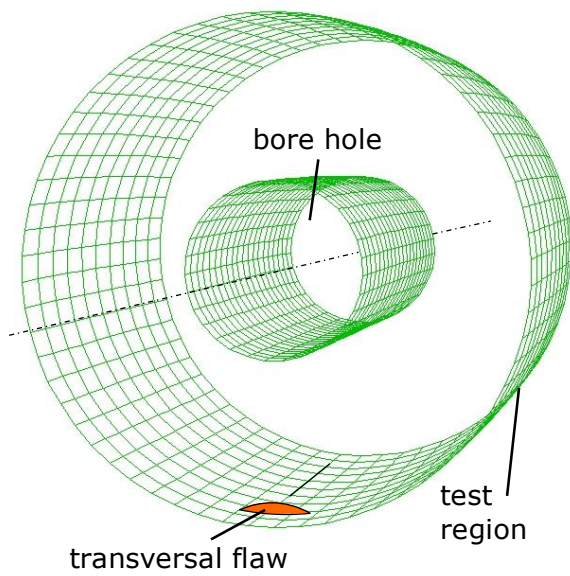


High speed ultrasonic axle inspection using a phased array with an electronically rotated beam

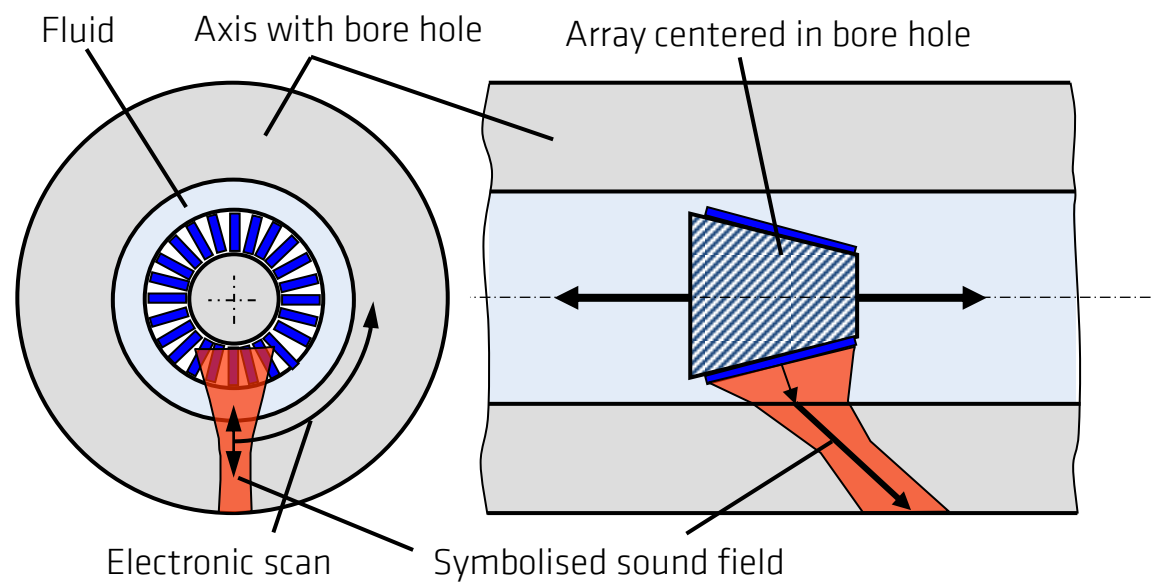
Thomas Heckel, Rainer Boehm, BAM Berlin, Germany
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The Task

