

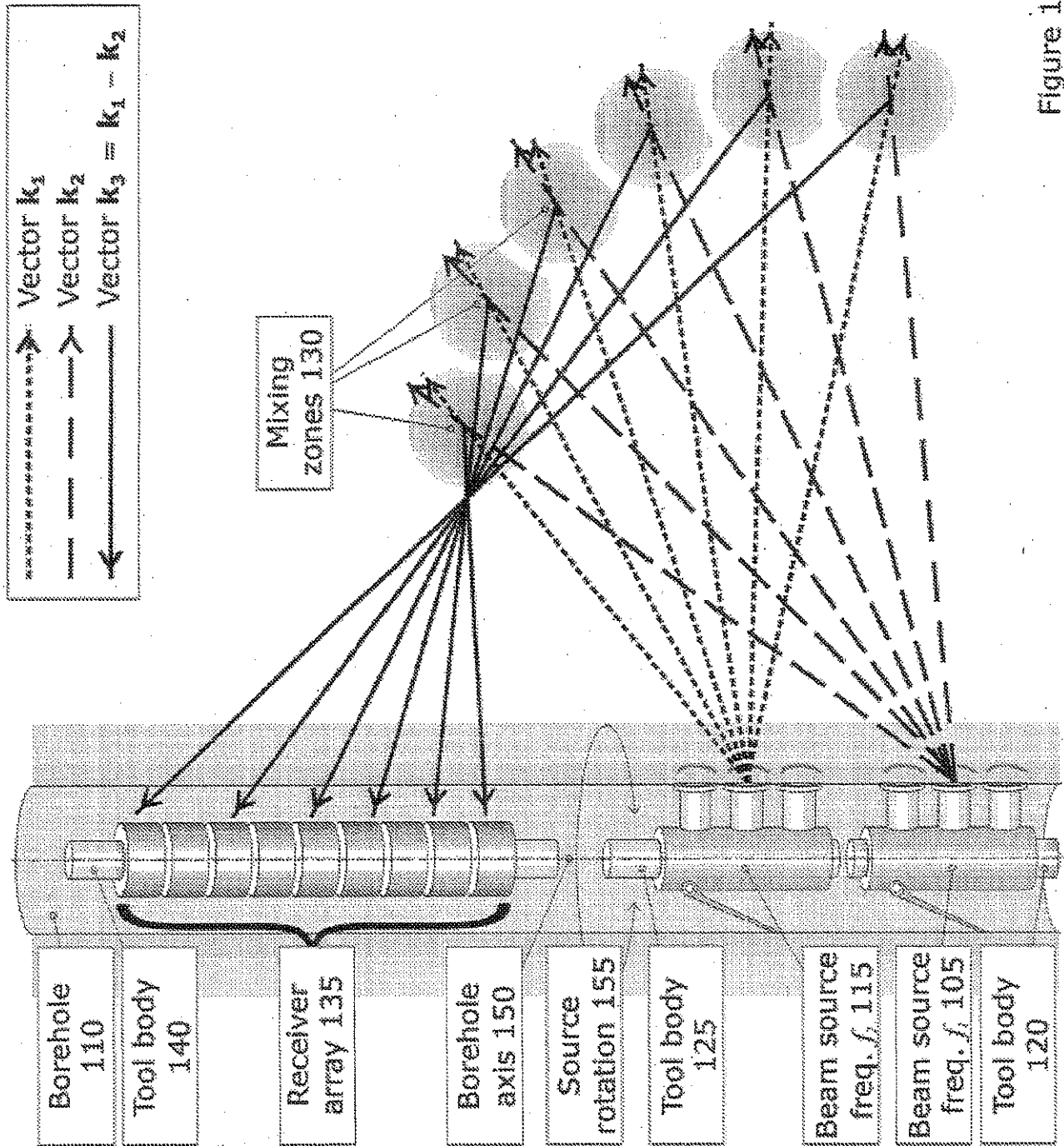


Figure 1

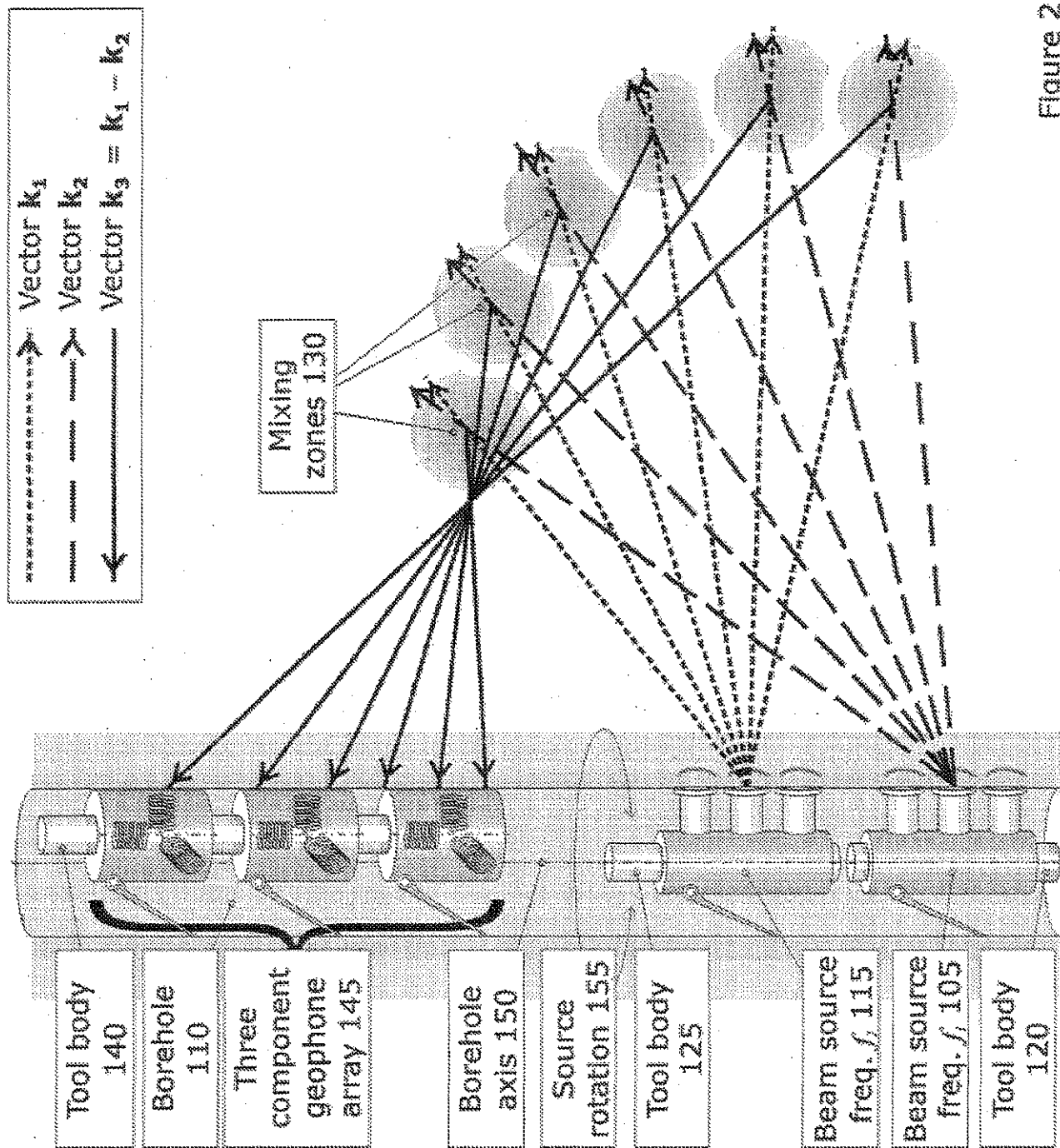


Figure 2

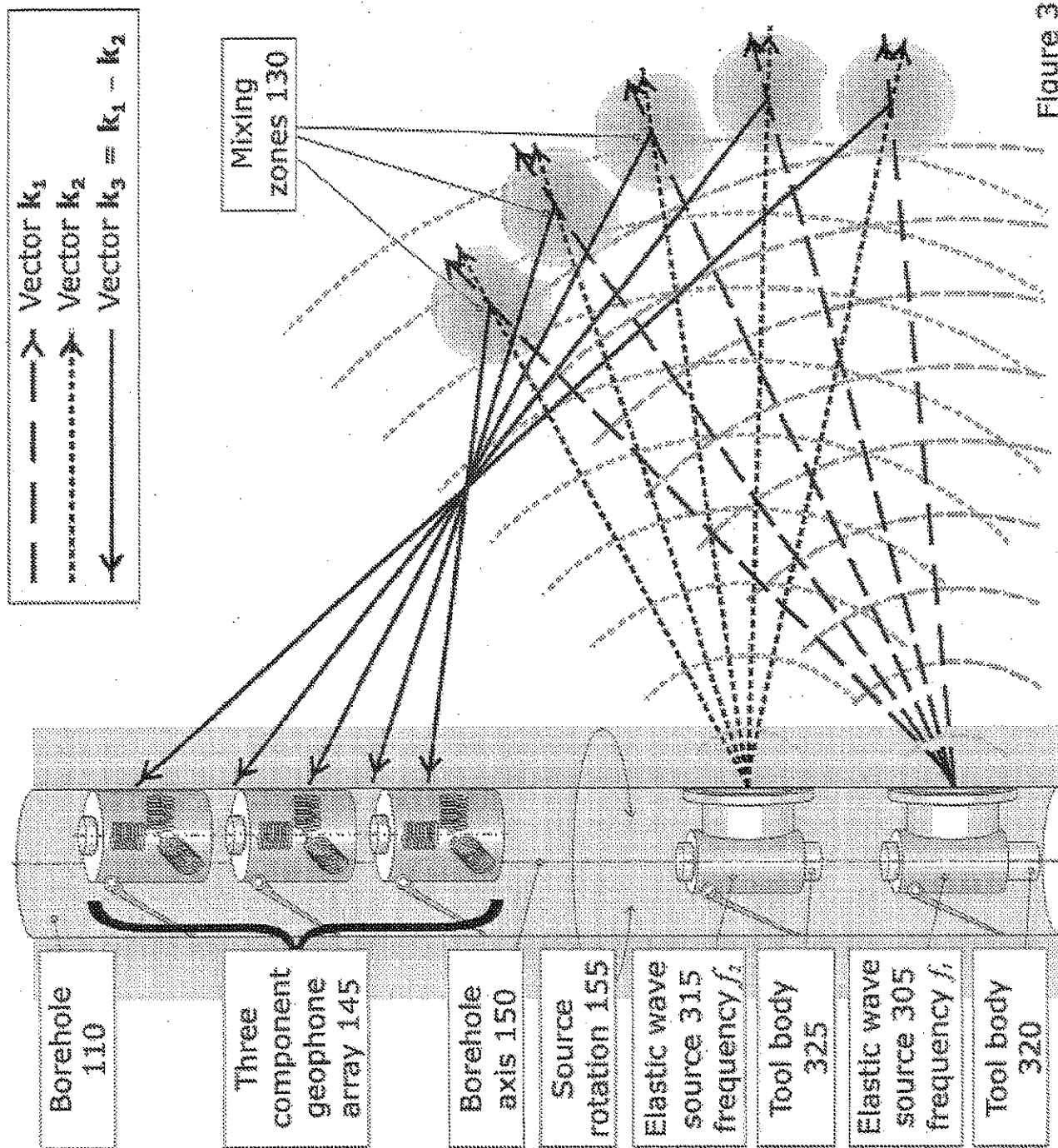


Figure 3

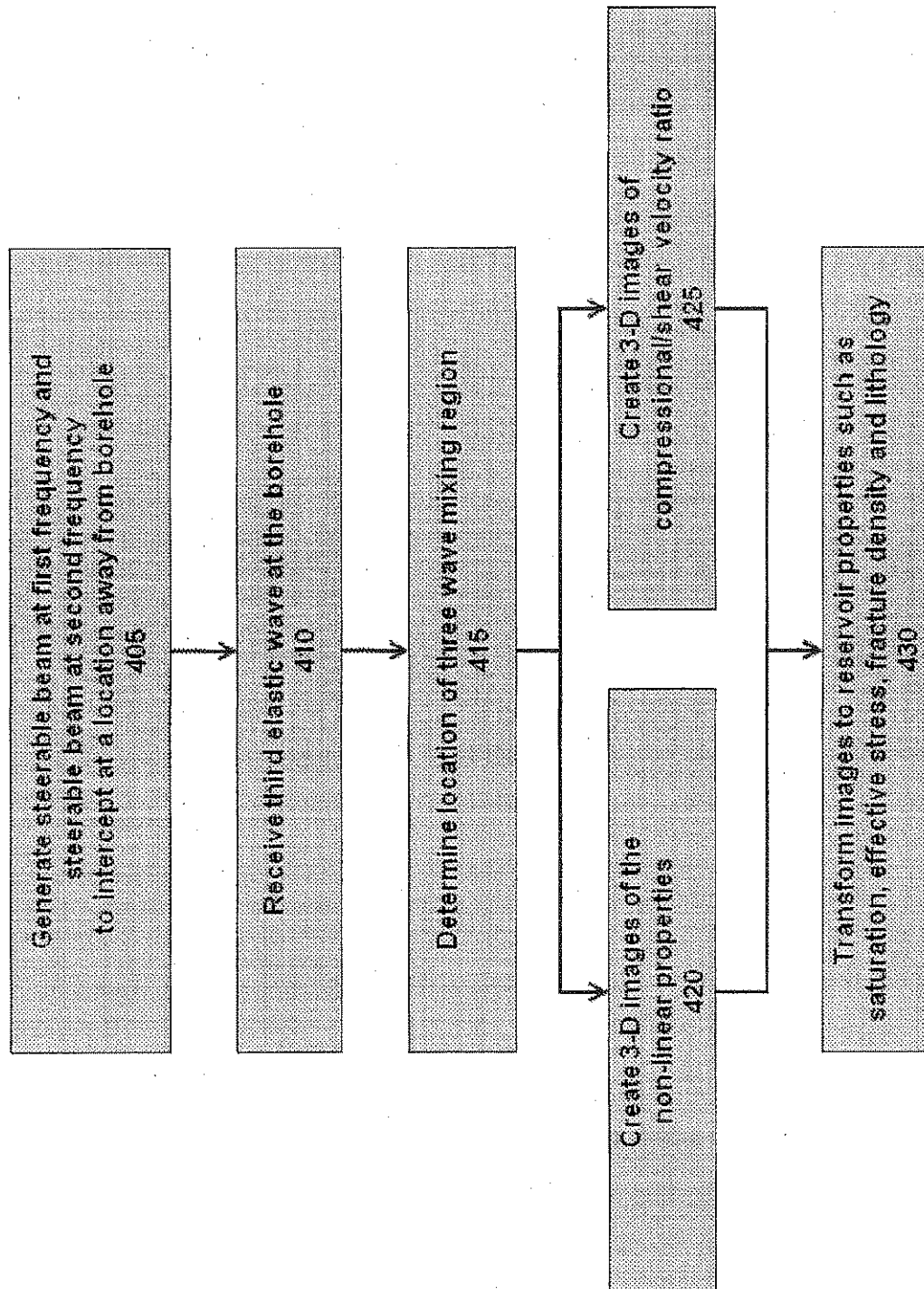


Figure 4

Figure 5b, 18 kHz shear beam

