

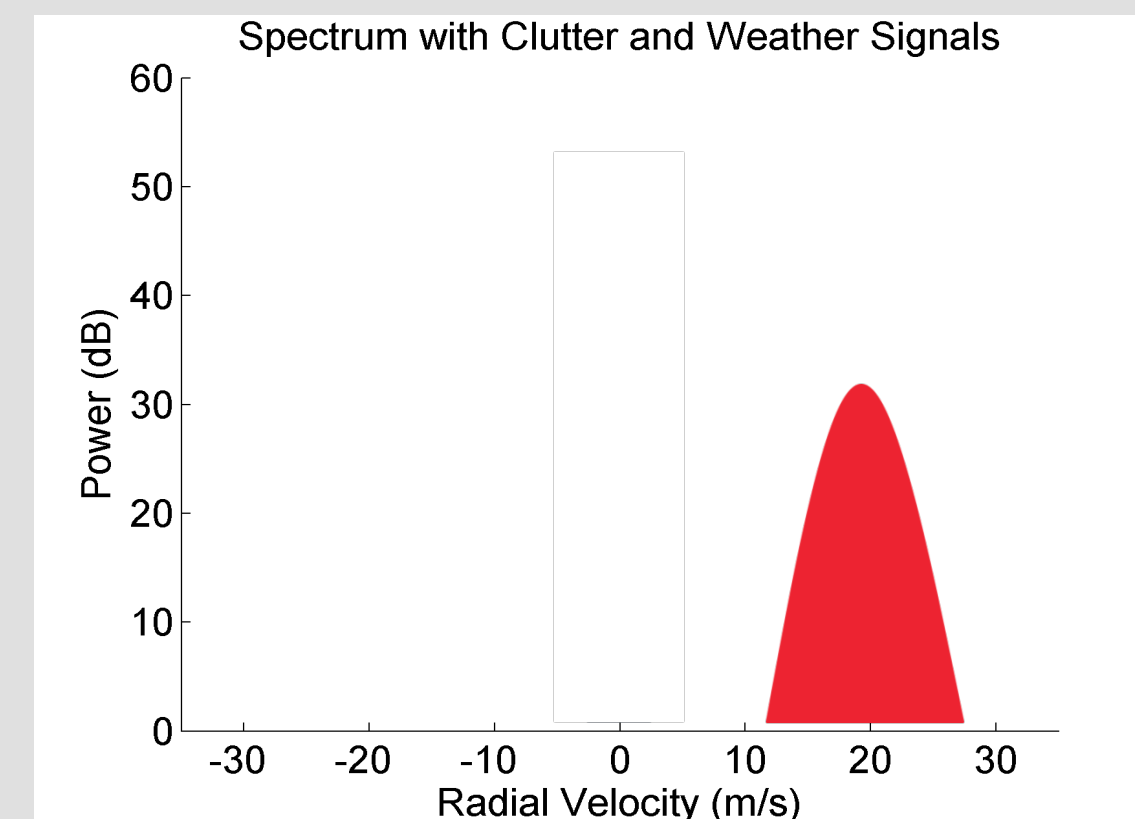
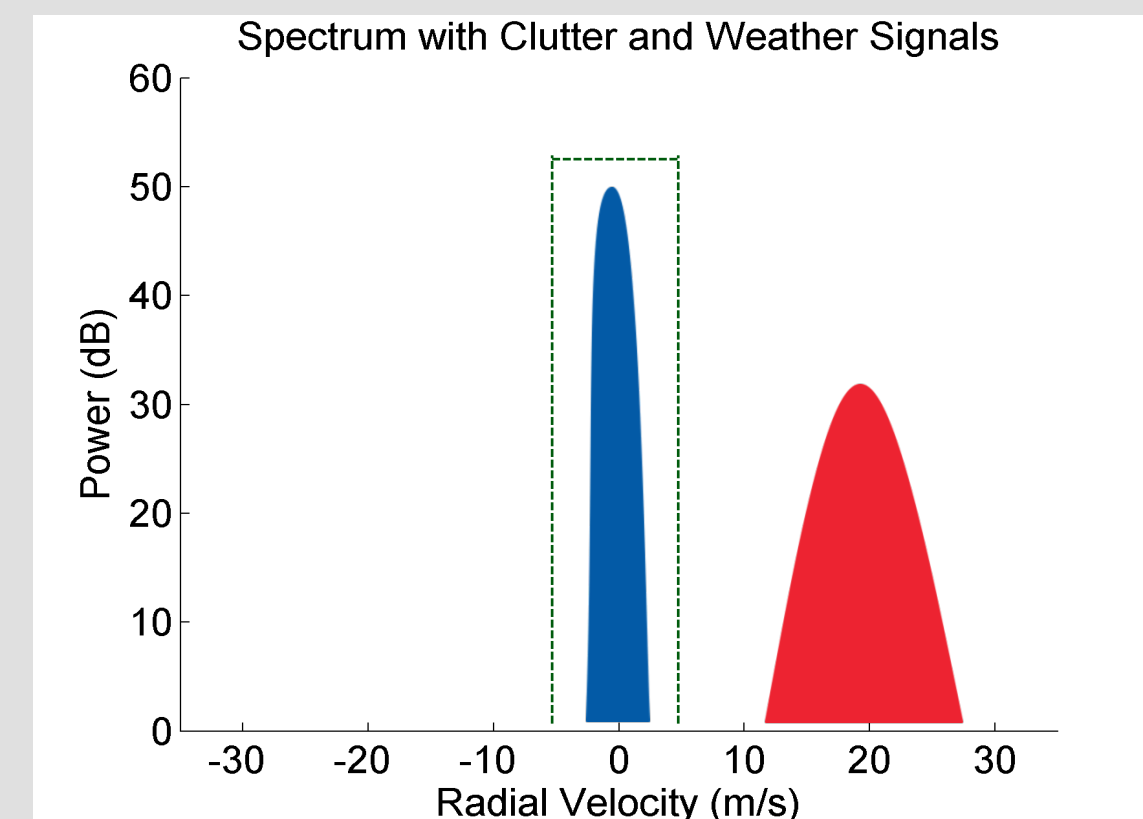
# PAR to the Rescue: Improving Clutter Mitigation with Adaptive Beamforming

Christopher Curtis

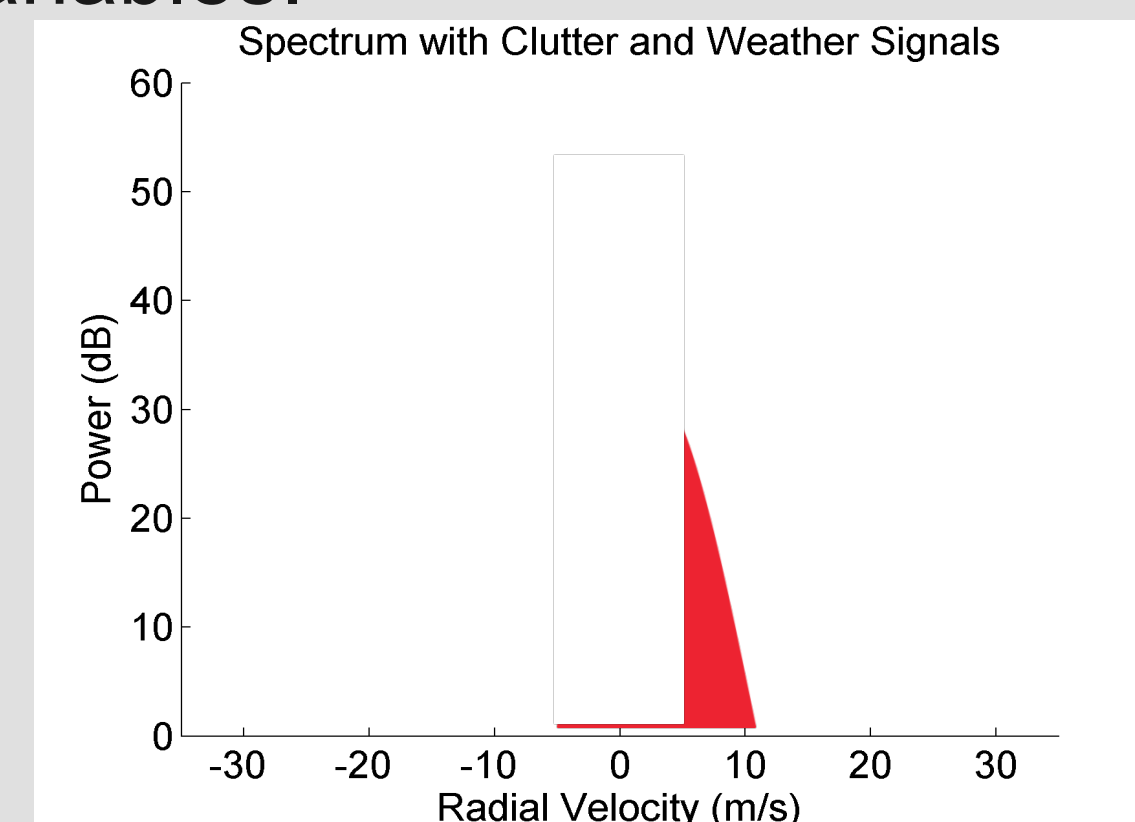
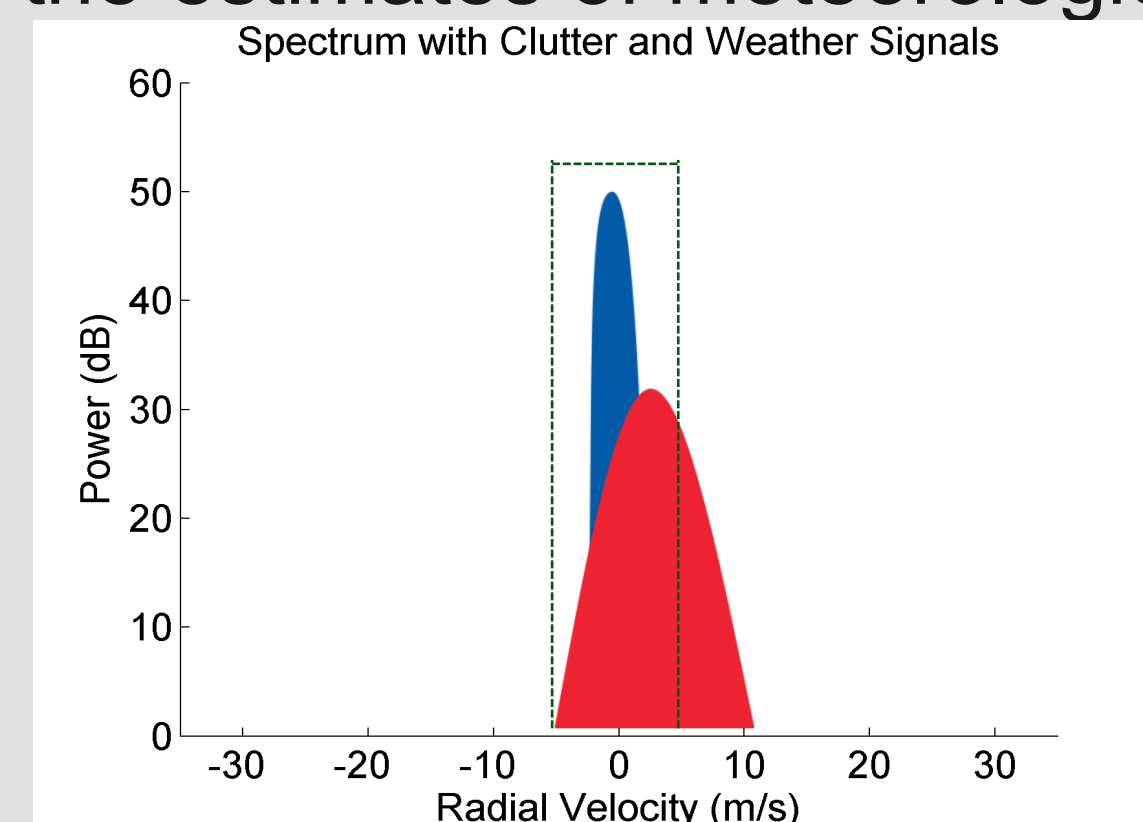
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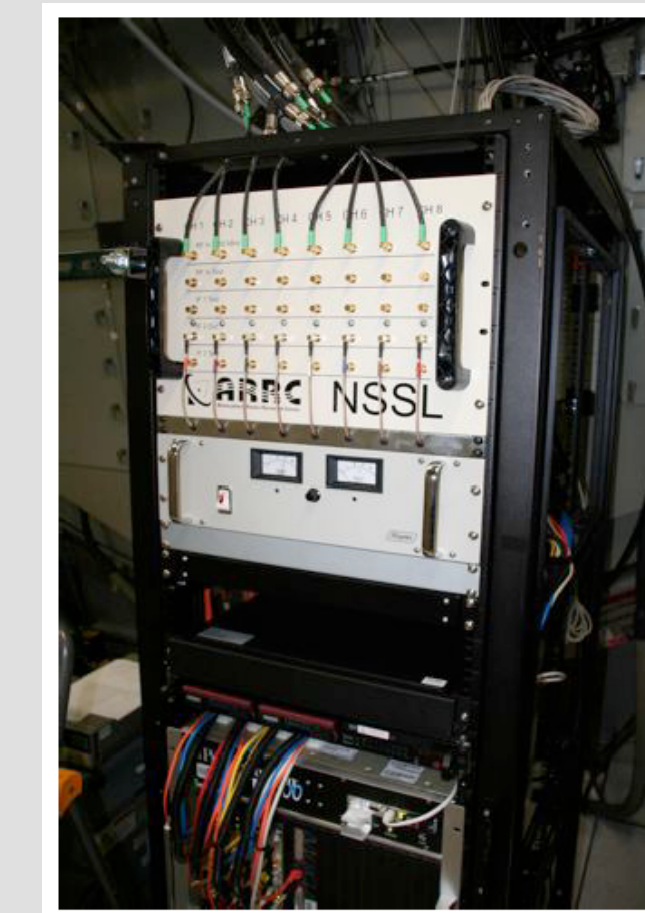
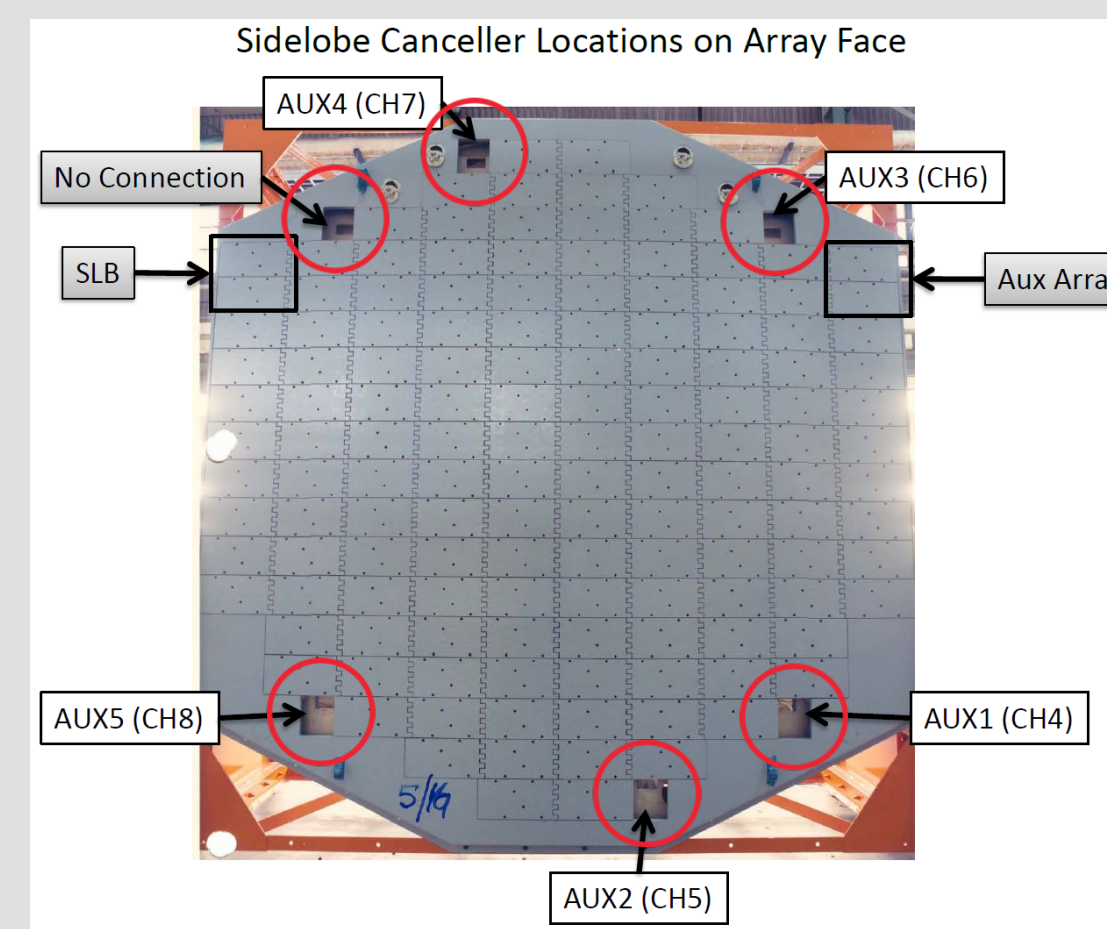
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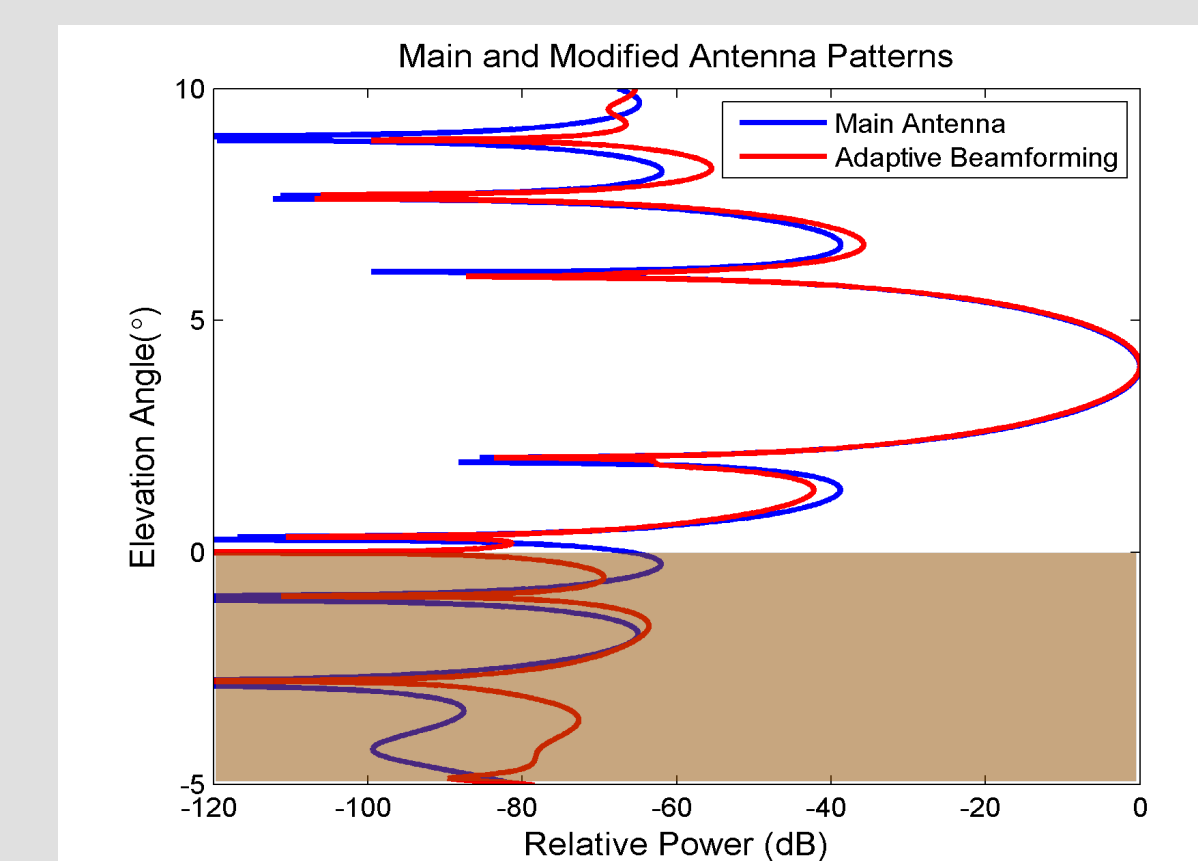
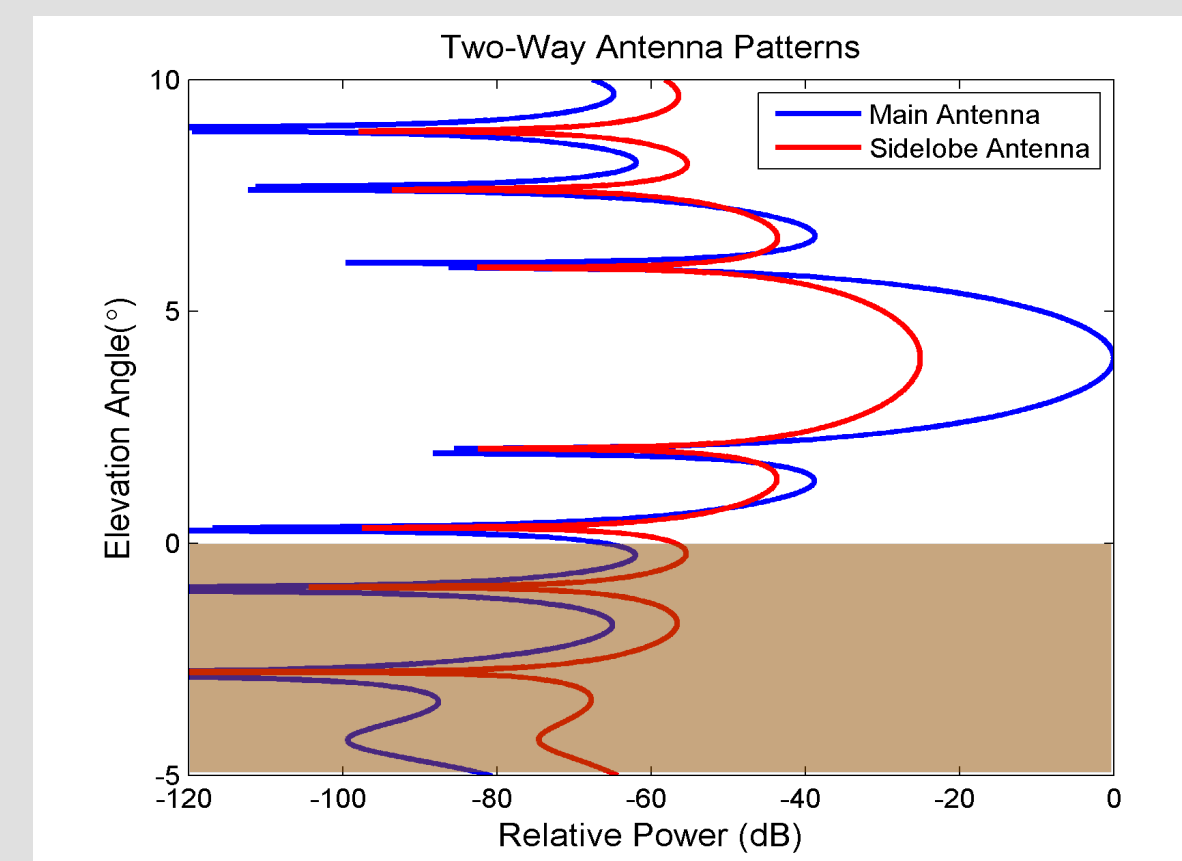