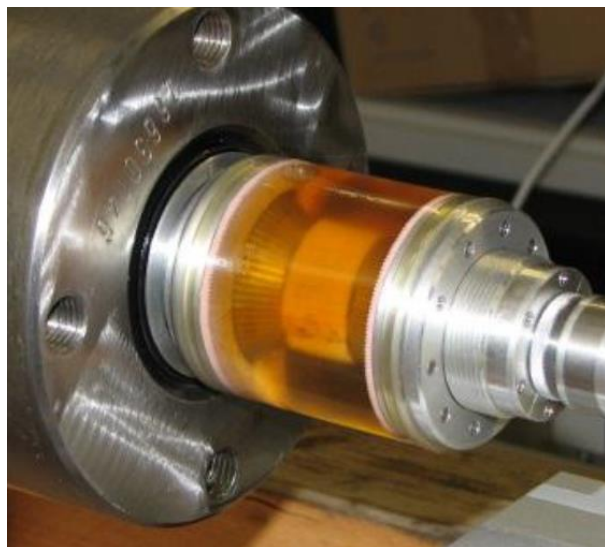


Sketch of an axis with bore hole

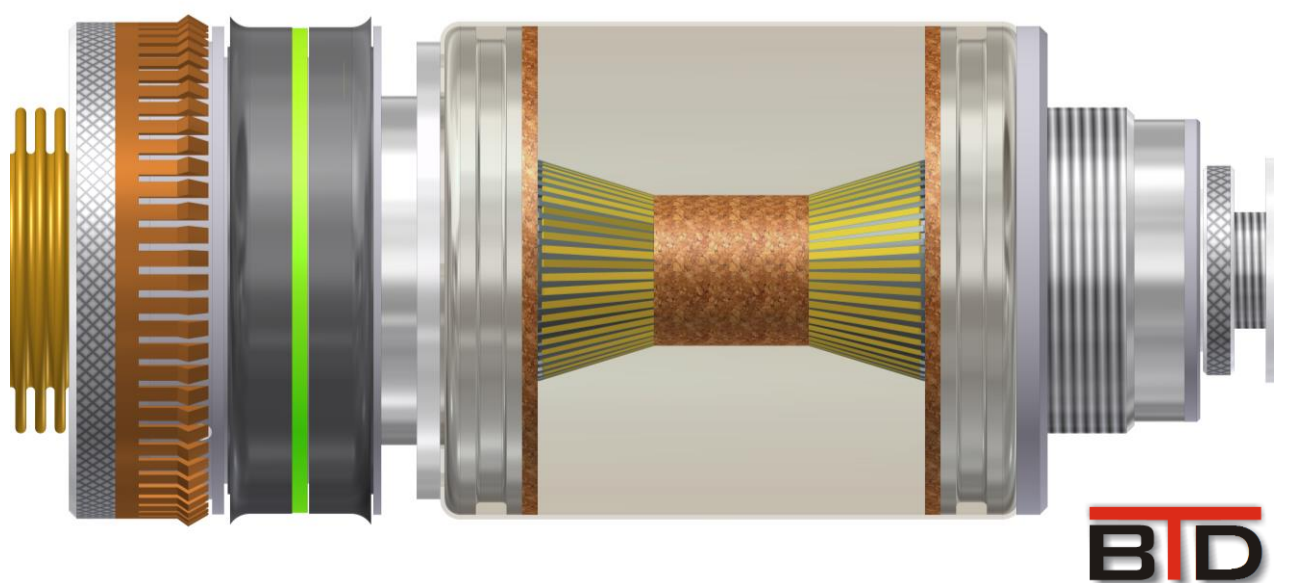
The Solution



Sketch of the cone shaped phased array for electronic rotation scan with a focussed sound beam



Probe system from the previous project WOLAXIM¹



Design drawing of the previous cone phased array for forward and backward scanning

Design boundaries:

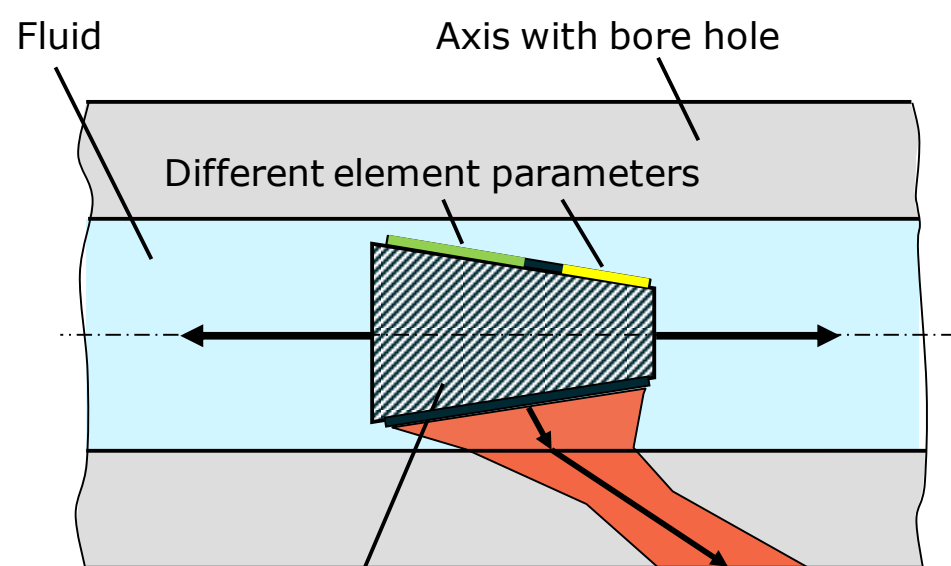
60 mm ≥ cone diameter ≥ 30 mm,
α = 38° and 45°

Parameter variations:

- Cone angle
Elements
- length and width
 - total number
 - activ number
 - position on the cone

Design studies:

Divided elements → Beam width
Long wave → SAFT Imaging



Conical array centered in the bore hole Ø 65 mm

Parameter variation for further simulations to optimize the sound field values

References

¹WOLAXIM "Whole Life Rail Axle Assessment and Improvement 2012"

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