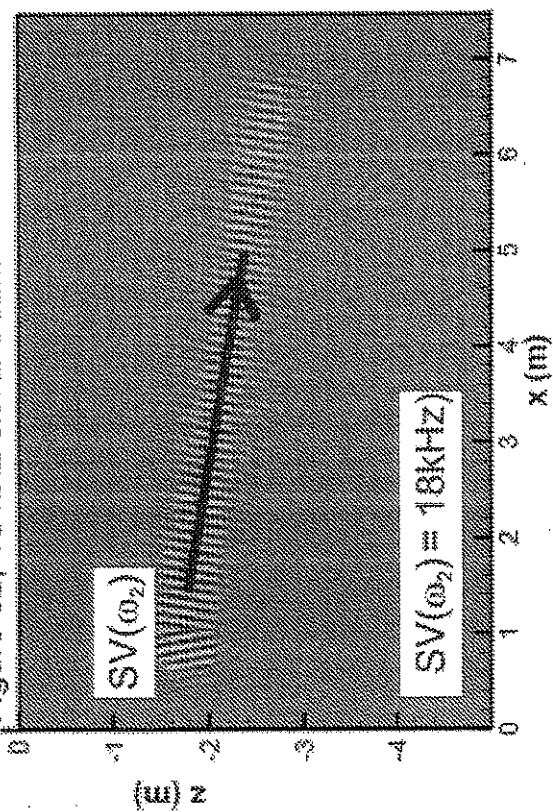


Figure 5a, 25 kHz compressional beam

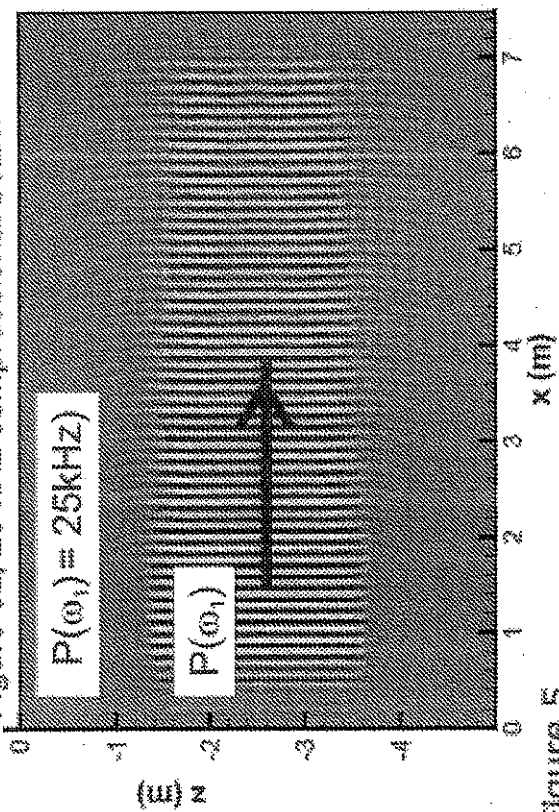


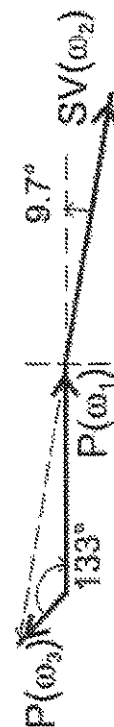
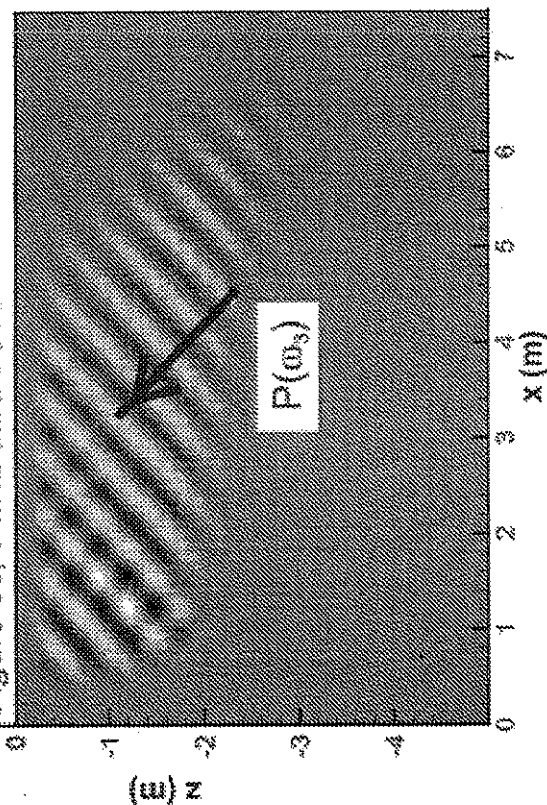
Figure 5