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Is there another way to discriminate between clutter and weather signals?



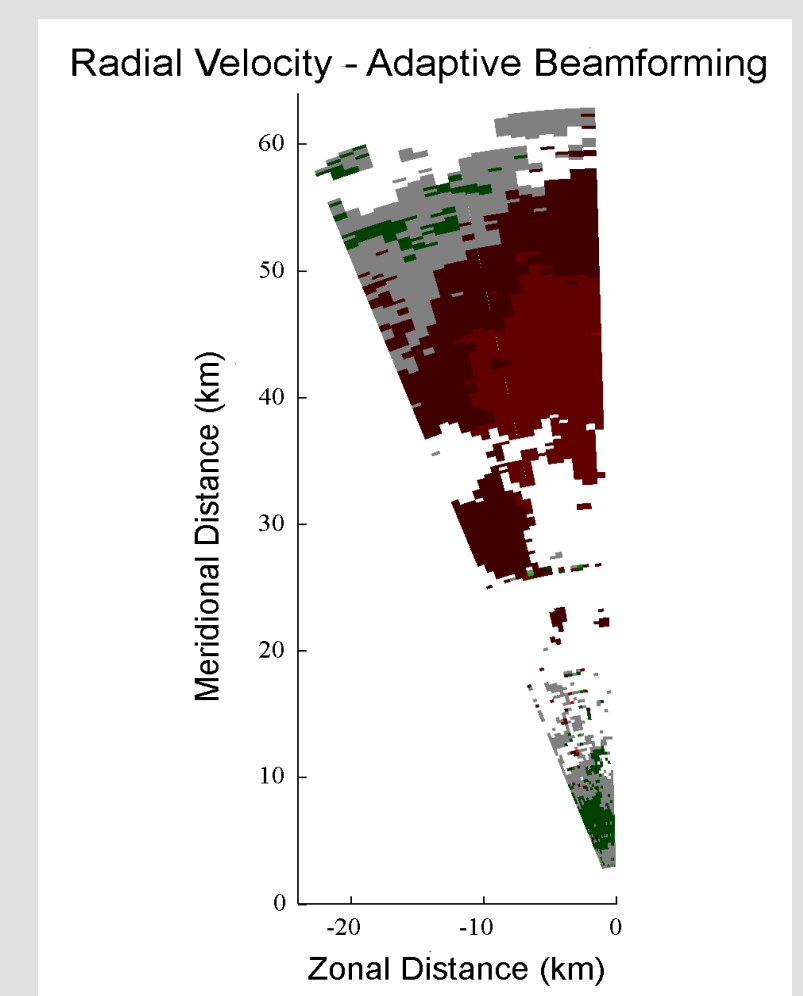
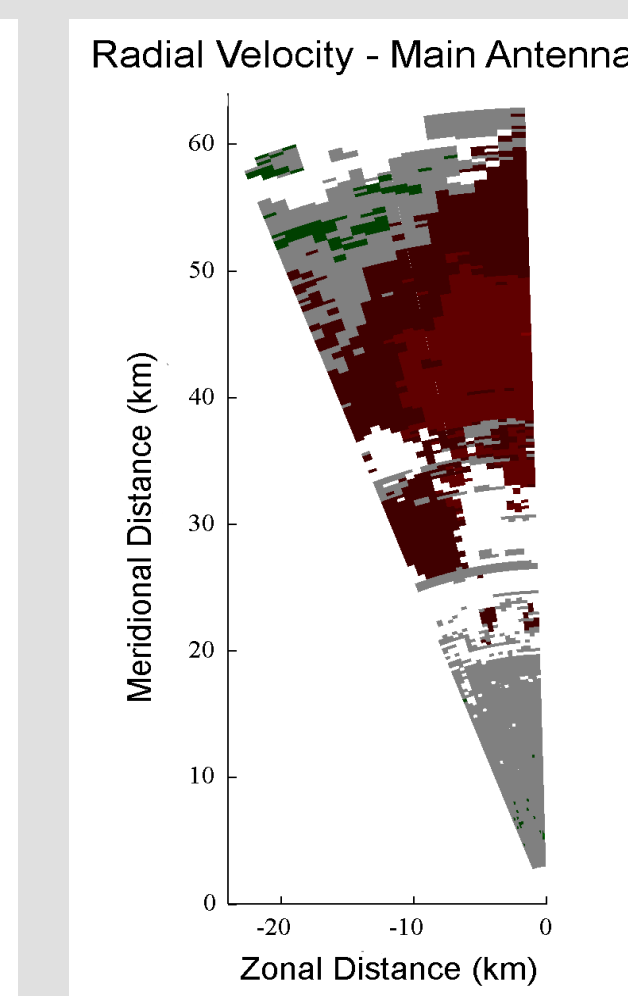
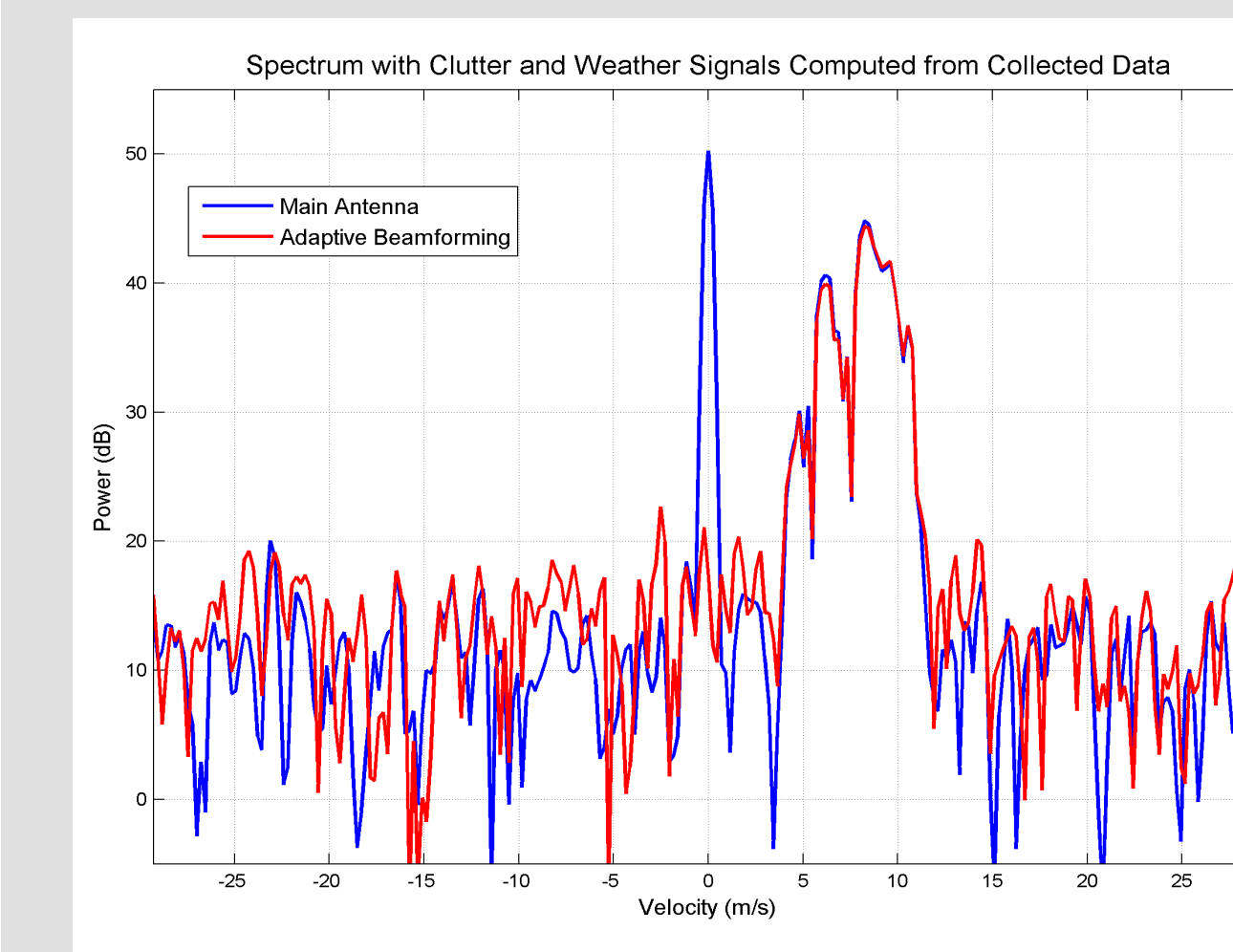
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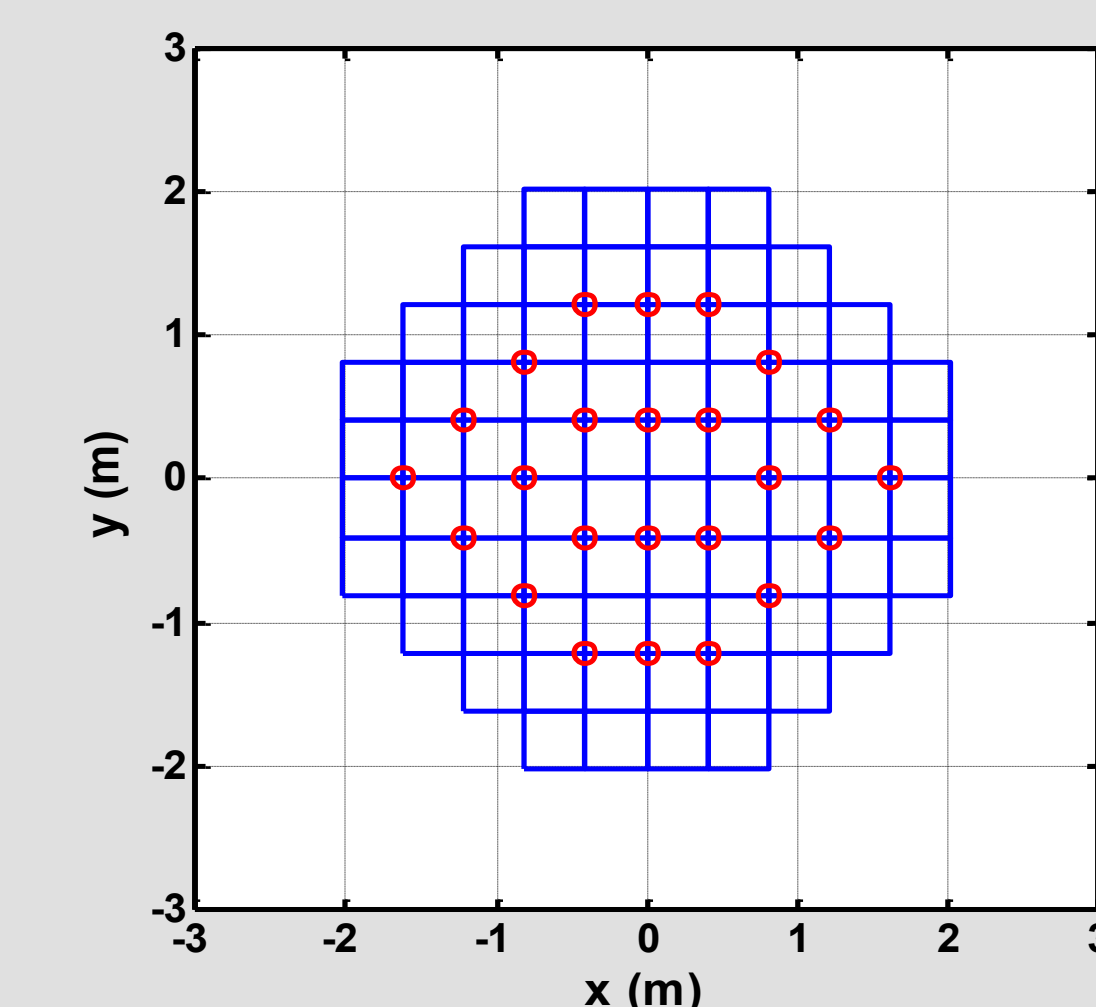
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Modern active arrays such as the Advanced Technology Demonstrator provide more channels and a different array geometry, leading to new research opportunities.