Relative amplitude

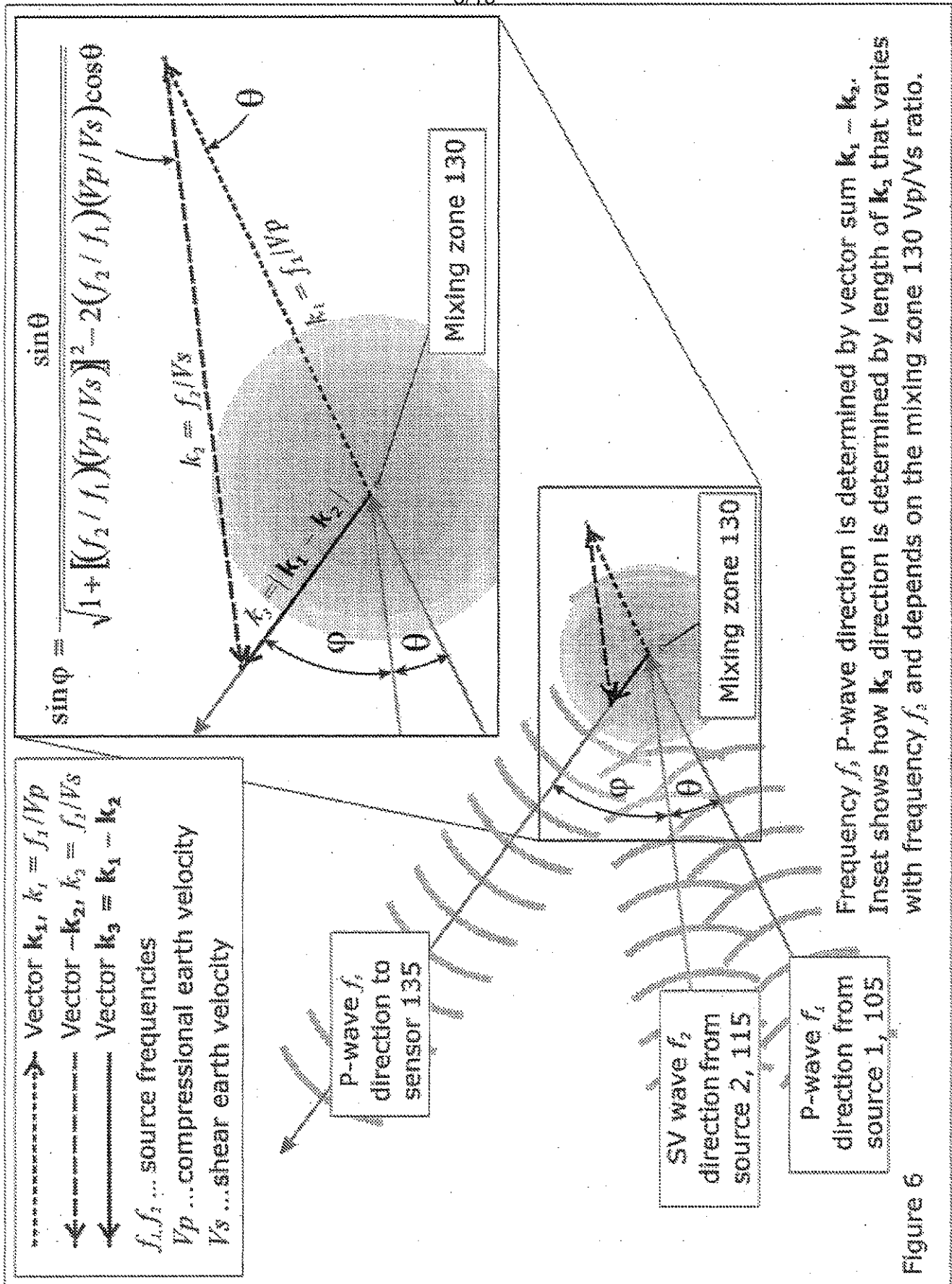
Negative 0 Positive



Figure 5c, 7 kHz third wave



Returning signal vector $P(\omega_3)$ determined by vector difference $P(\omega_1) - SV(\omega_3)$



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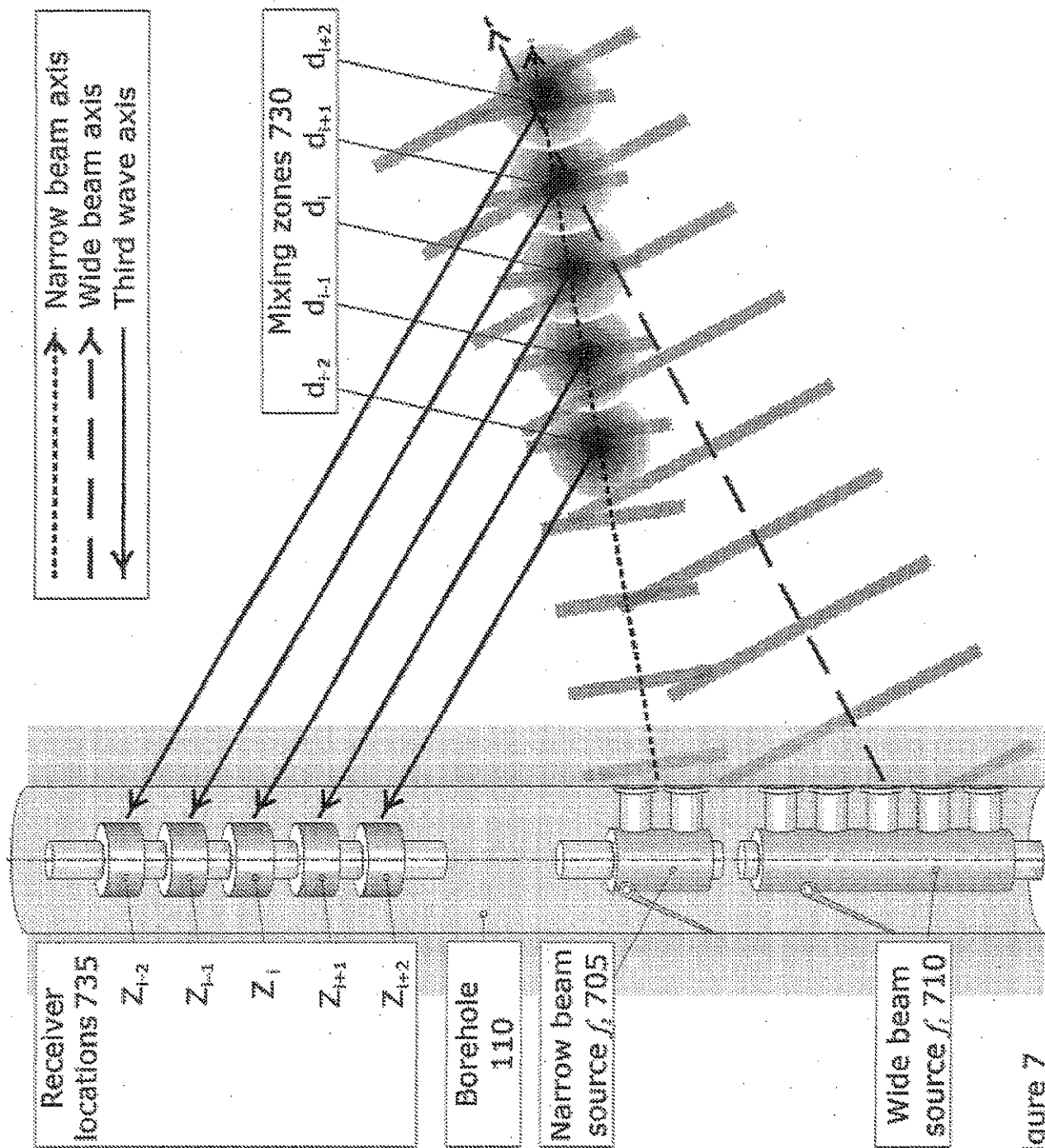
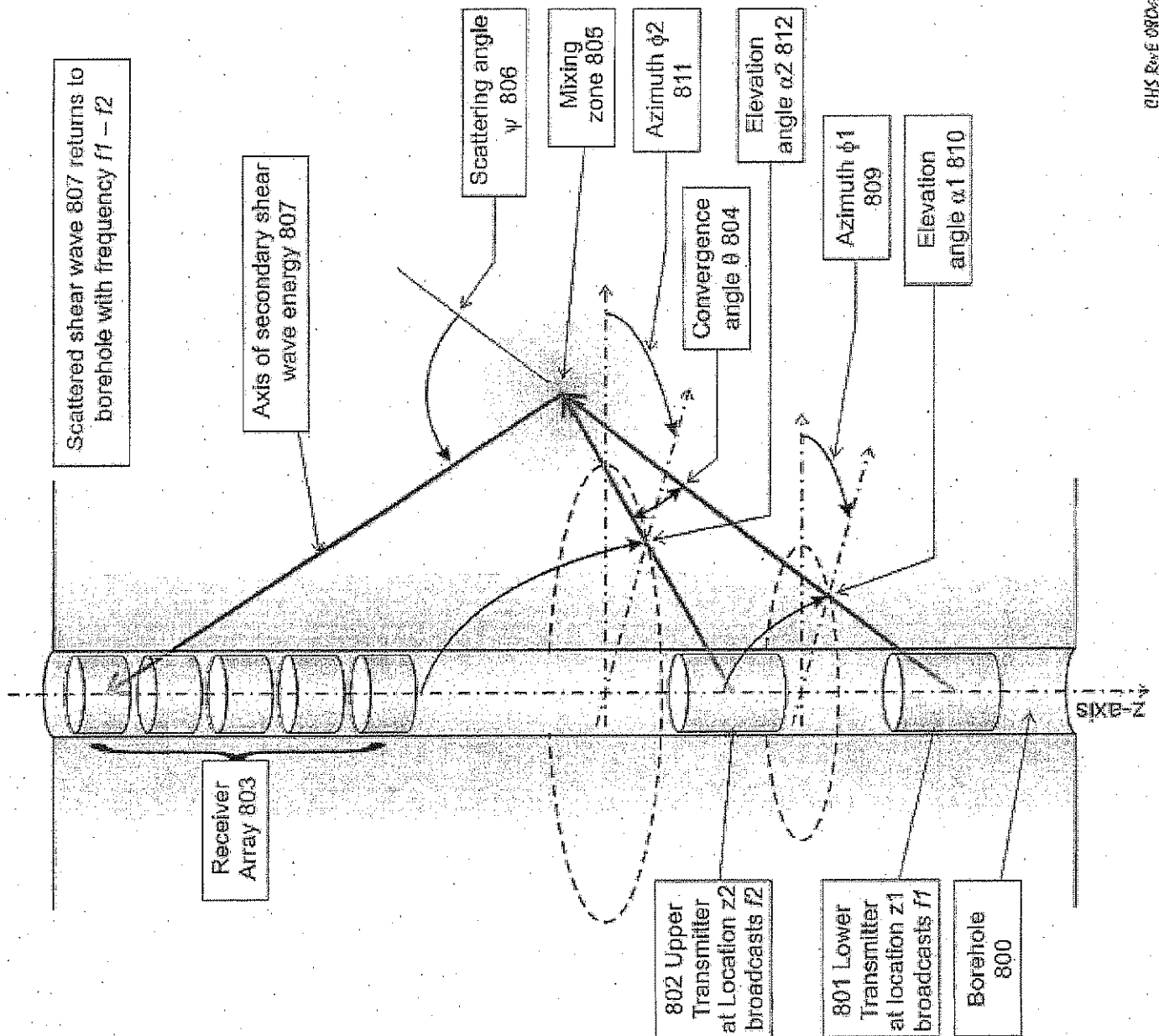