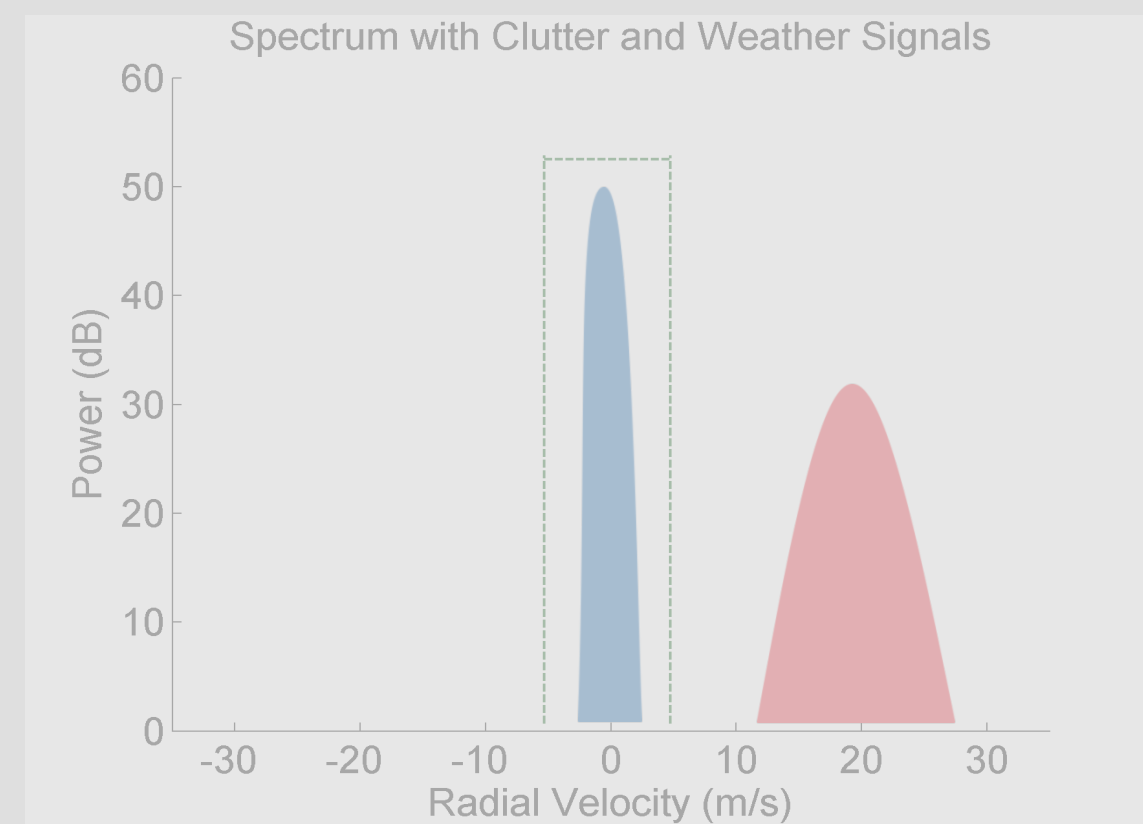
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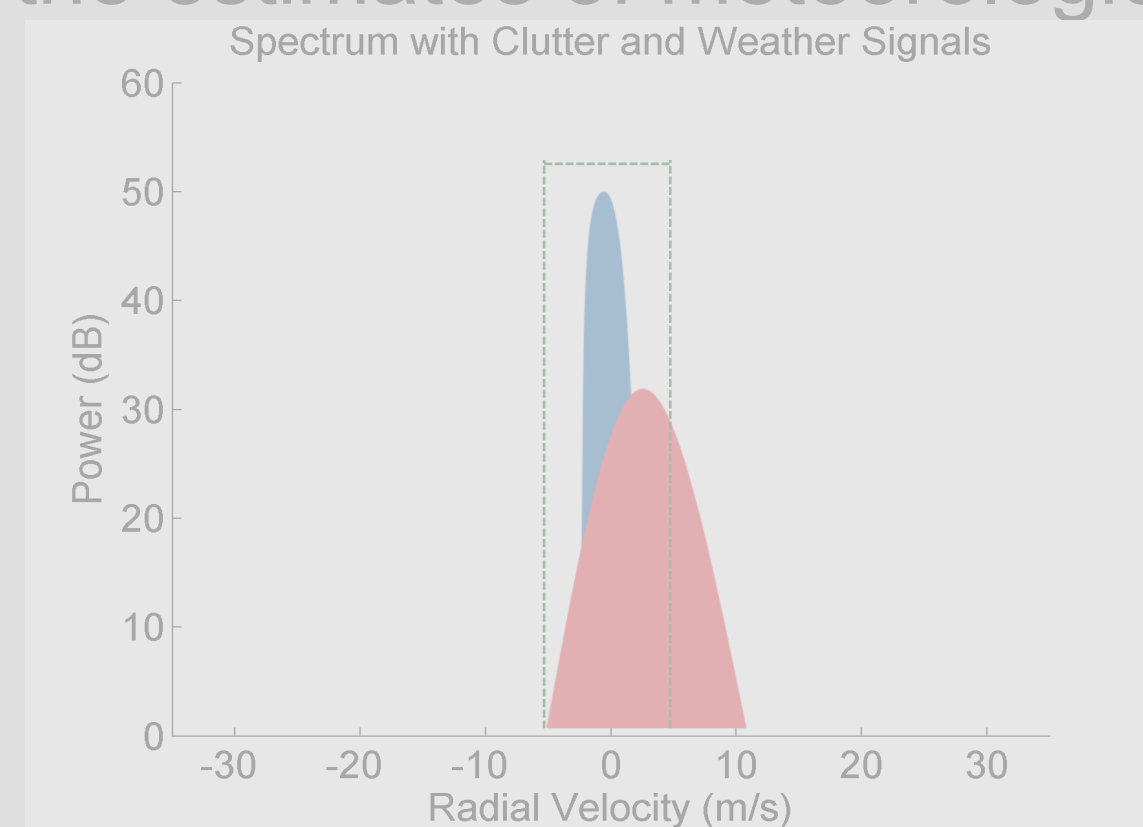
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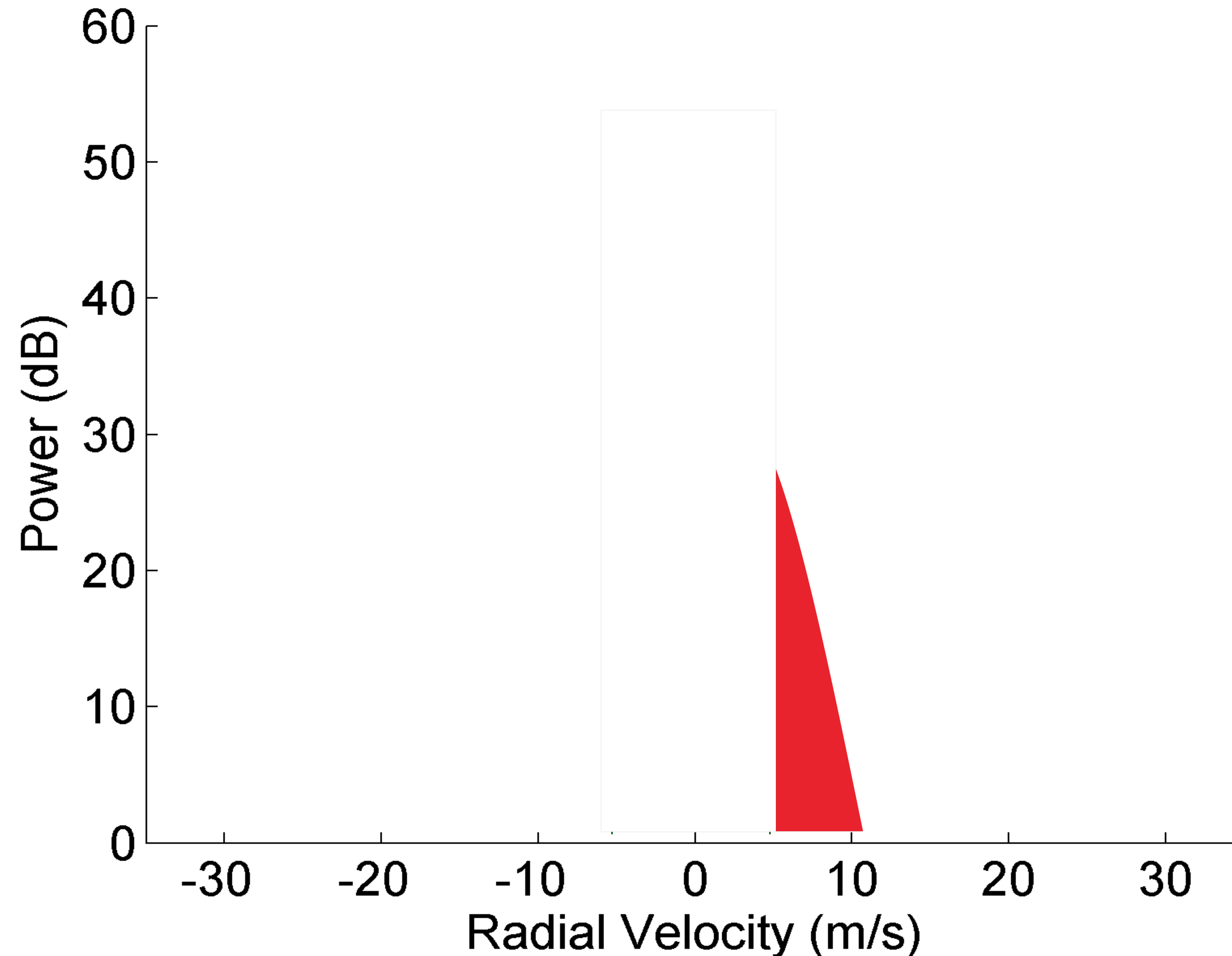


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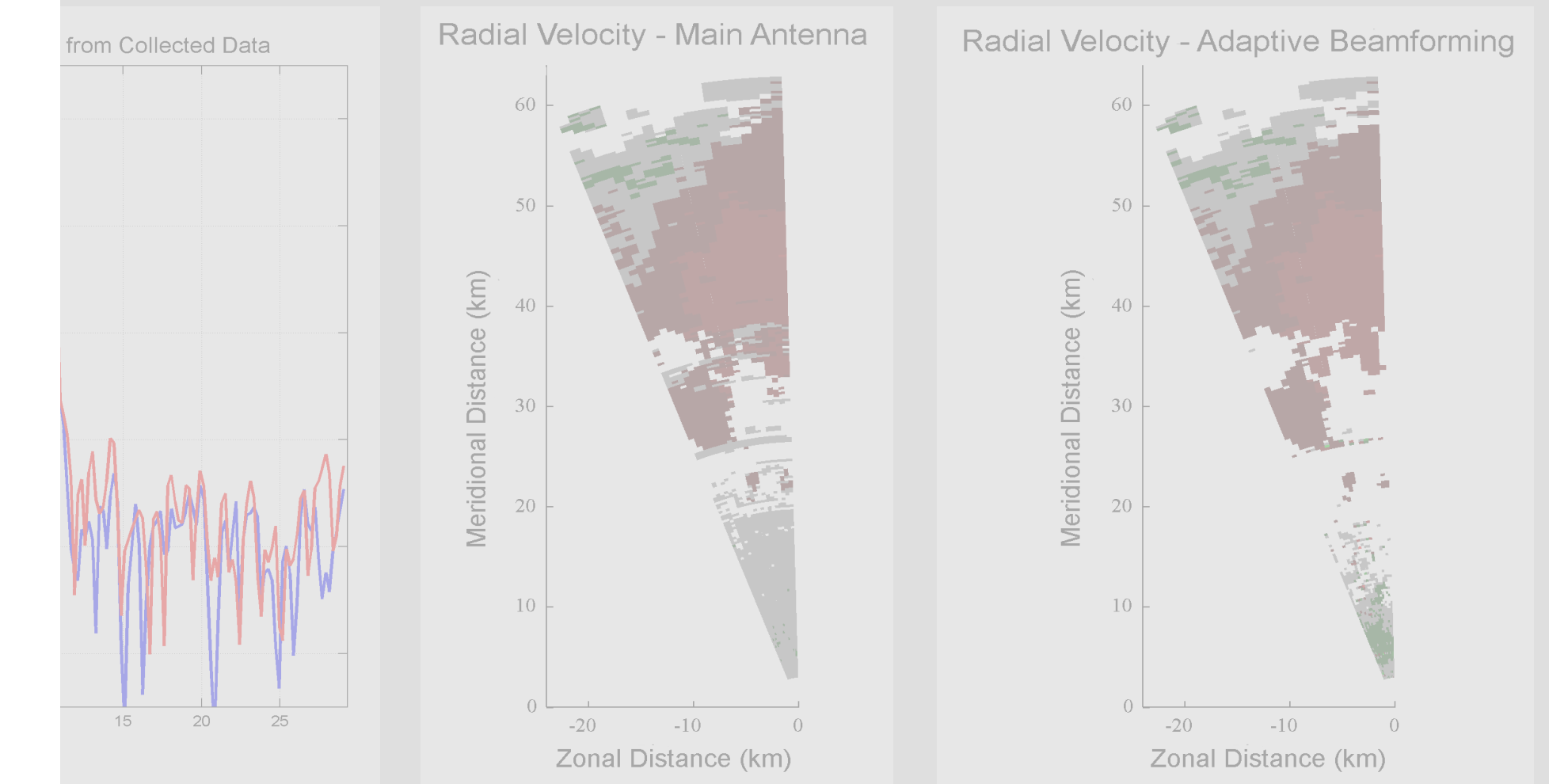
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## Spectrum with Clutter and Weather Signals



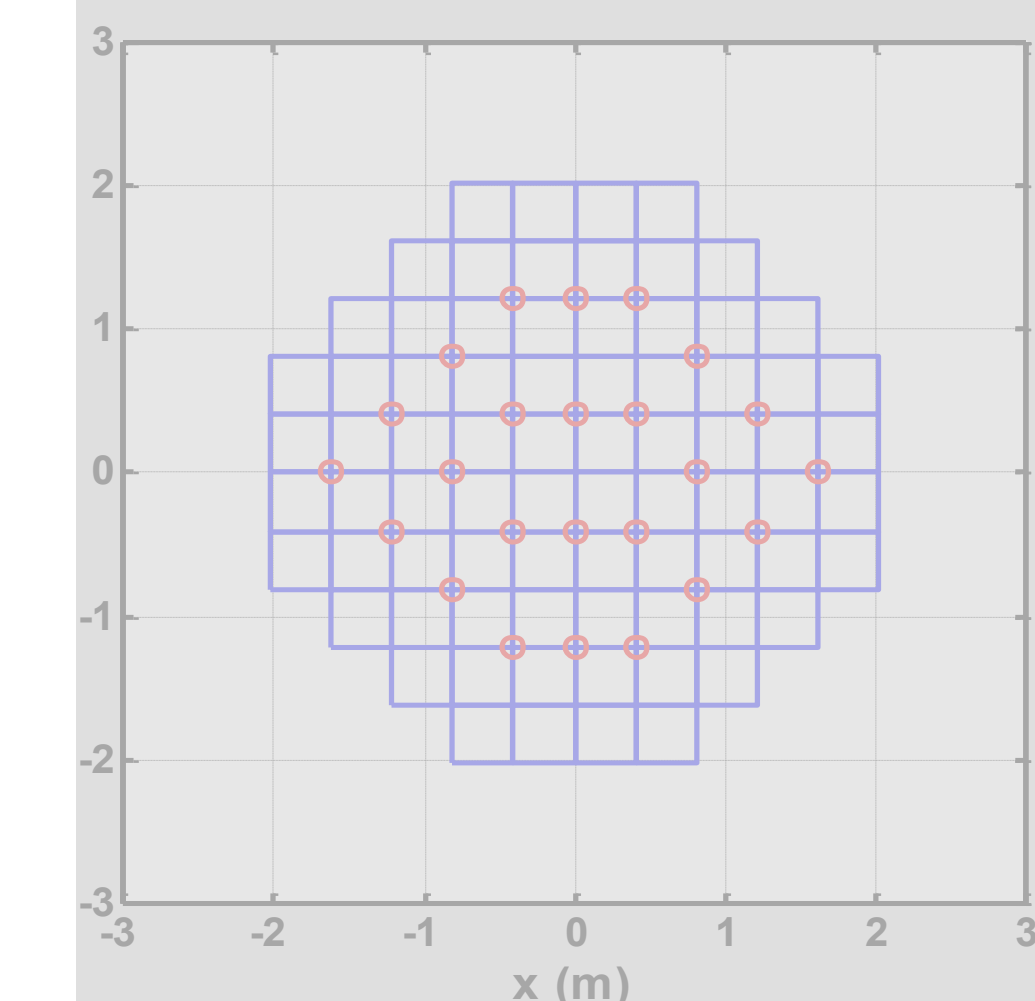
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## Phased Array Active Arrays

Advances in active array technology, such as the Advanced Technology Active Array (ATAA), provide more channels and a different array geometry, which offers many opportunities.



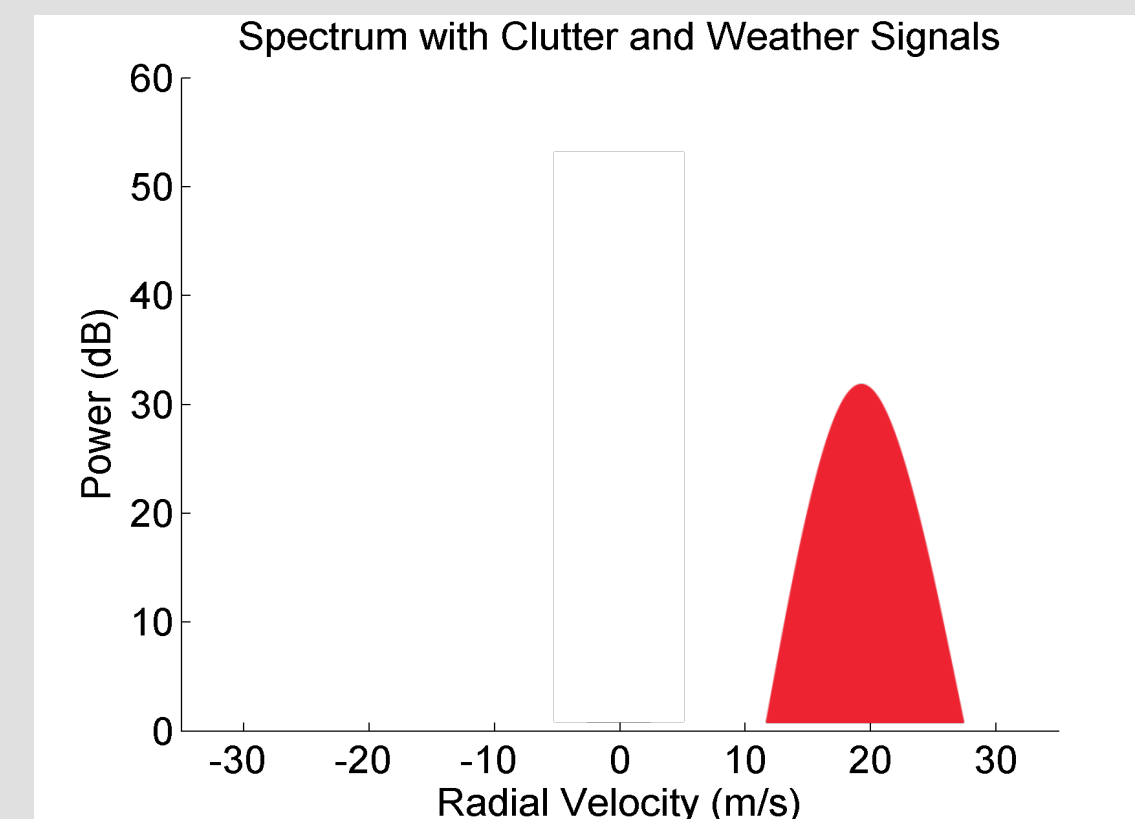
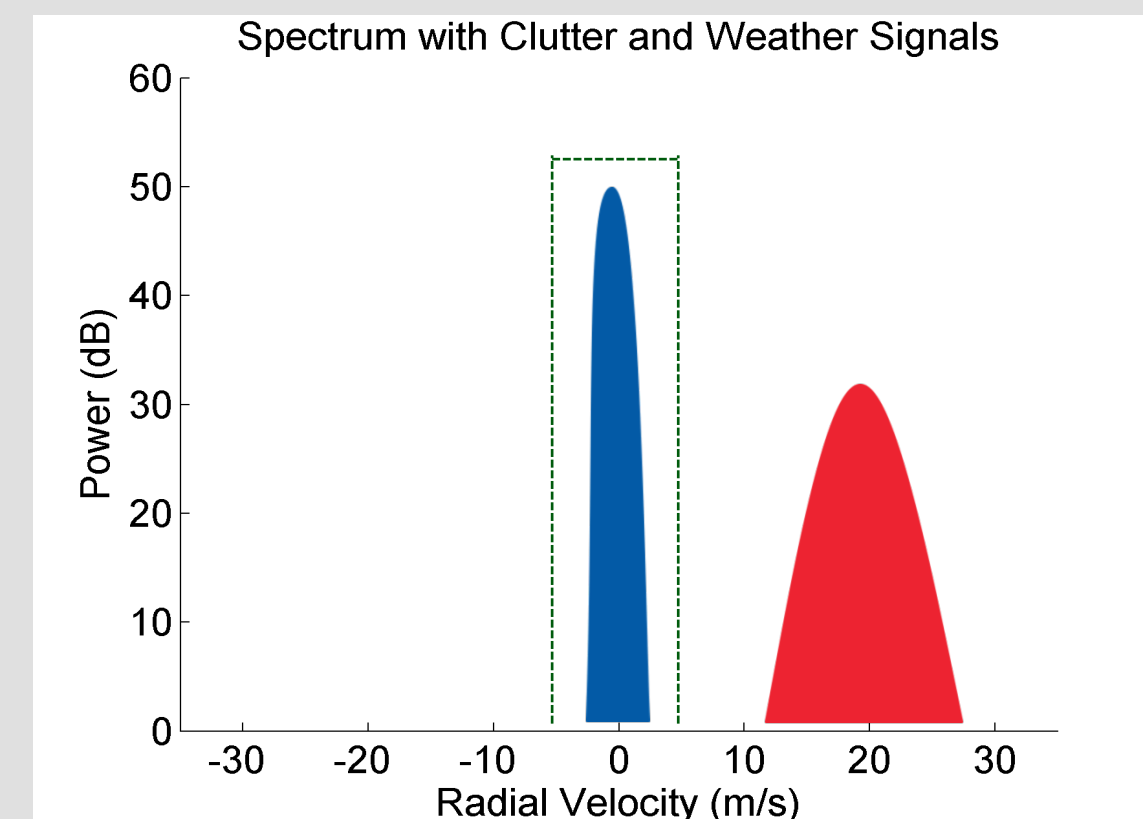
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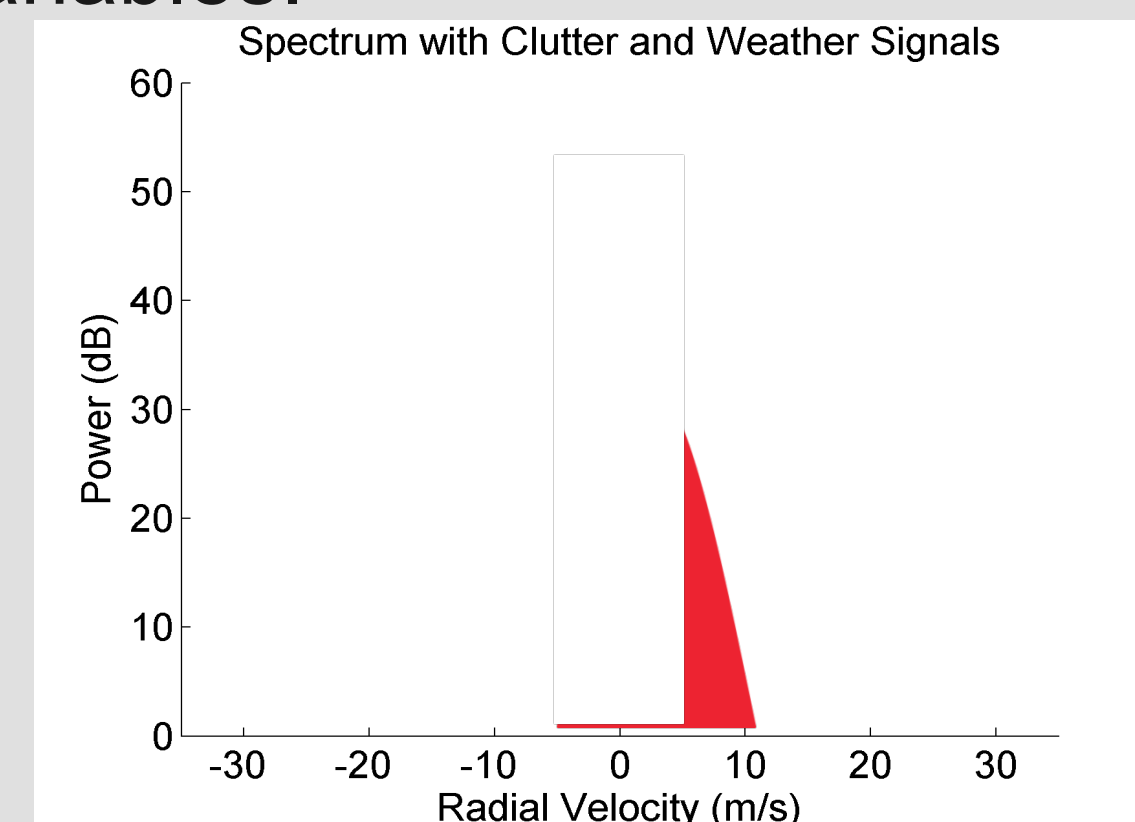
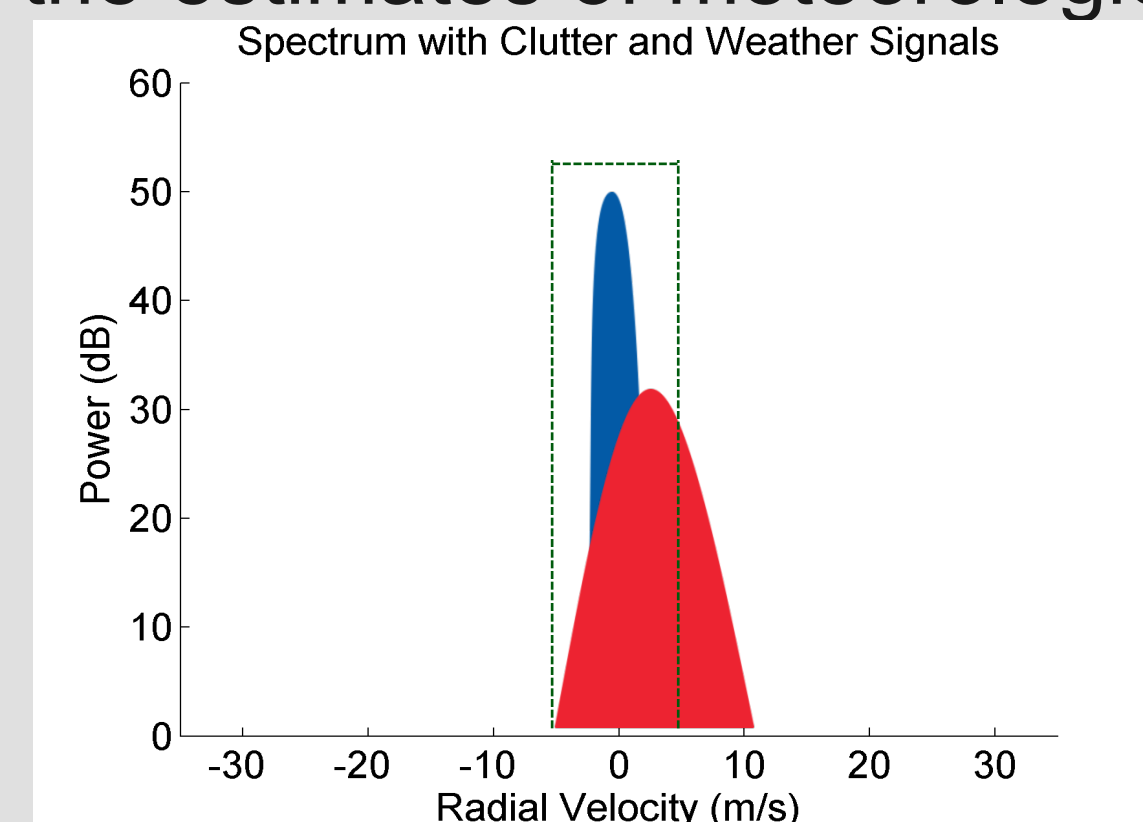
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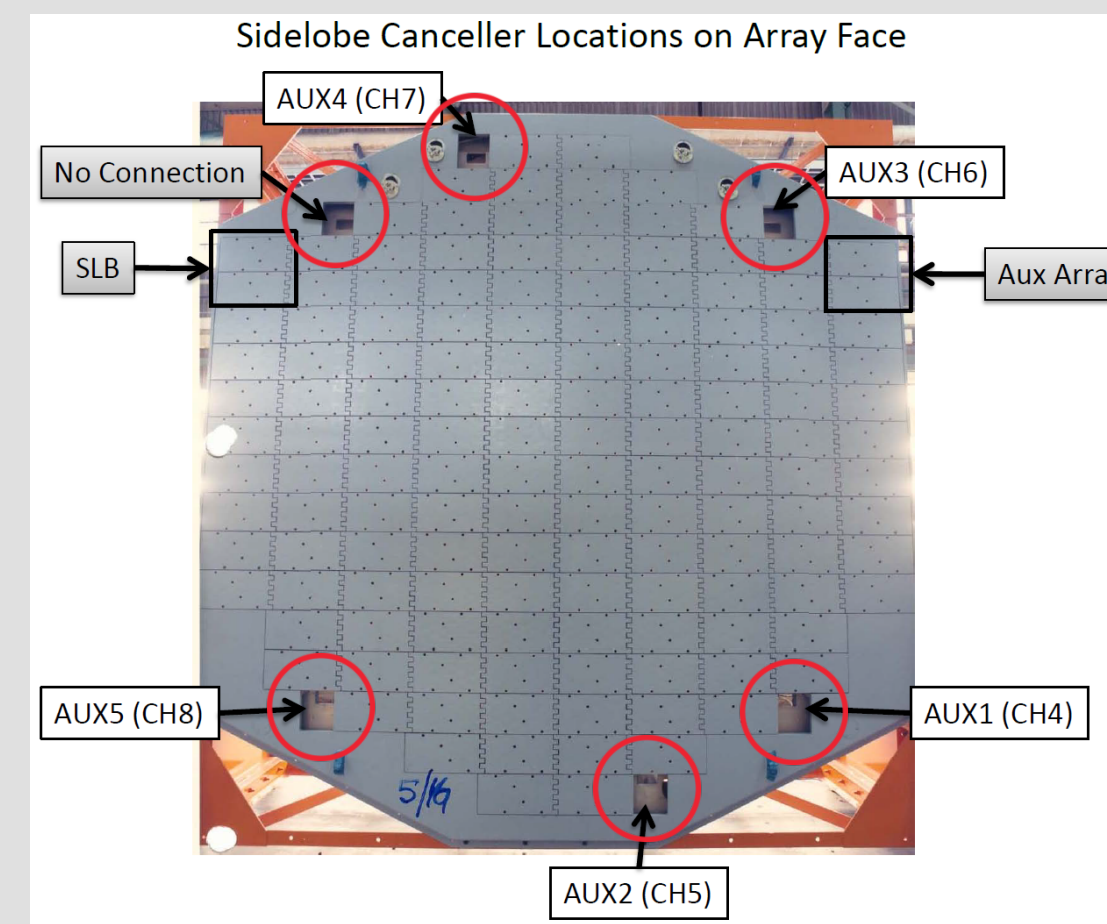
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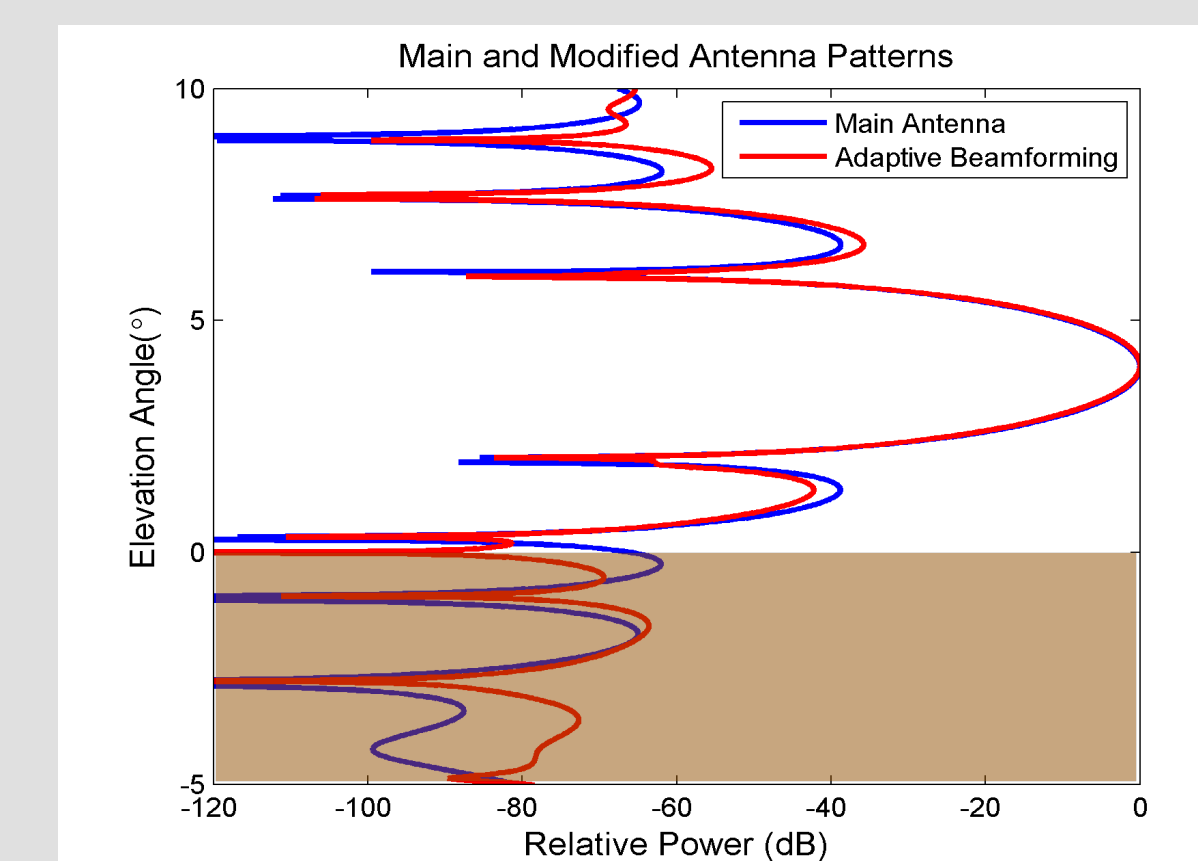
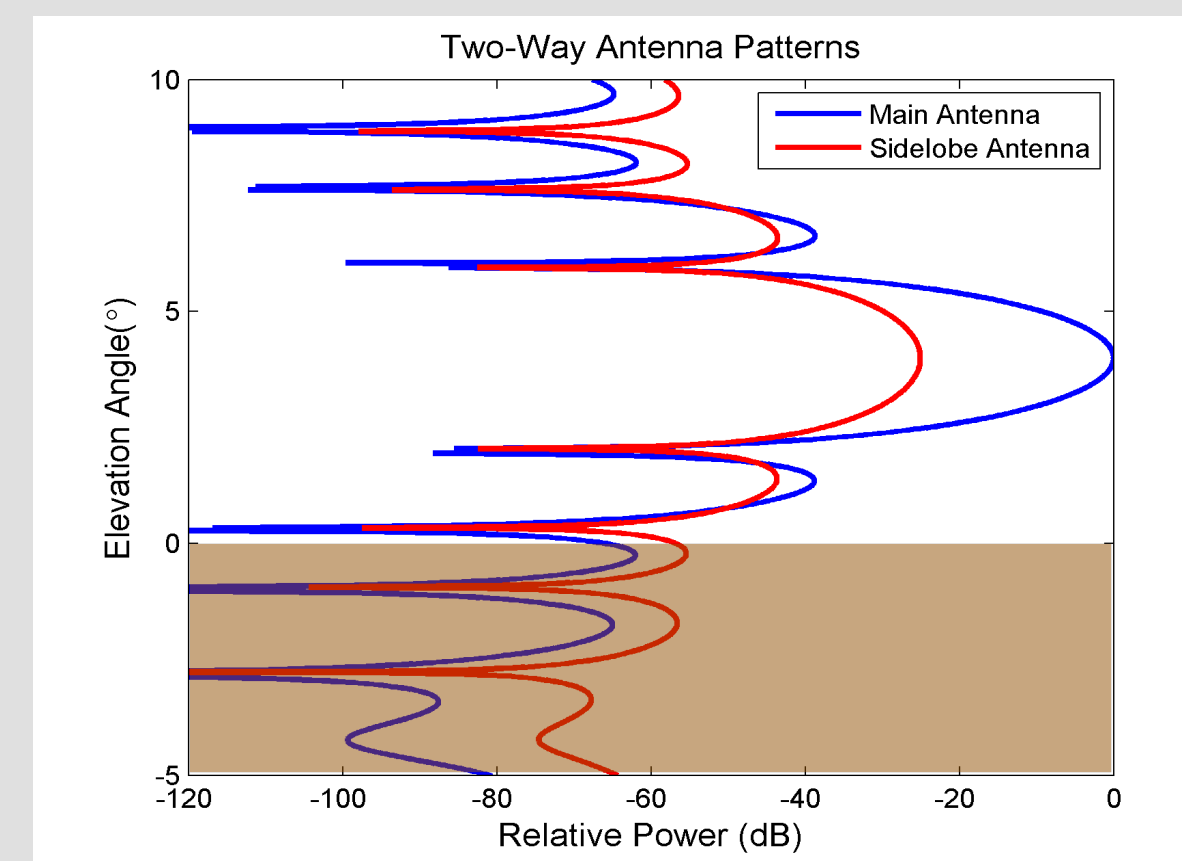