Figure 7



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Figure 8

Figures 9a and 9b show development of wave-vector triangles from geometry of configuration shown in figure 8. The sides of the triangle ABC in figure 9b are parallel to the extended axes of the beams from upper and lower transmitters and the axis of the secondary shear wave. In figure 9b, vector k_3 is equal to vector difference $k_1 - k_2$.

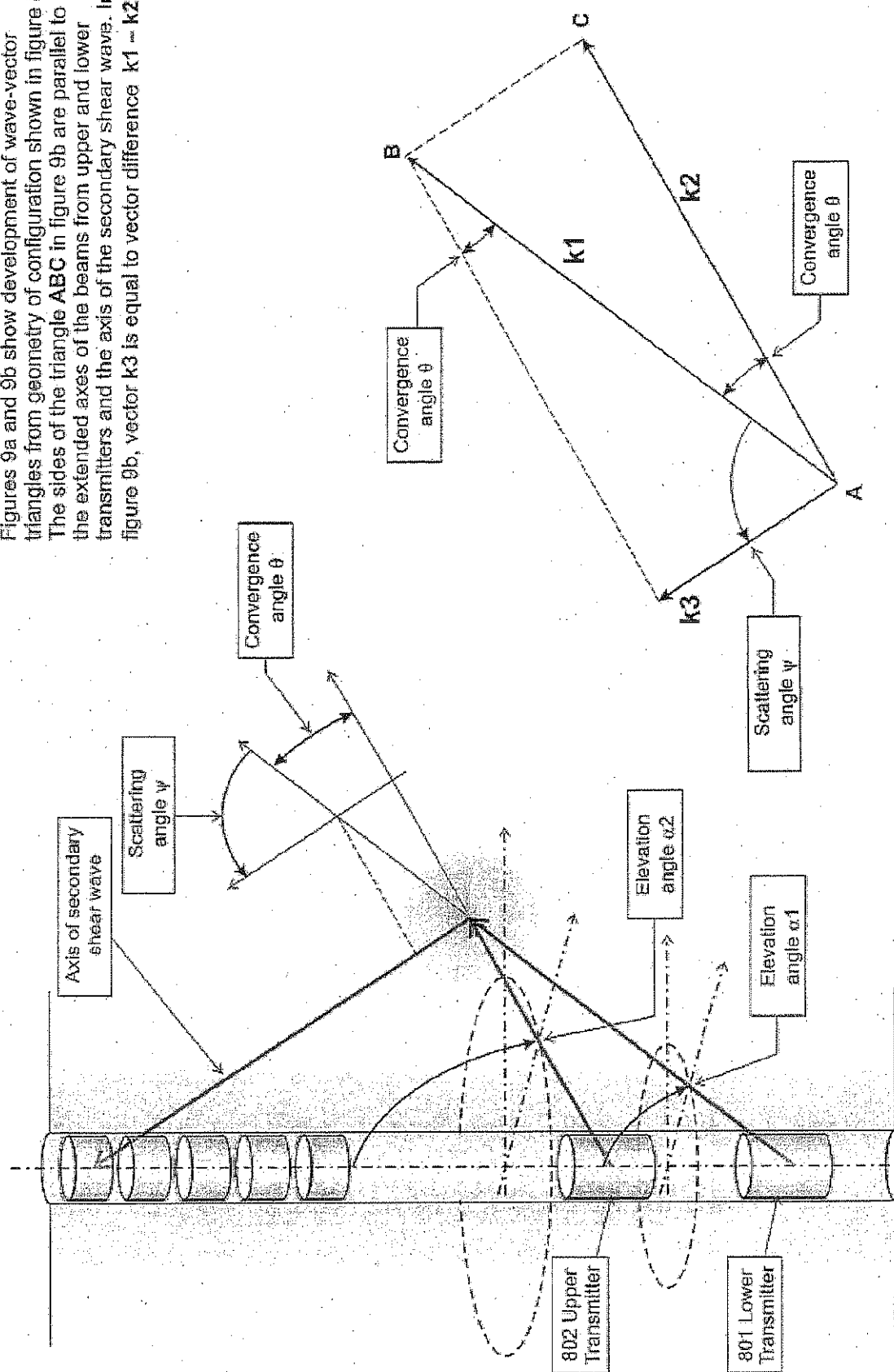


Figure 9b

Figure 9a

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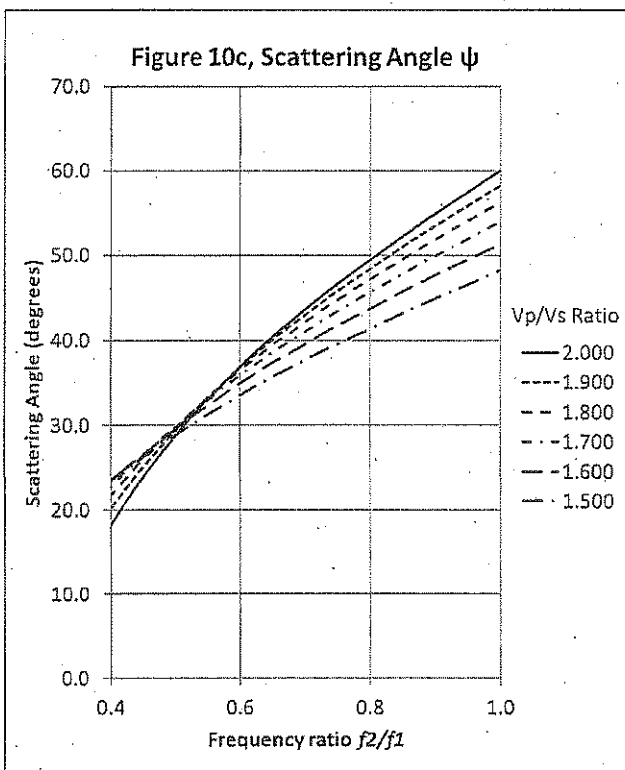
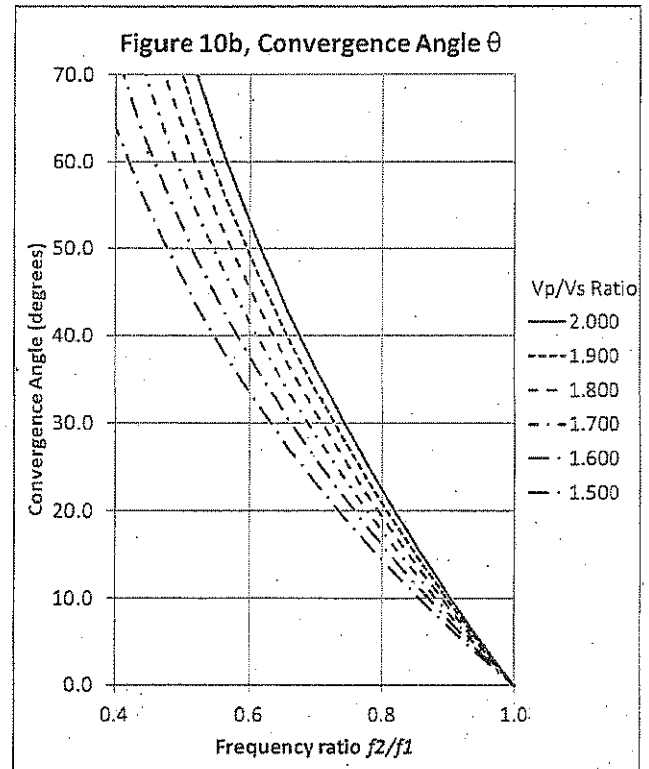
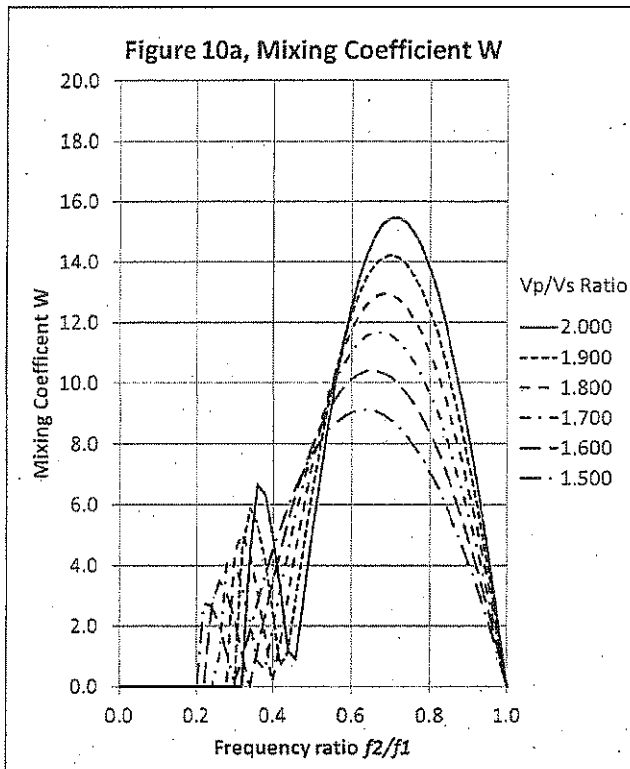


Figure 11a
Compressional beam from
lower transmitter

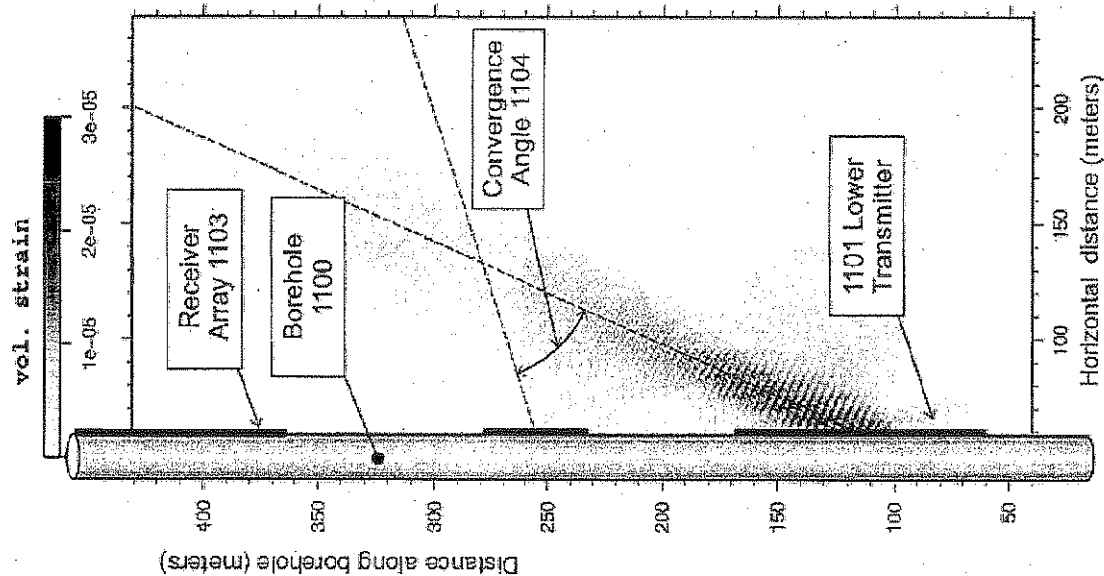


Figure 11b
Compressional beam from
upper transmitter

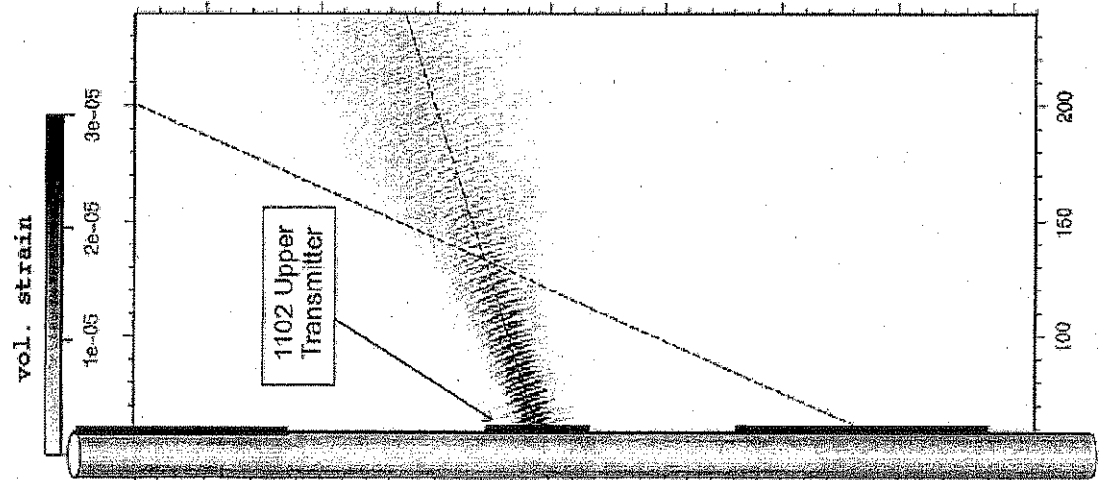
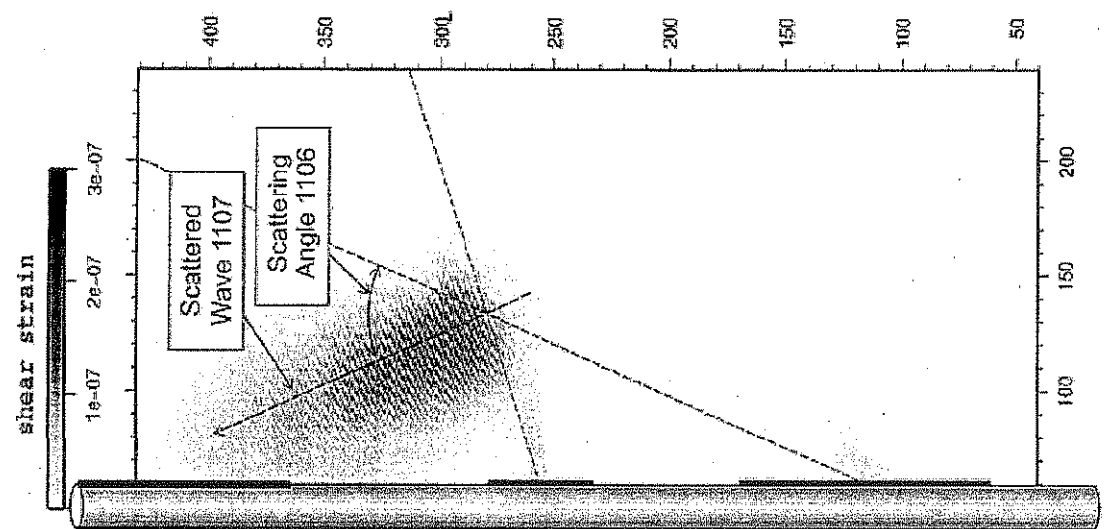


Figure 11c
Shear wave generated at
intersection of beams



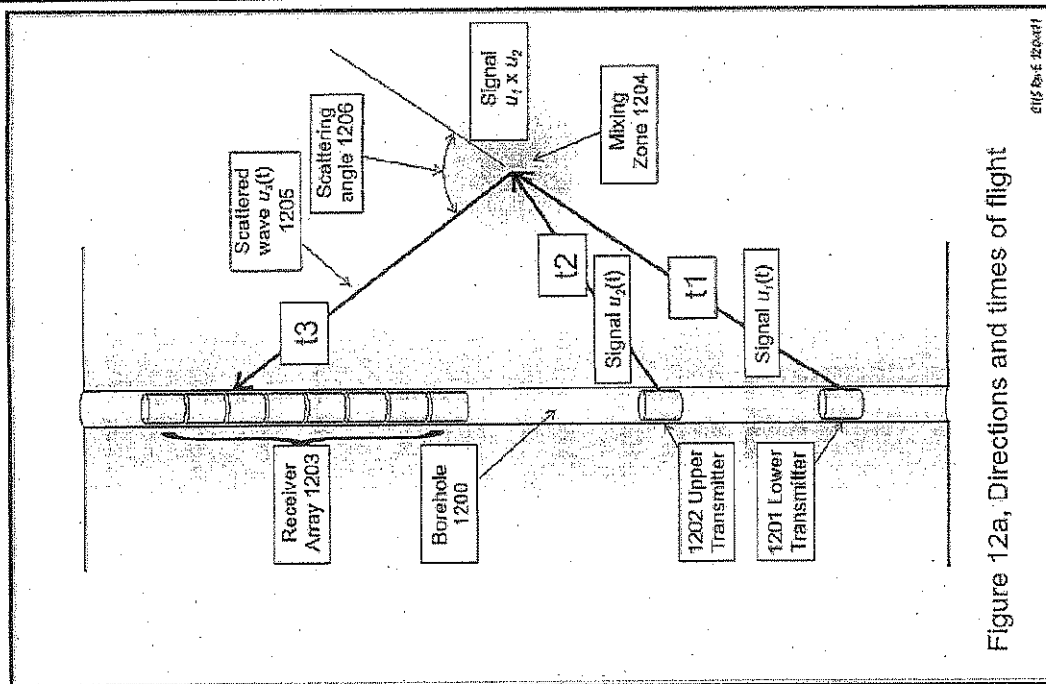
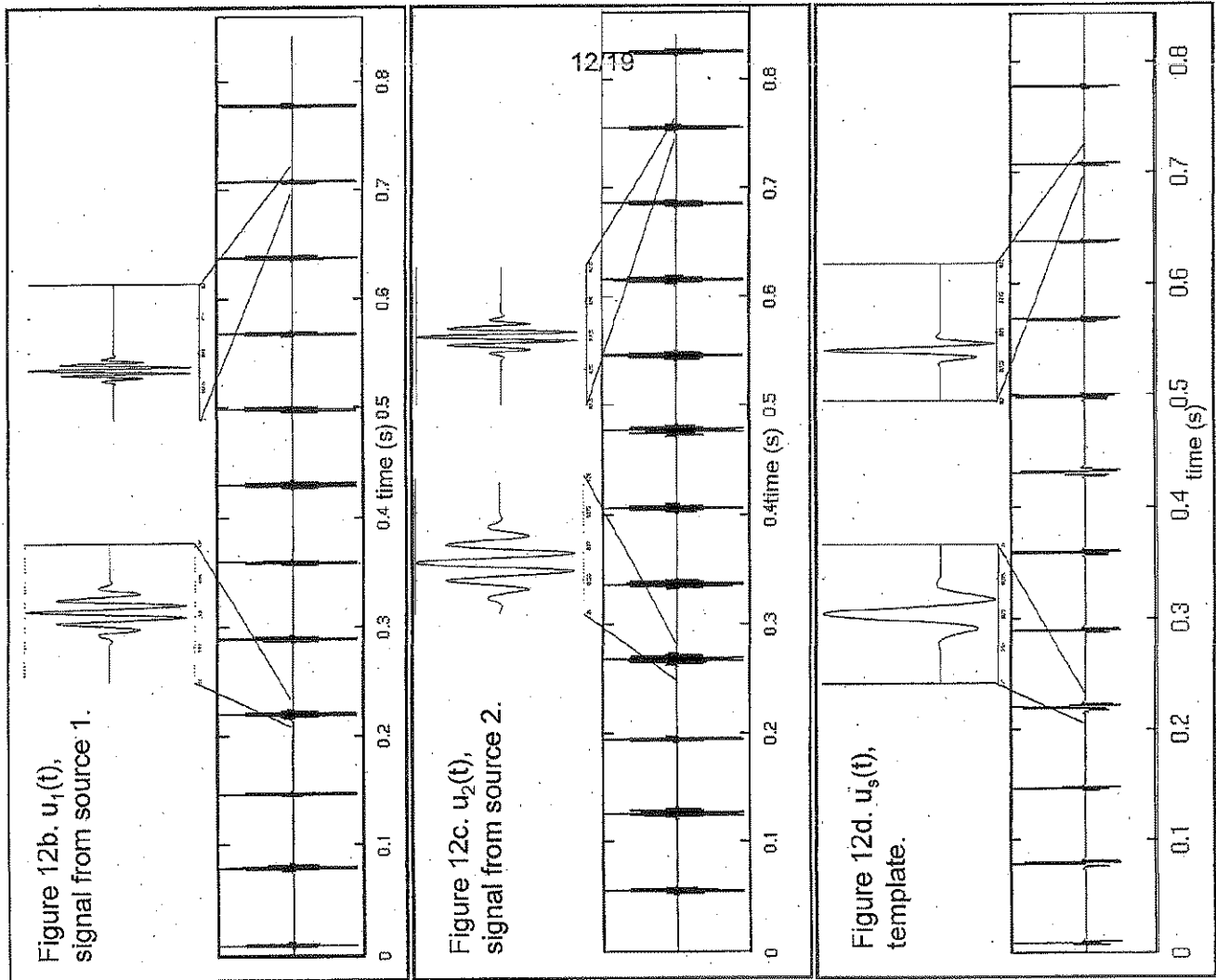