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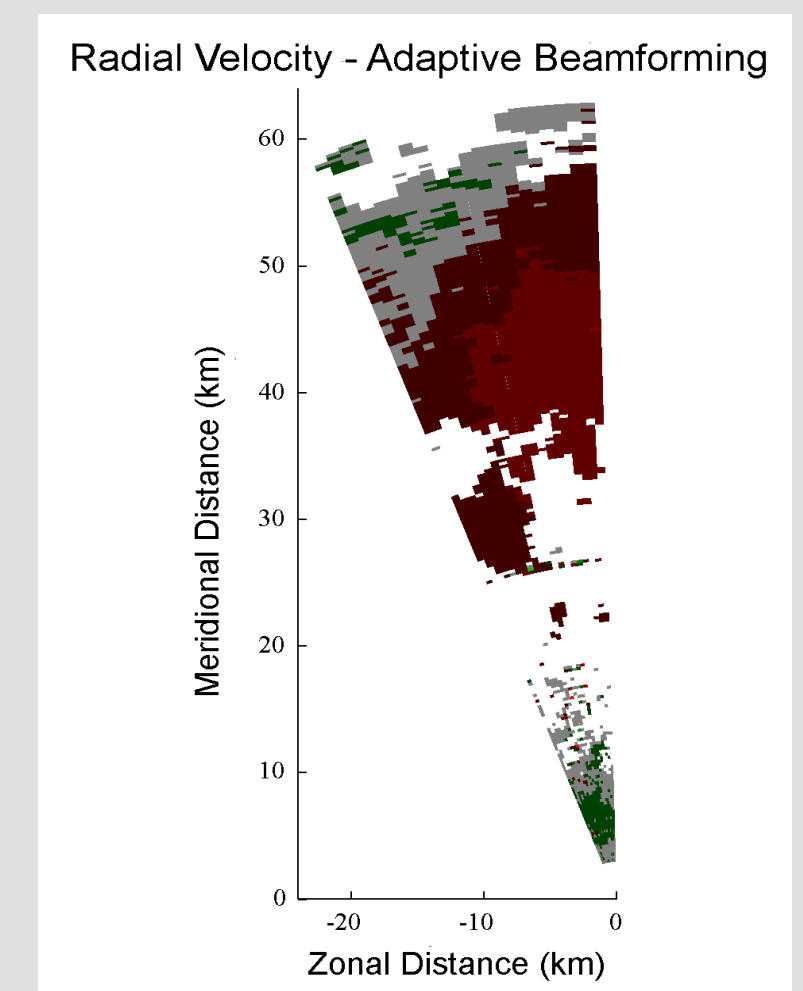
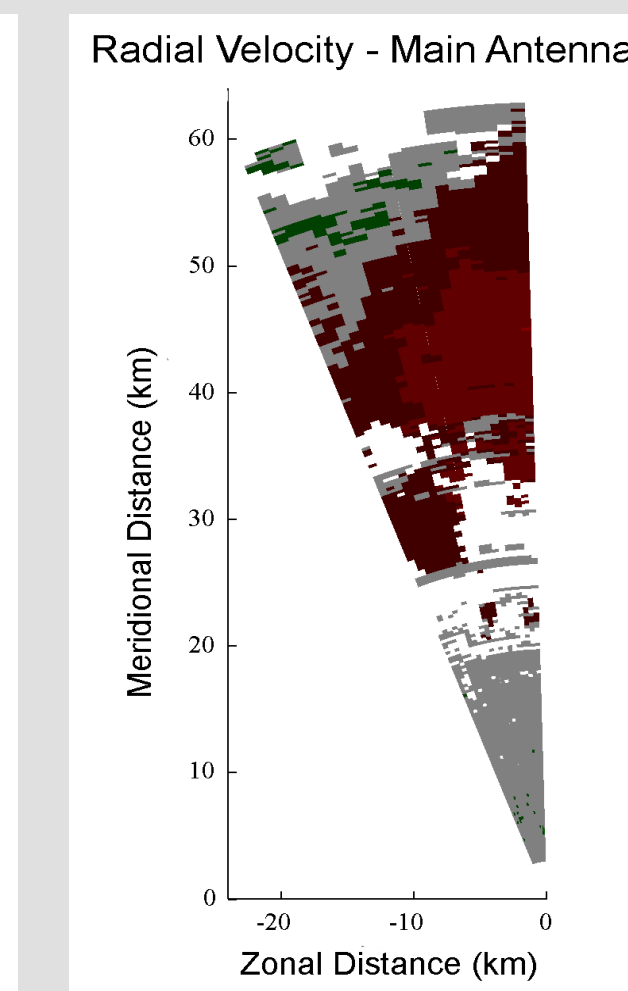
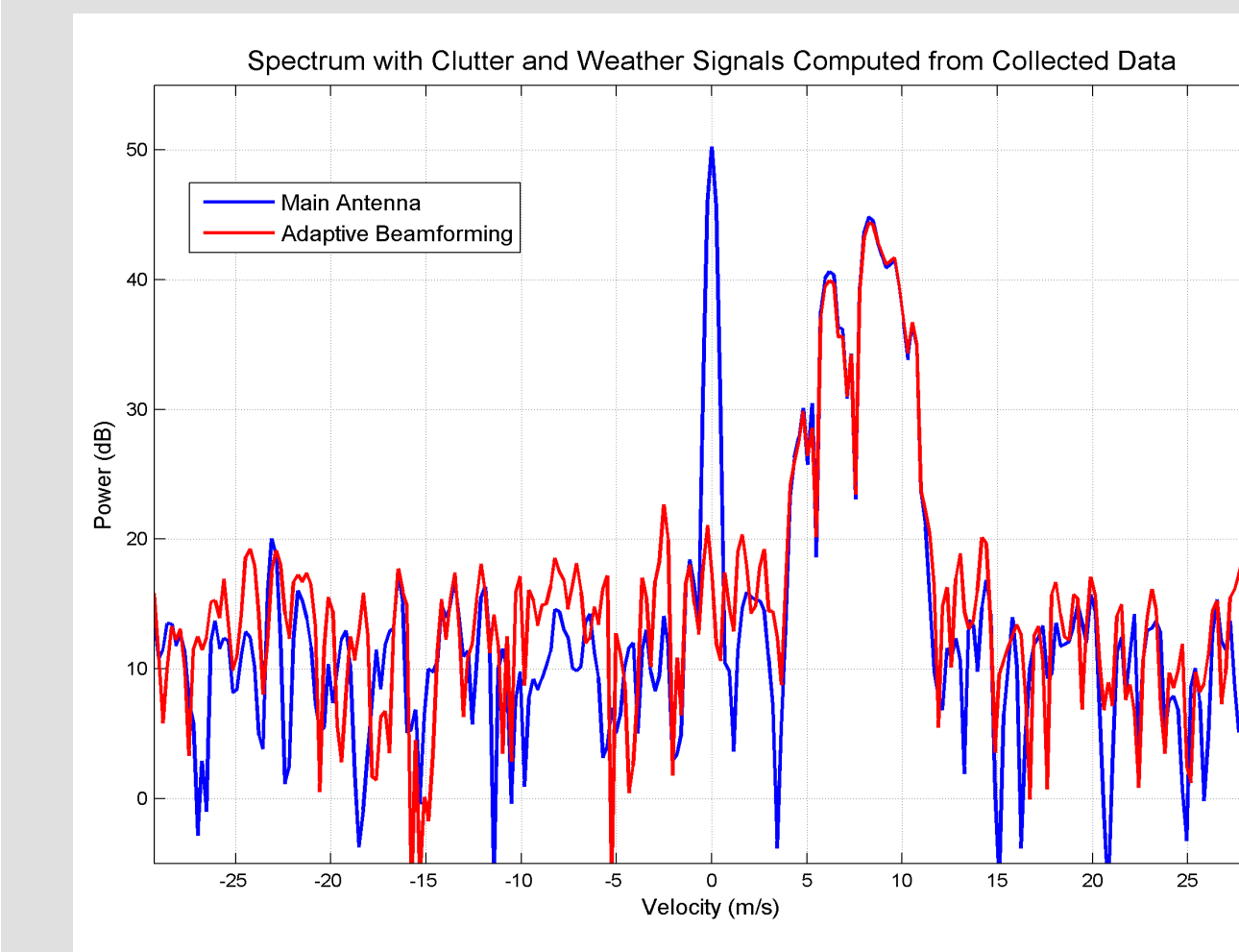
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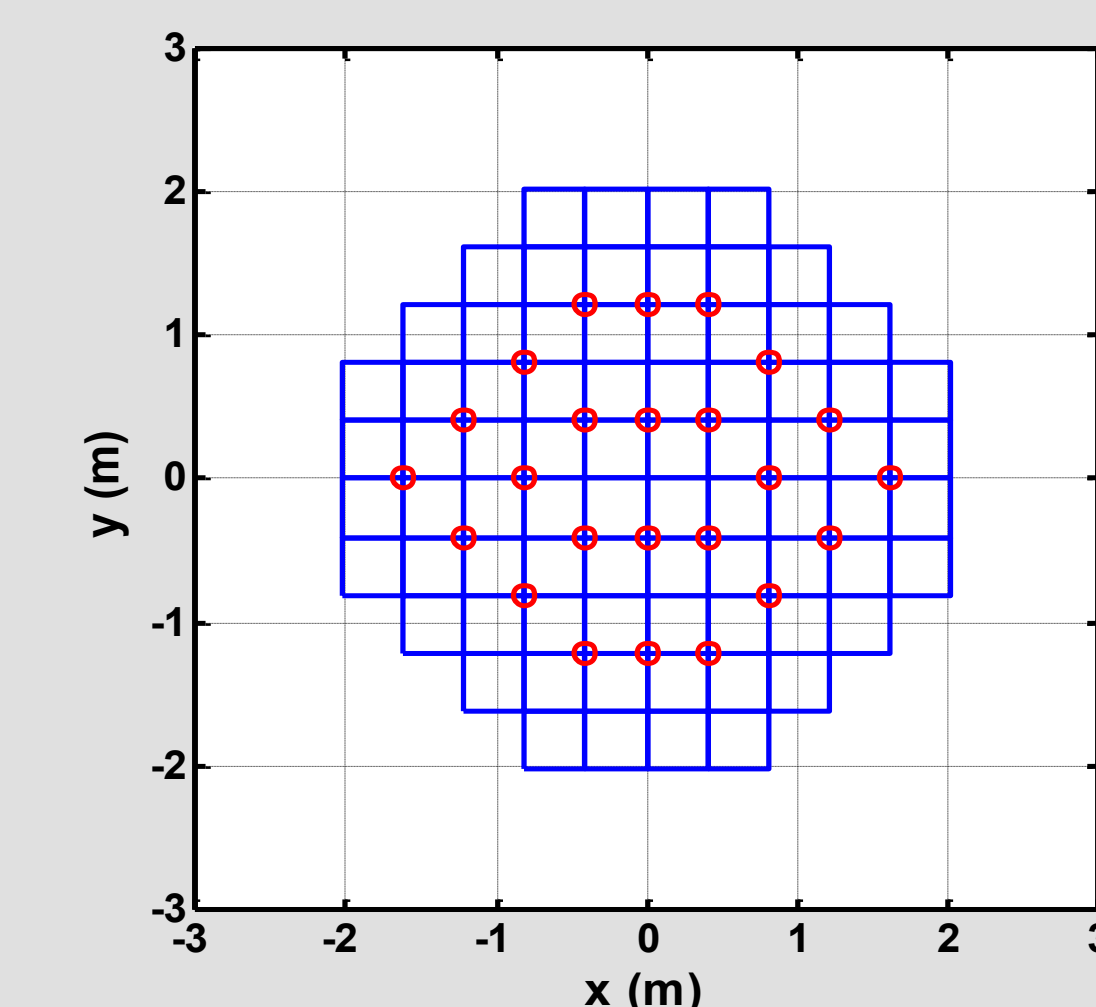
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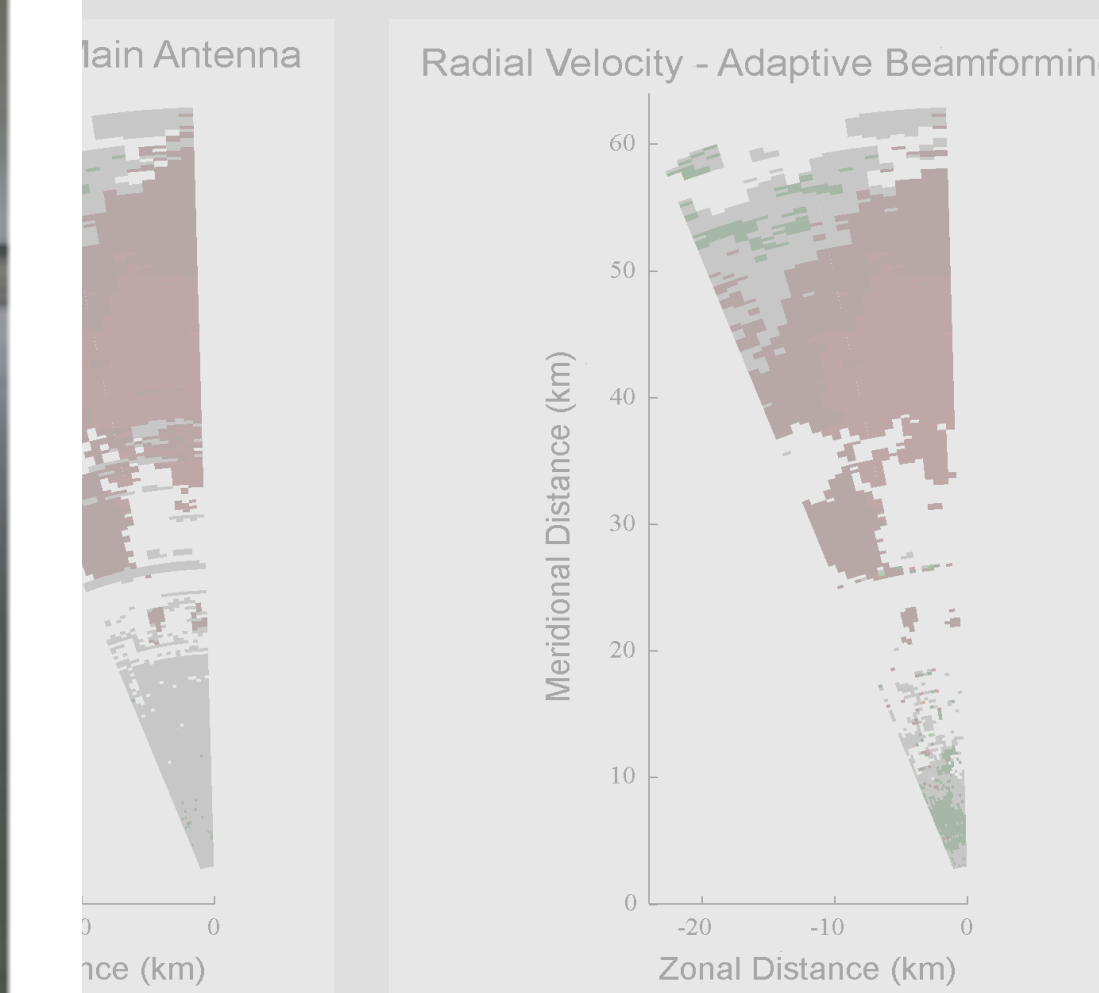
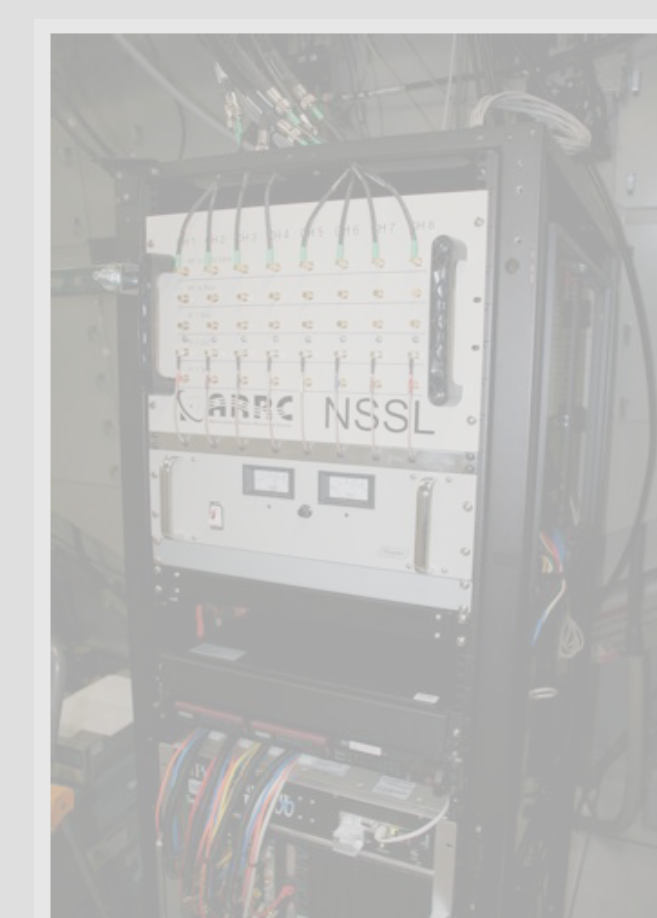
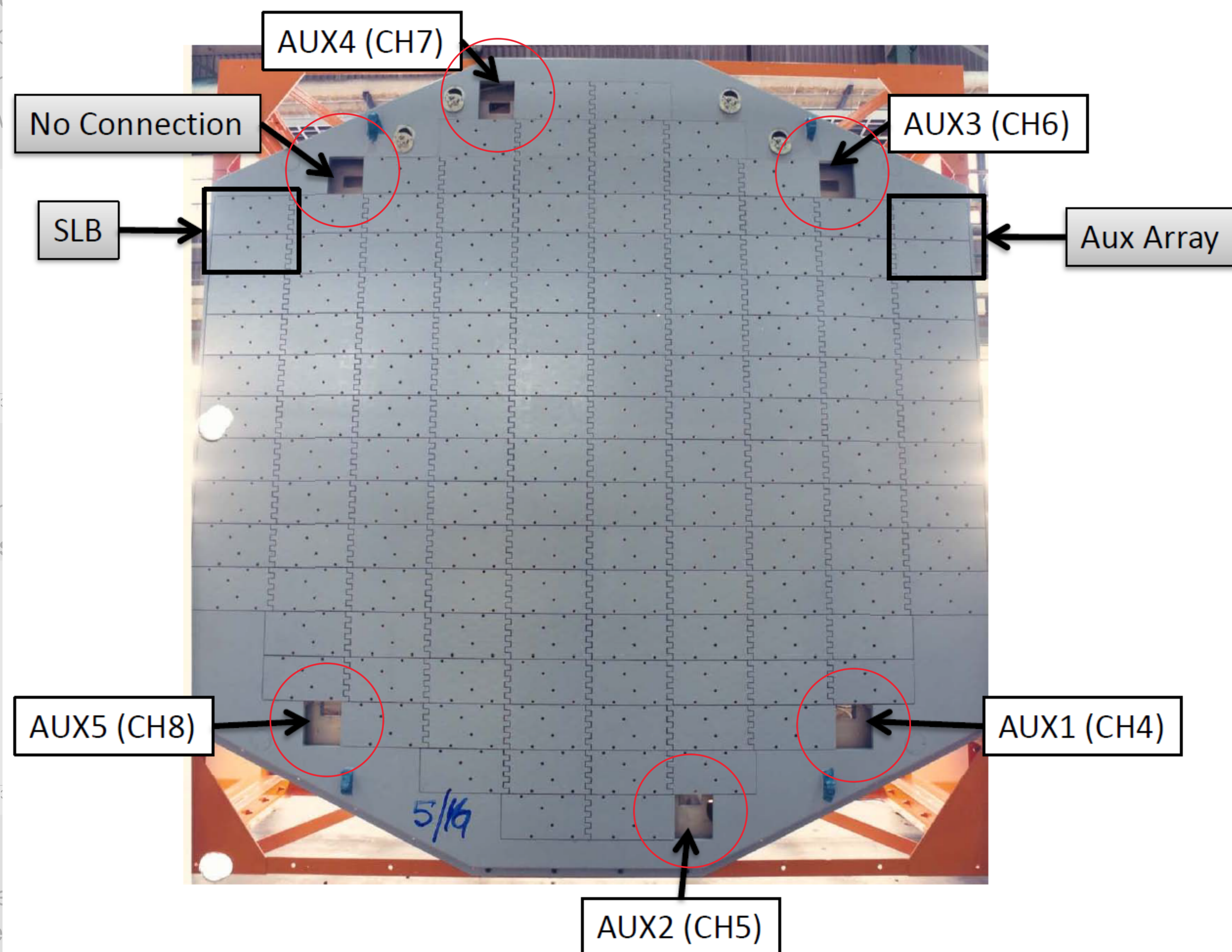