Figure 13a. Position of sources and receiver array.

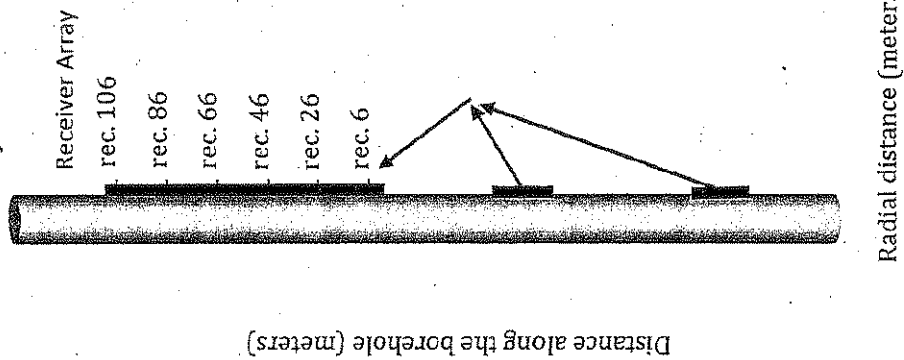


Figure 13b. $u_3(t)$, measured signal at the receiver array.

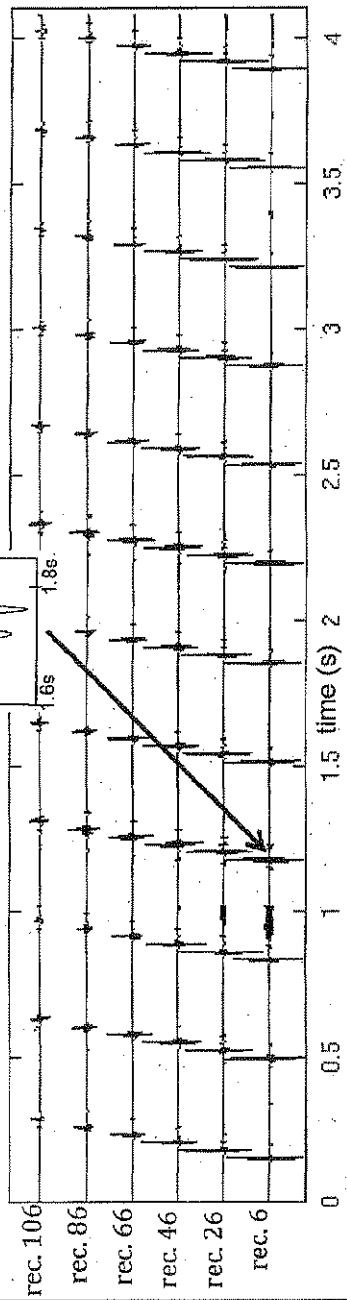


Figure 13c. $u_s(t)$, template.

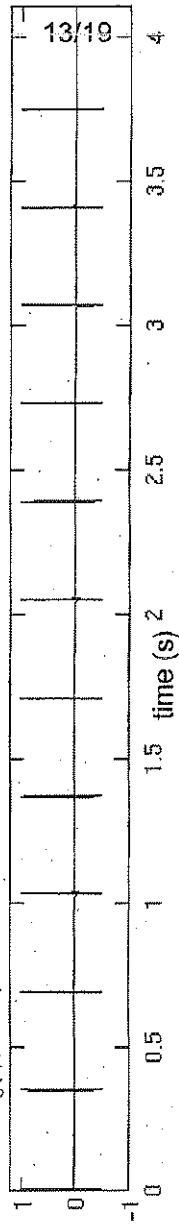


Figure 13d. $M(t)$, correlated signal.

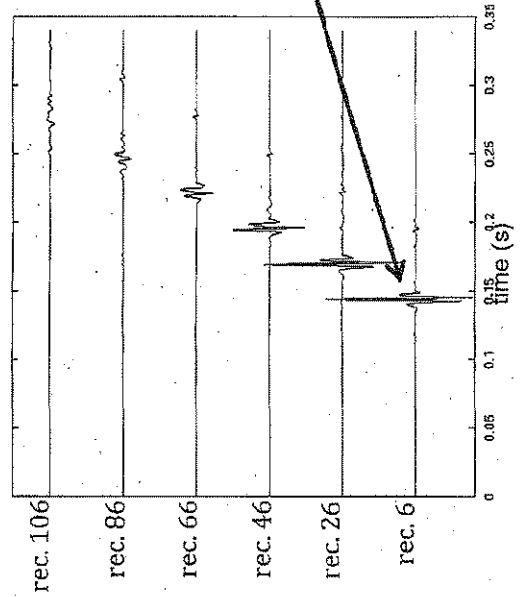


Figure 14a. Position of sources and receiver array.

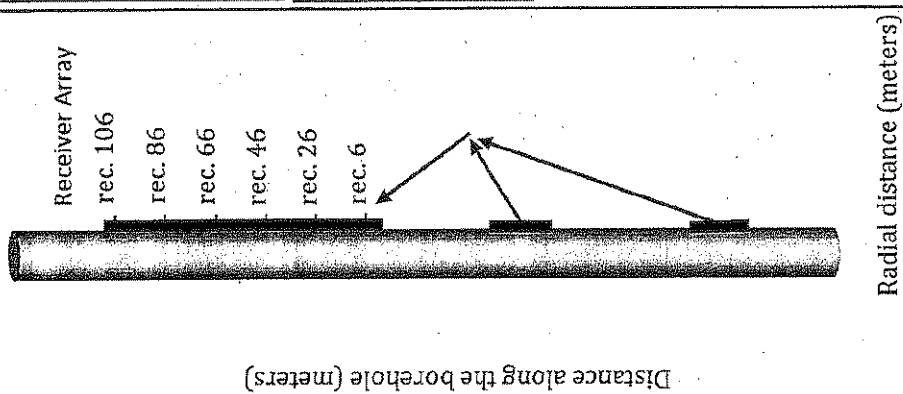


Figure 14b. $u_3(t)$, measured signal at the receiver array.

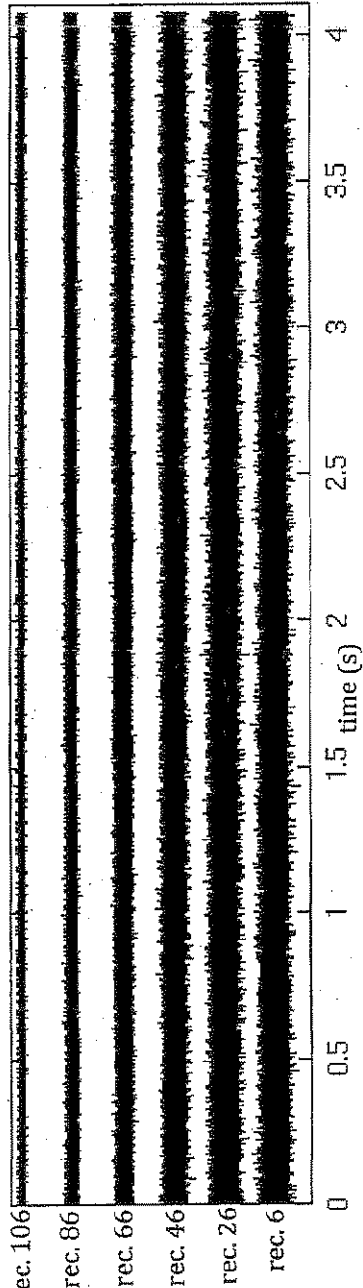


Figure 14c. $u_s(t)$, template.

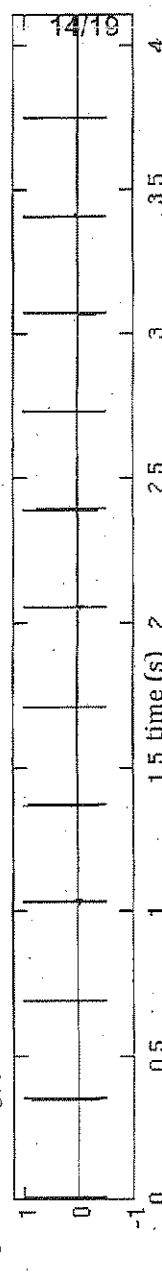
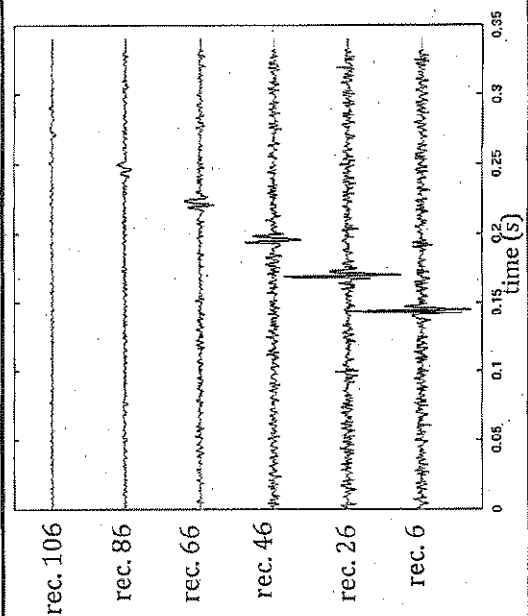


Figure 14d. $M(t)$, correlated signal.