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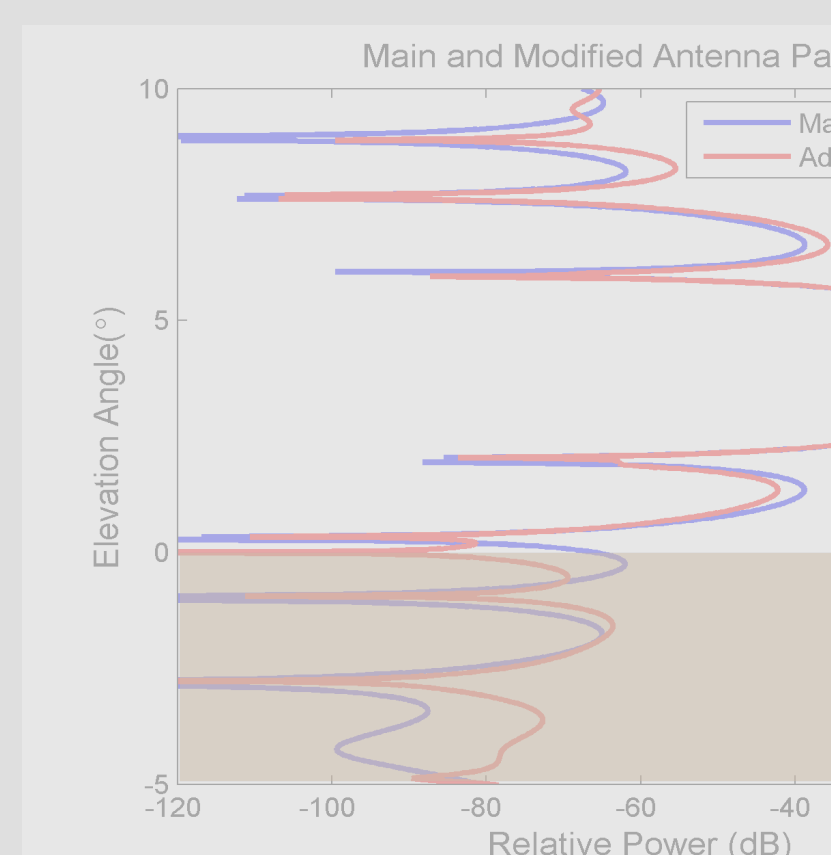
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## Sidelobe Canceller Locations on Array Face



## Arrays

Technology  
different array geometry,



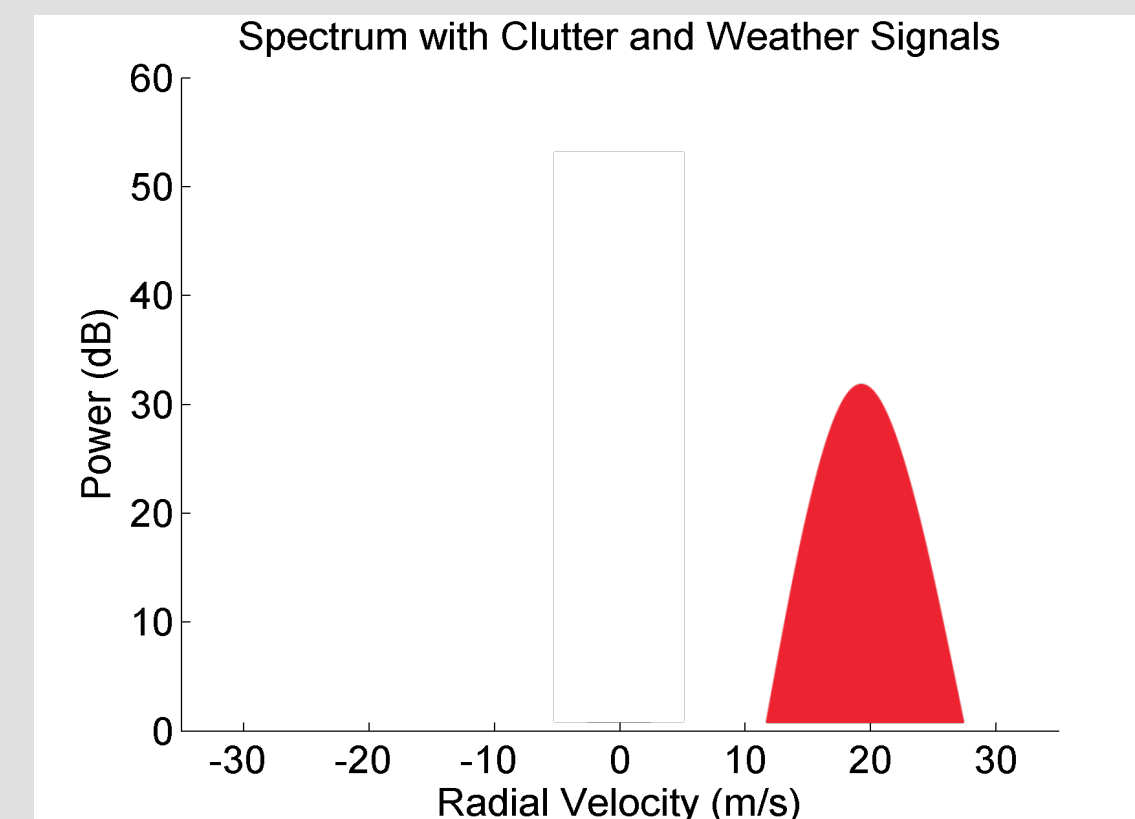
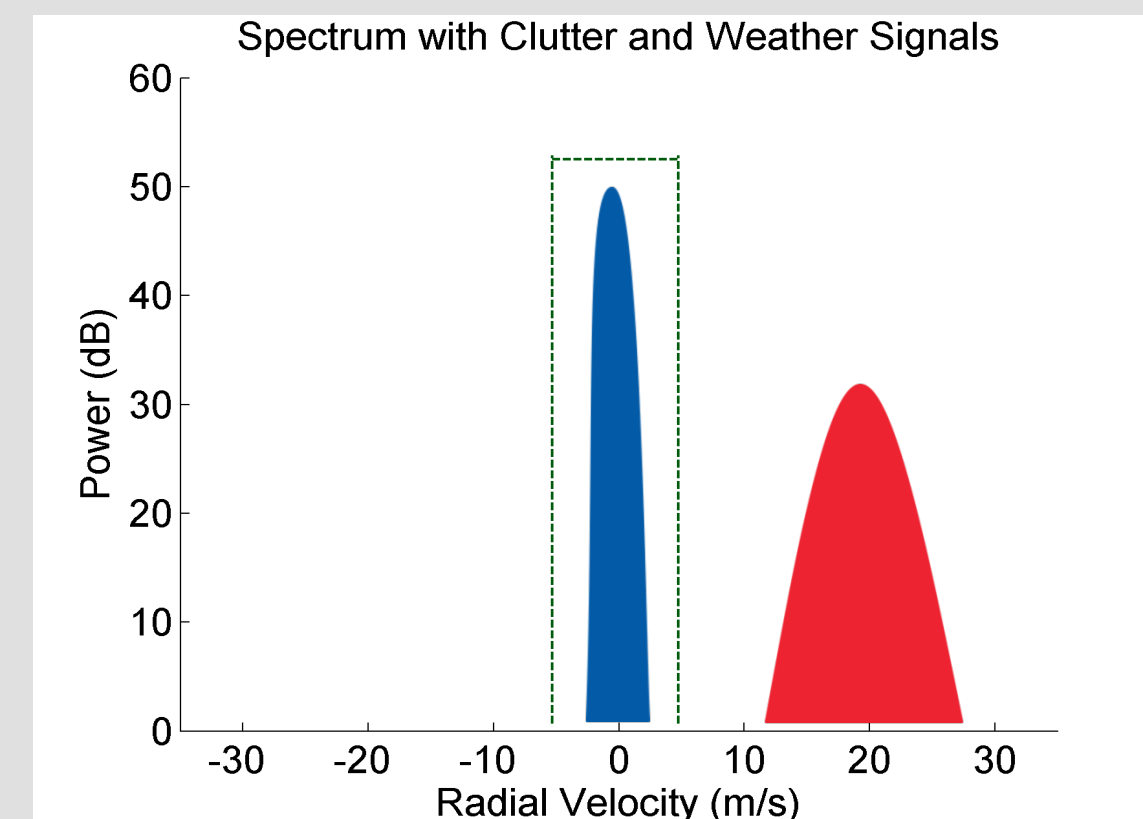
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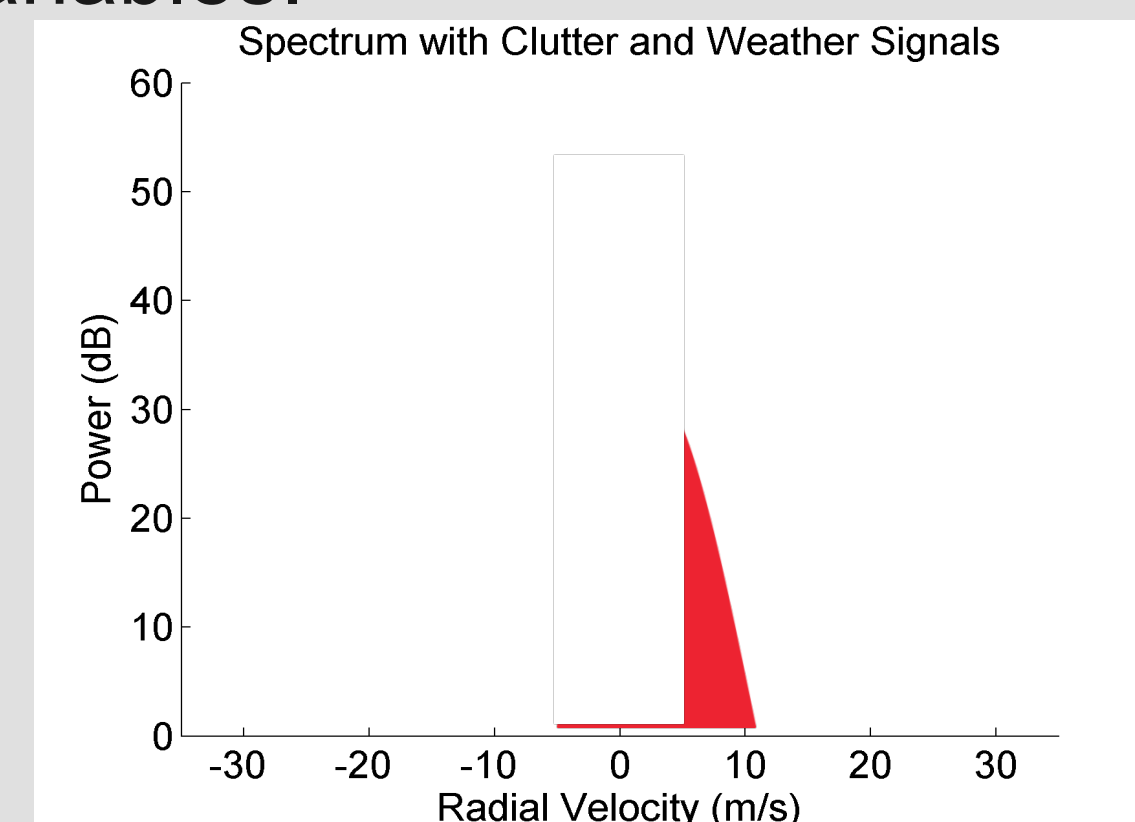