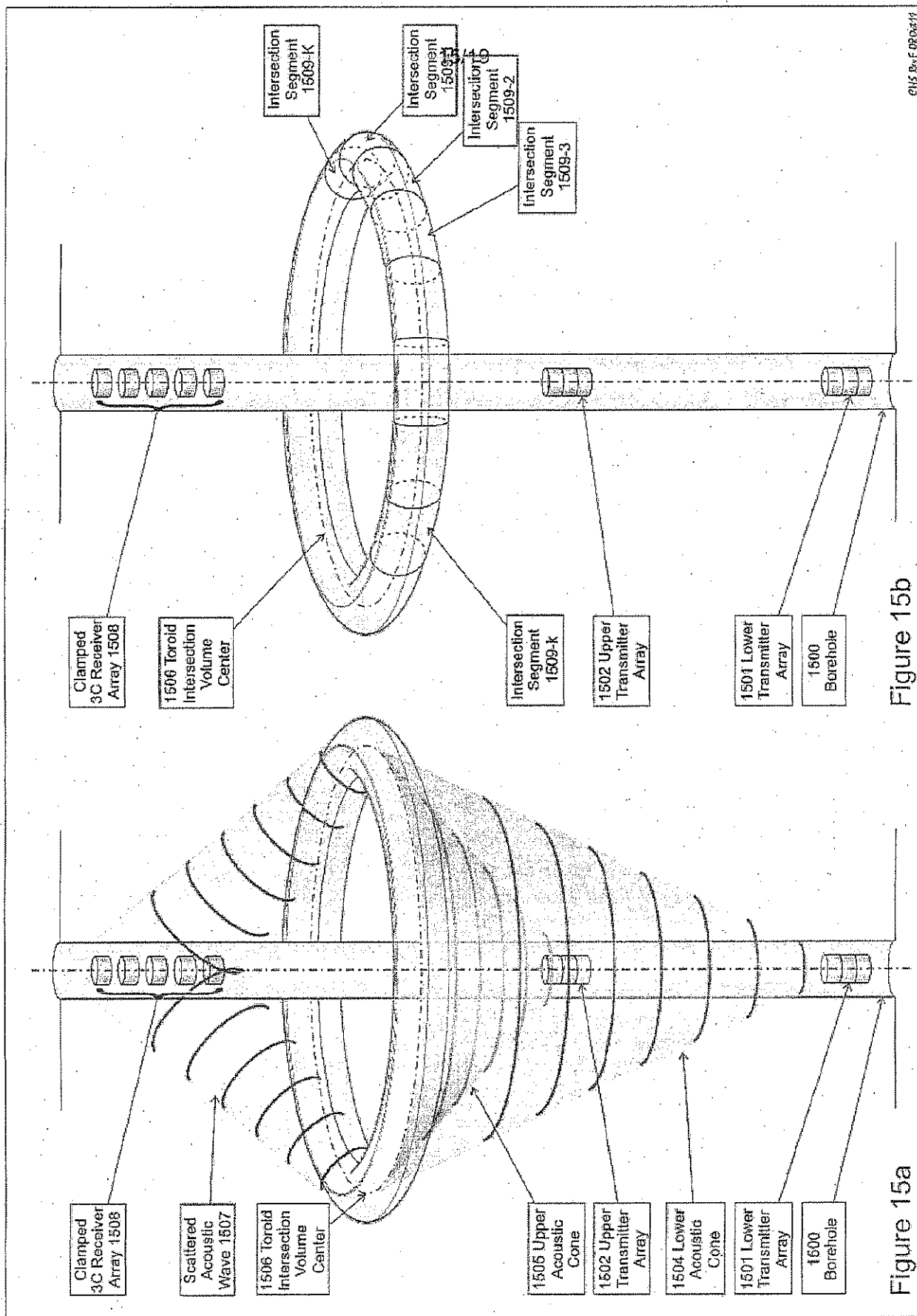


Figure 15b

Figure 15a

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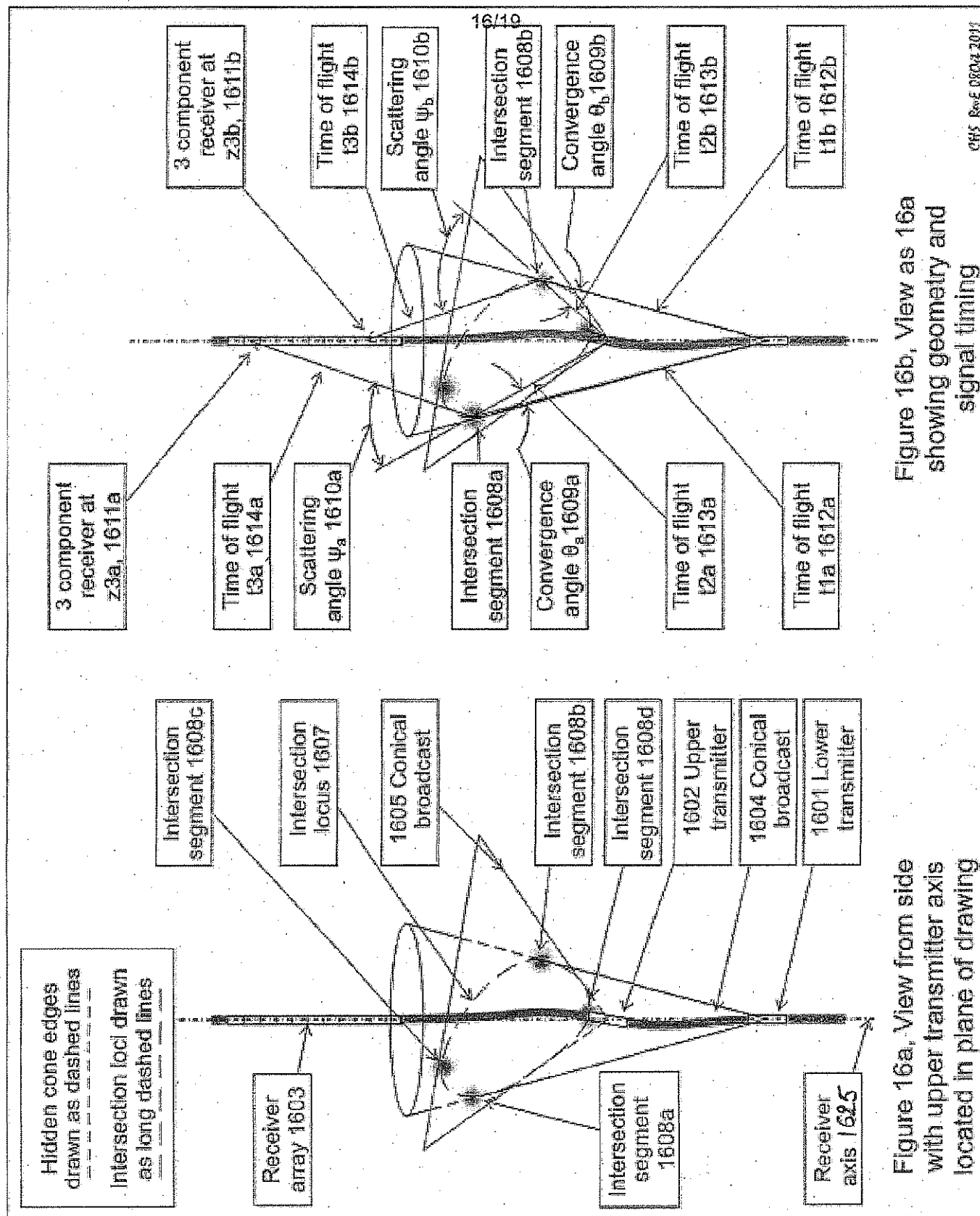
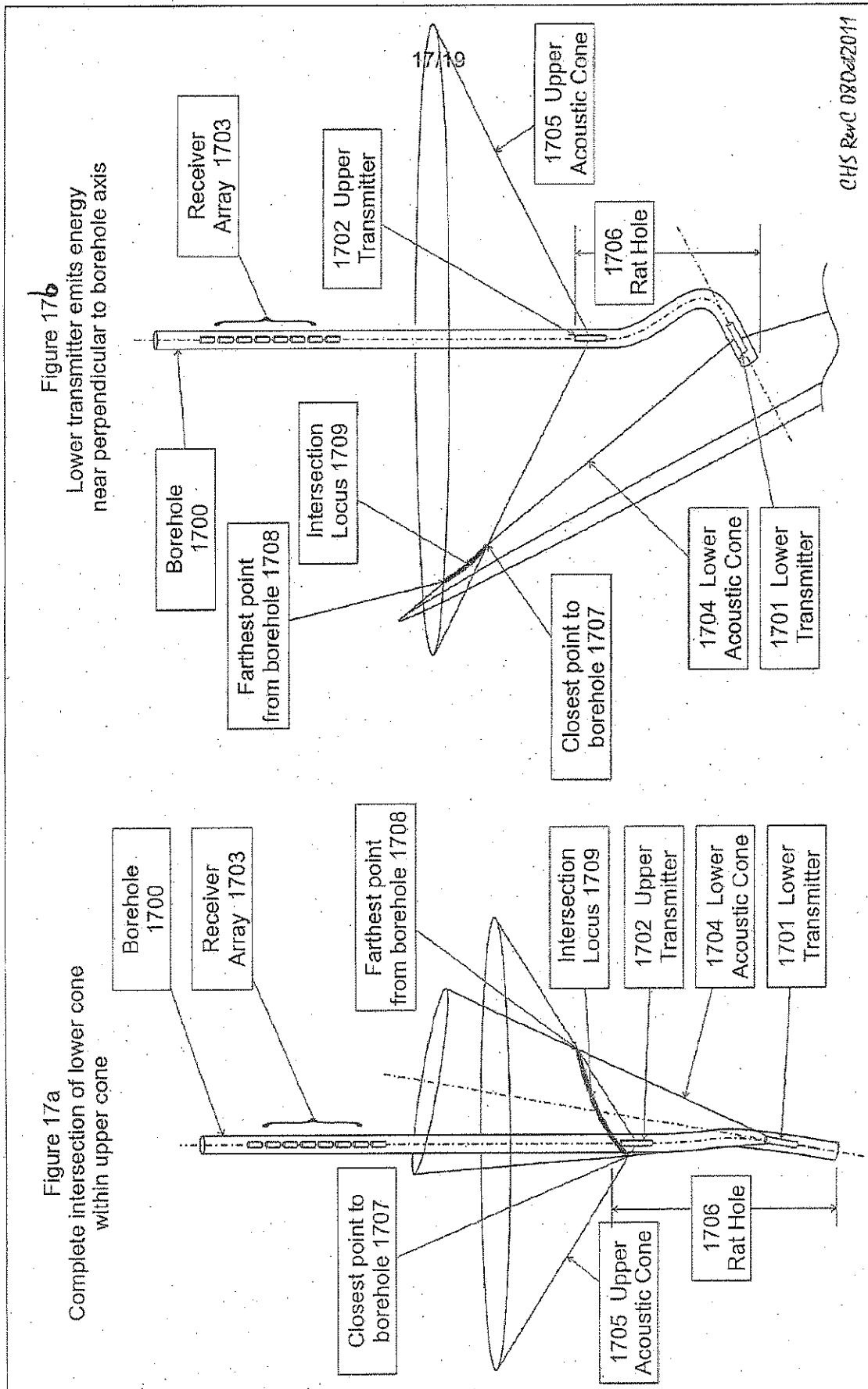
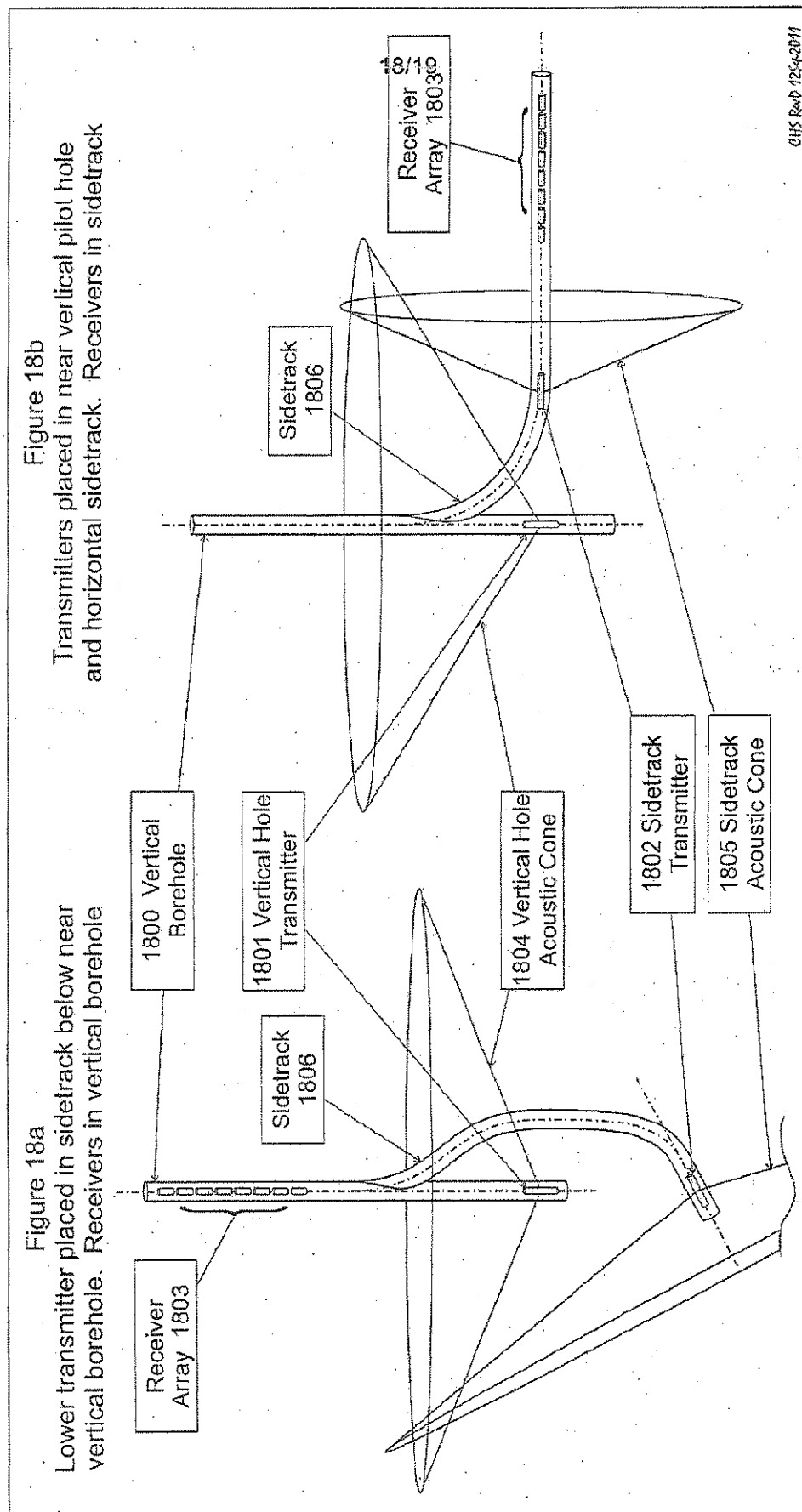


Figure 16b, View as 16a showing geometry and signal timing





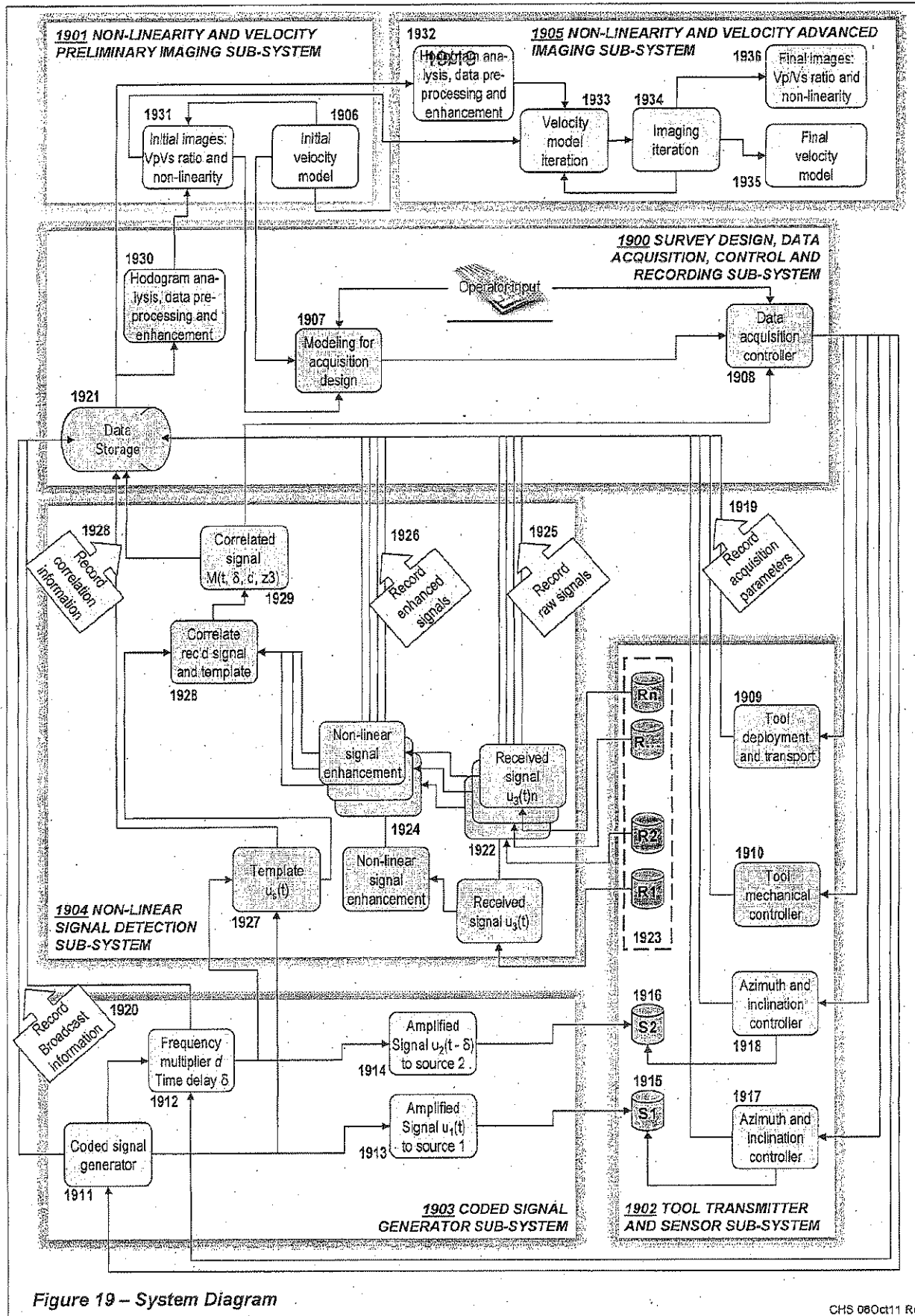


Figure 19 – System Diagram