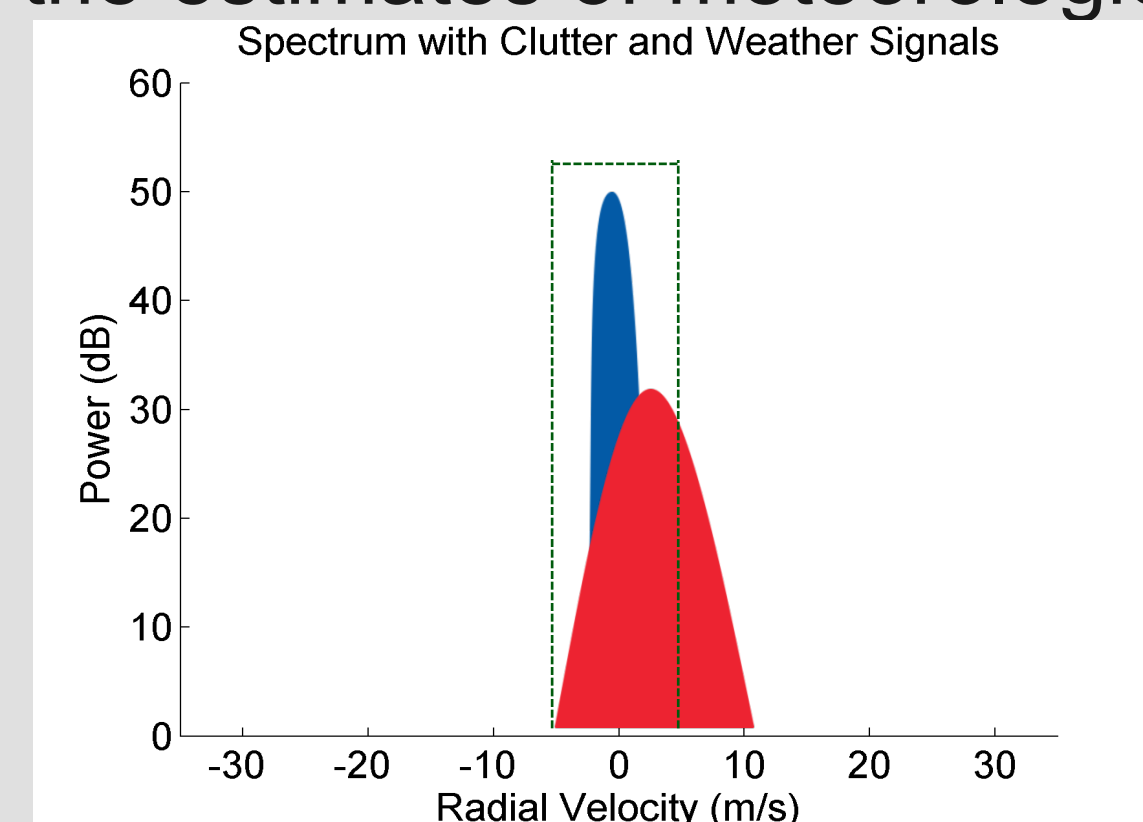
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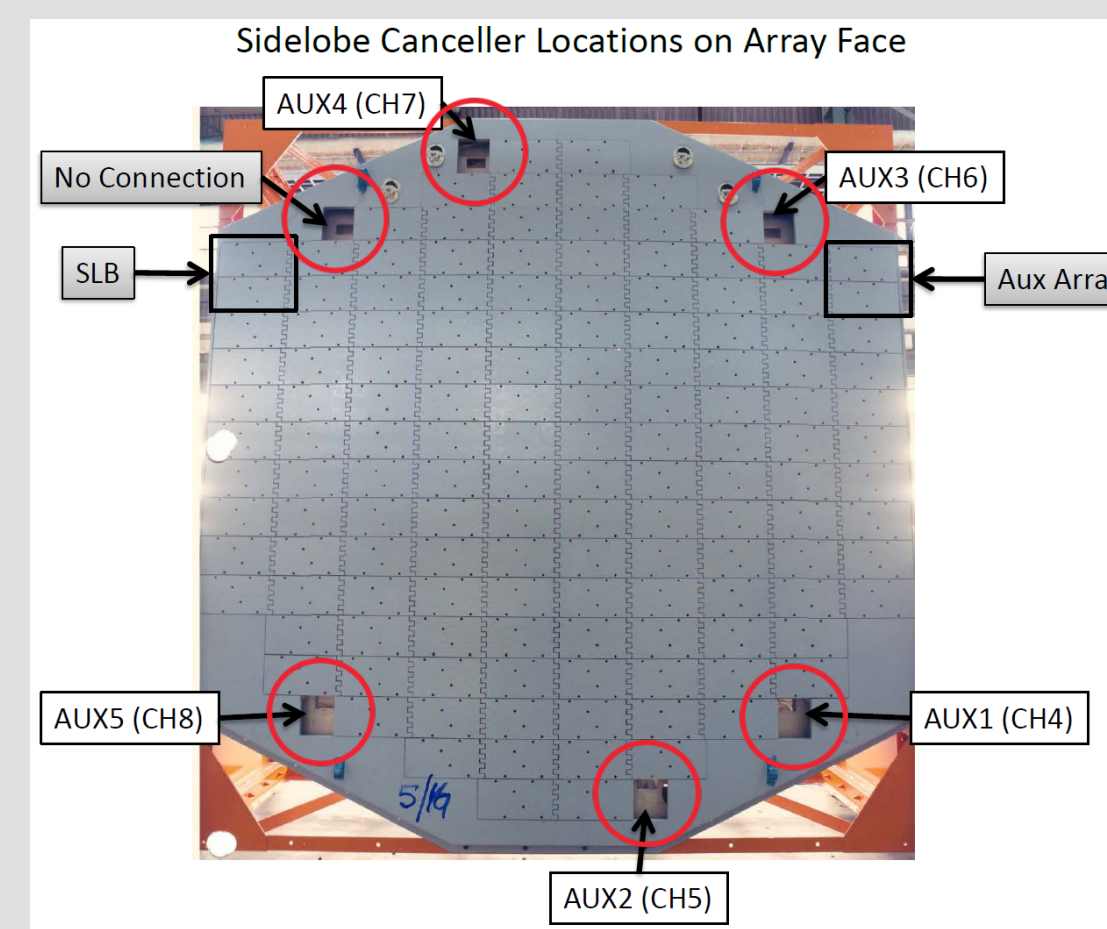
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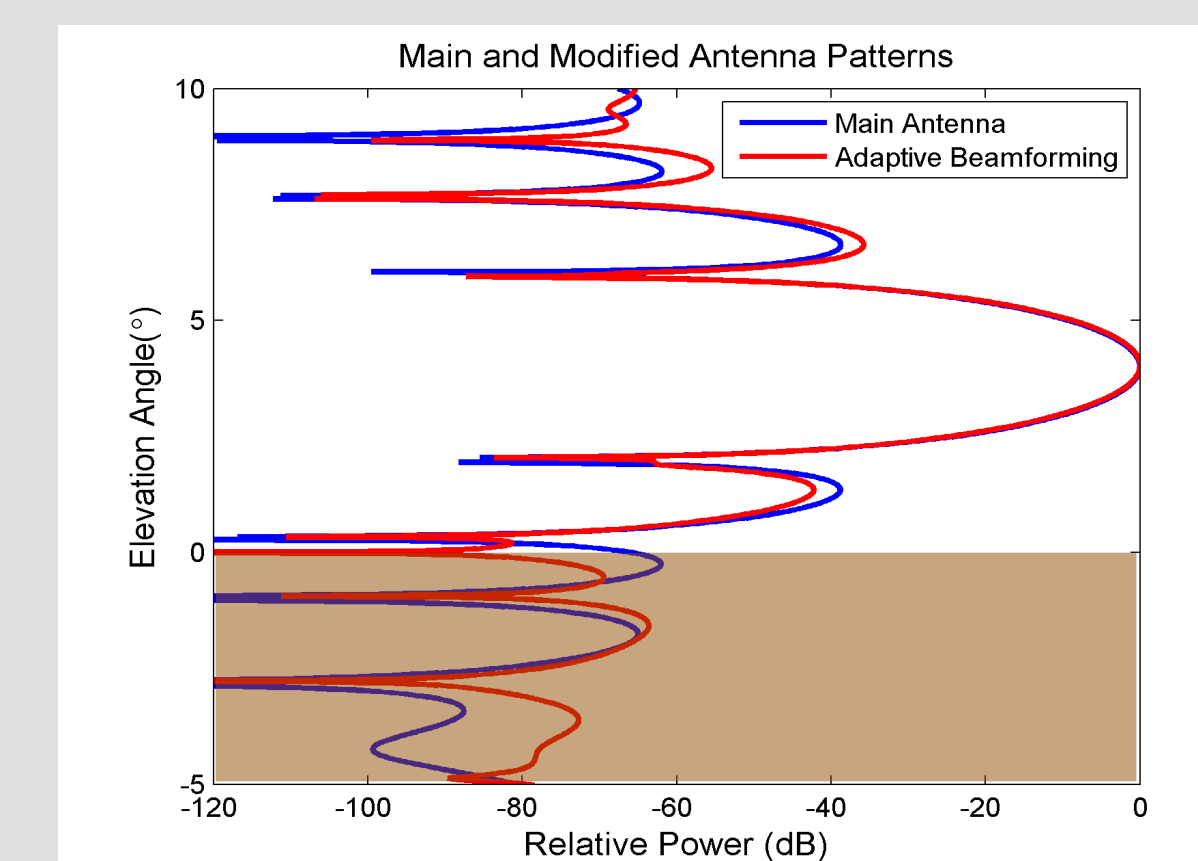
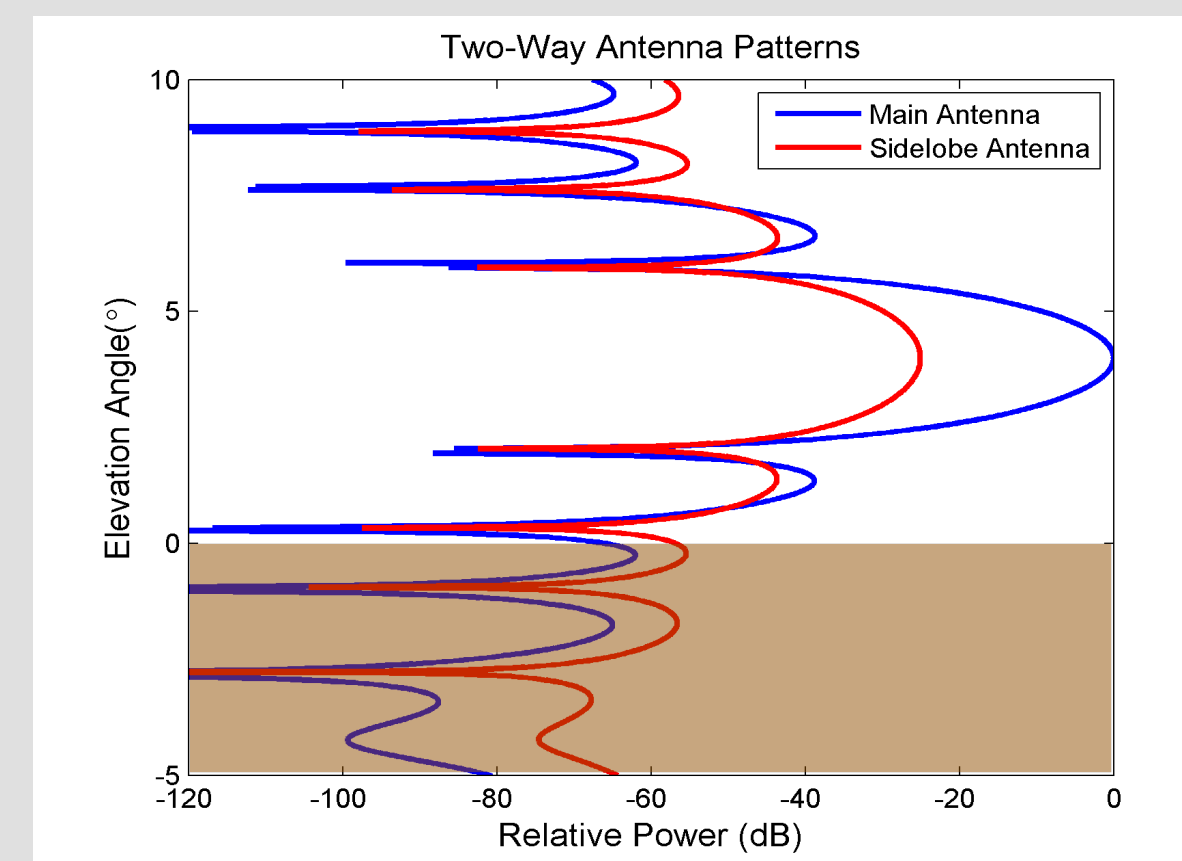
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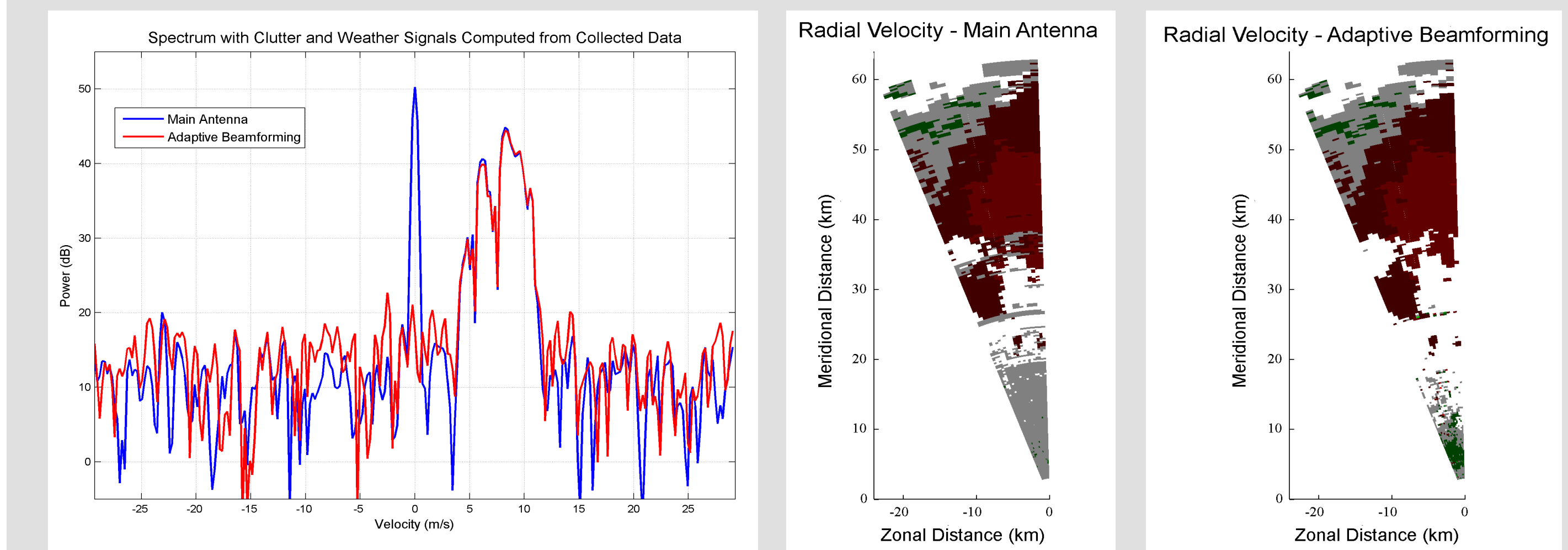
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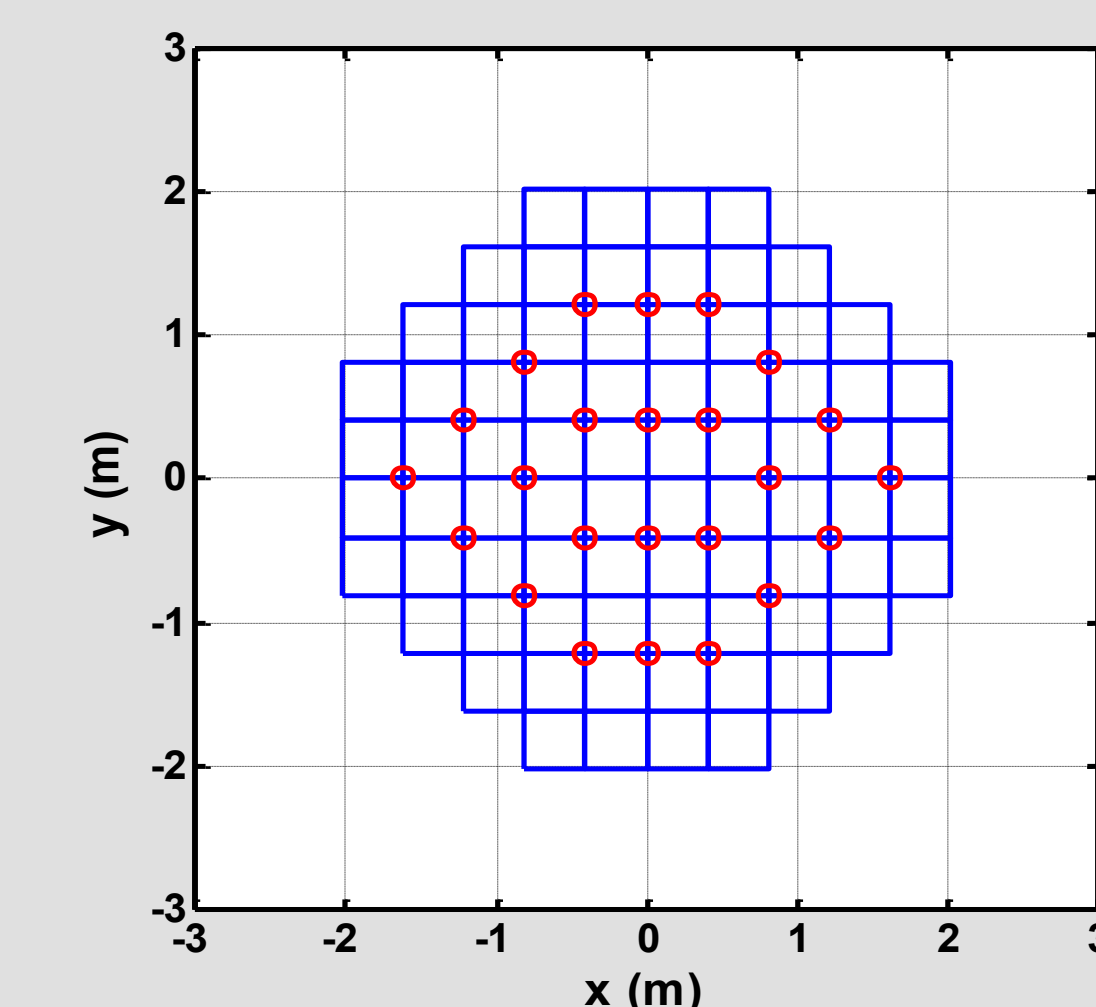
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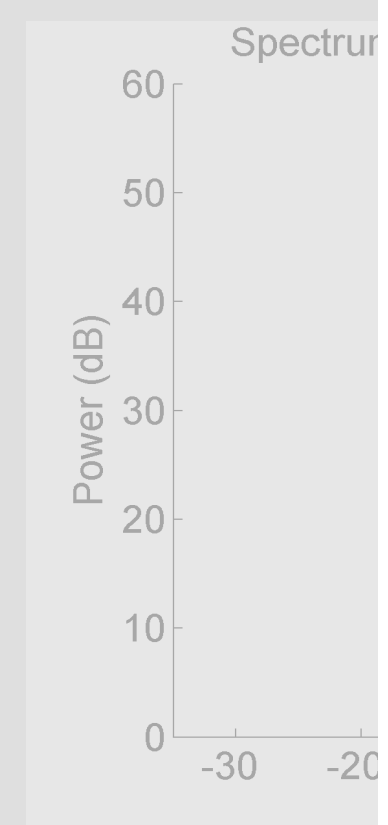
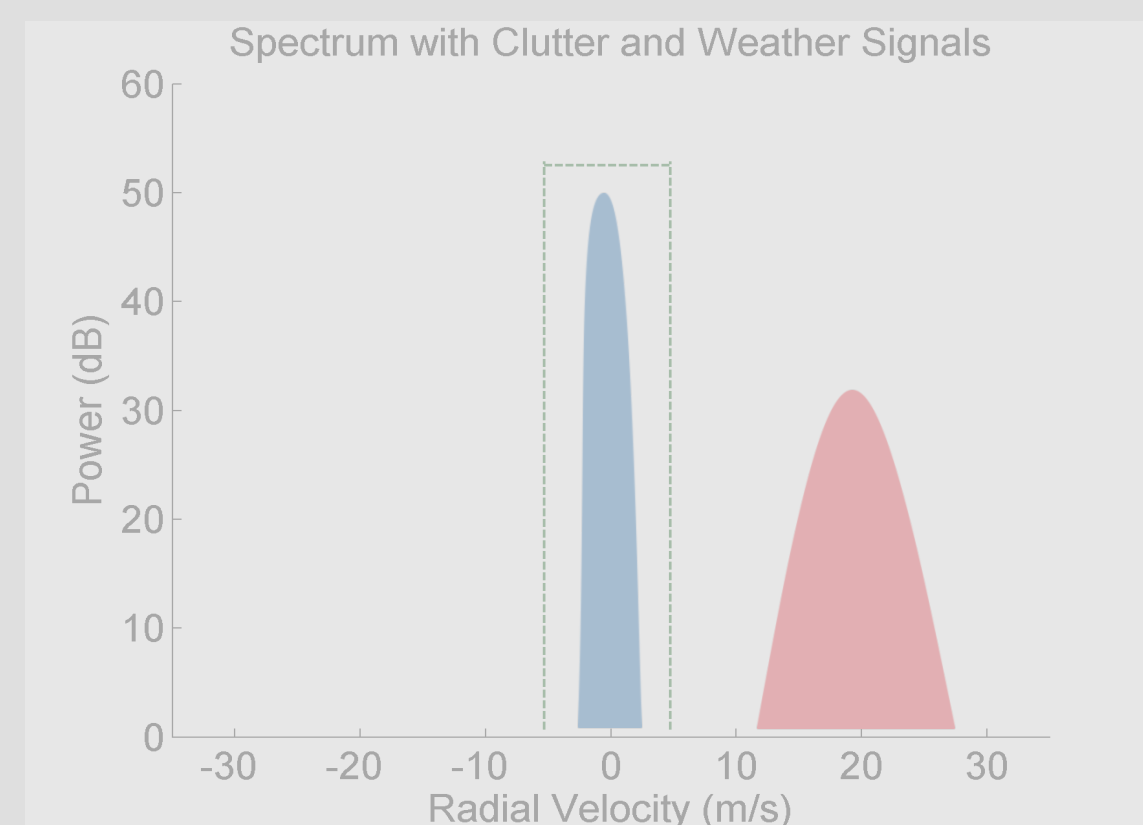
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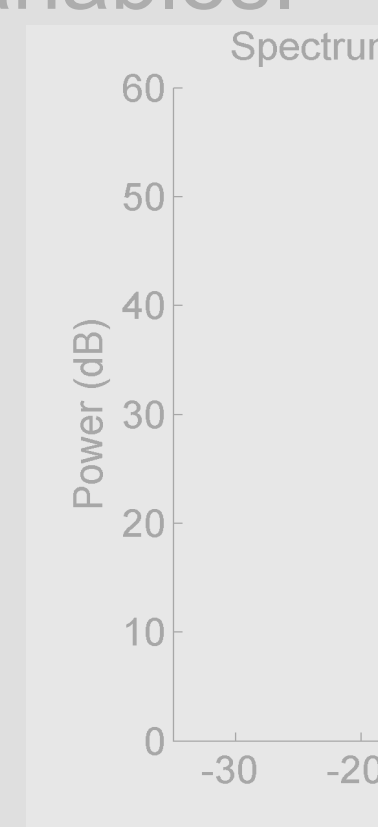
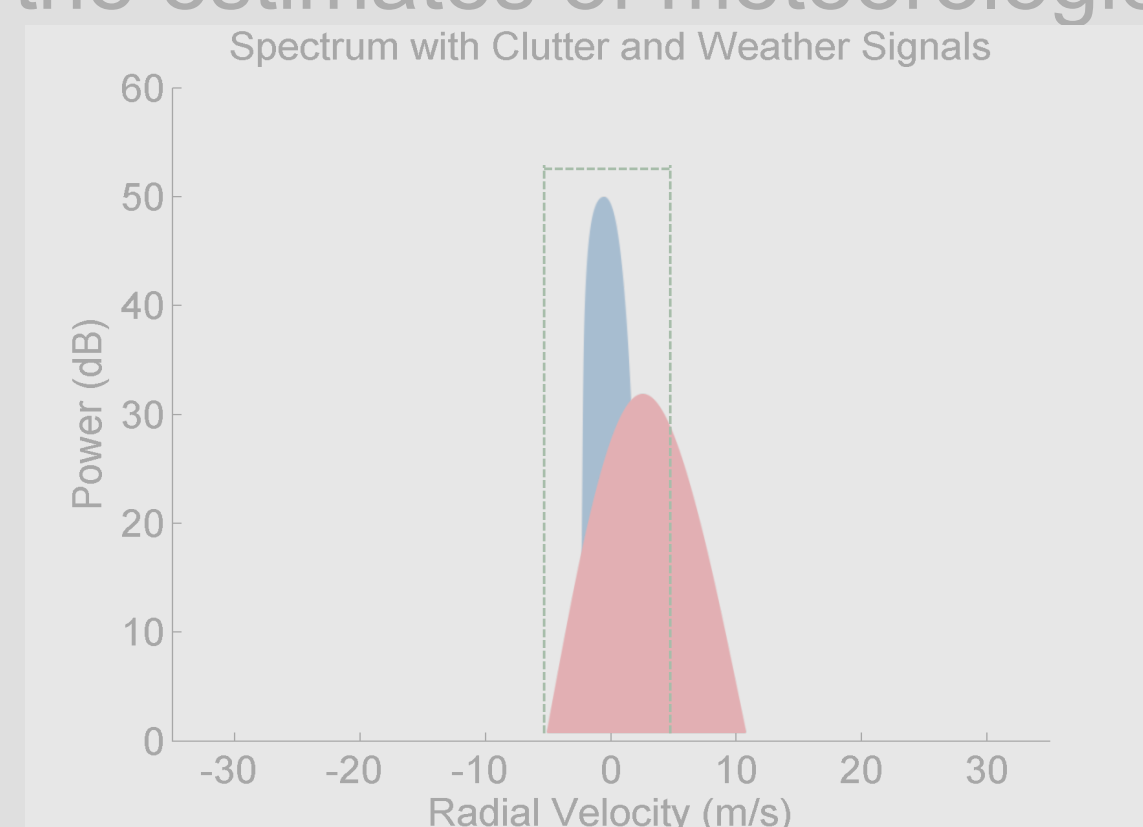
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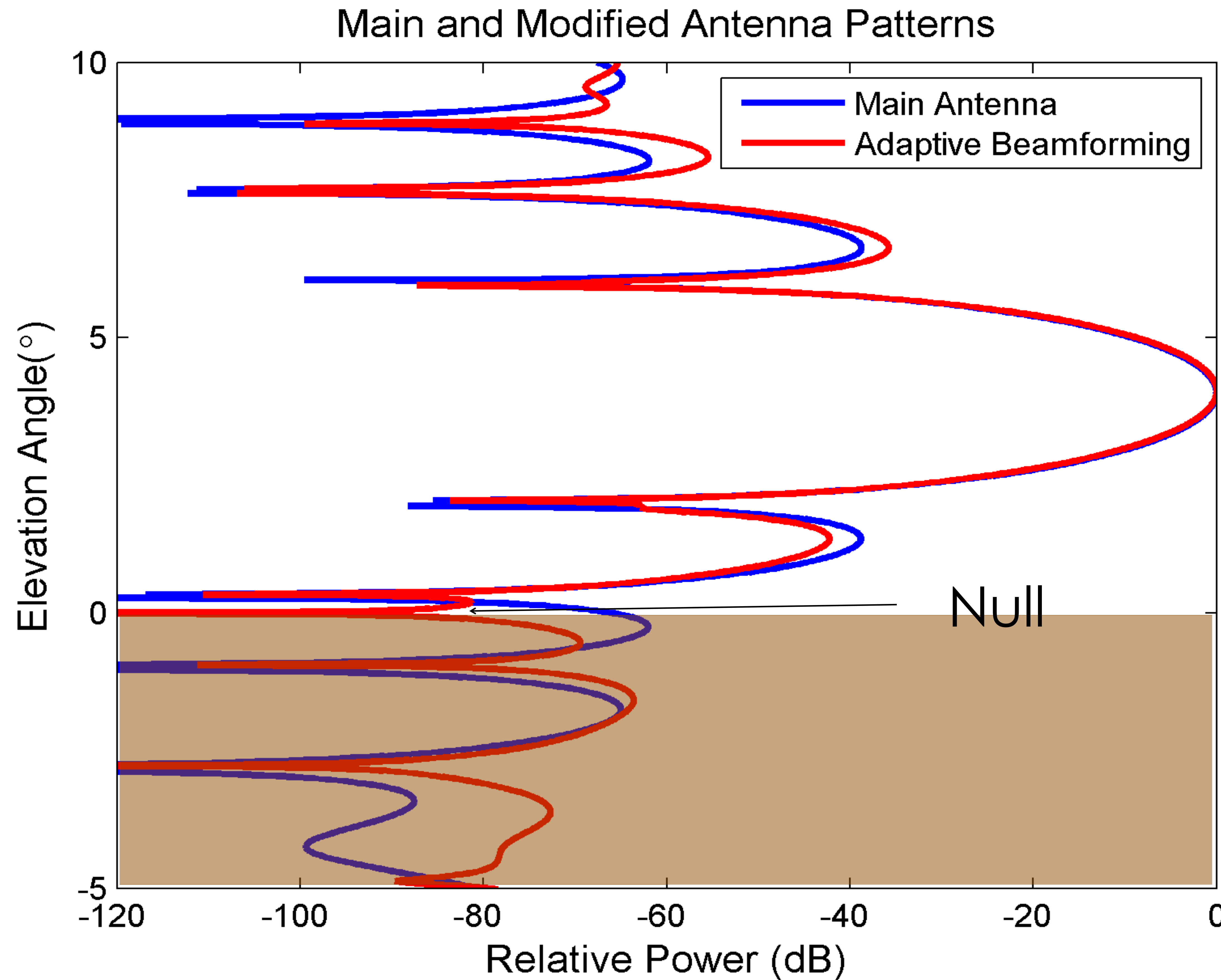
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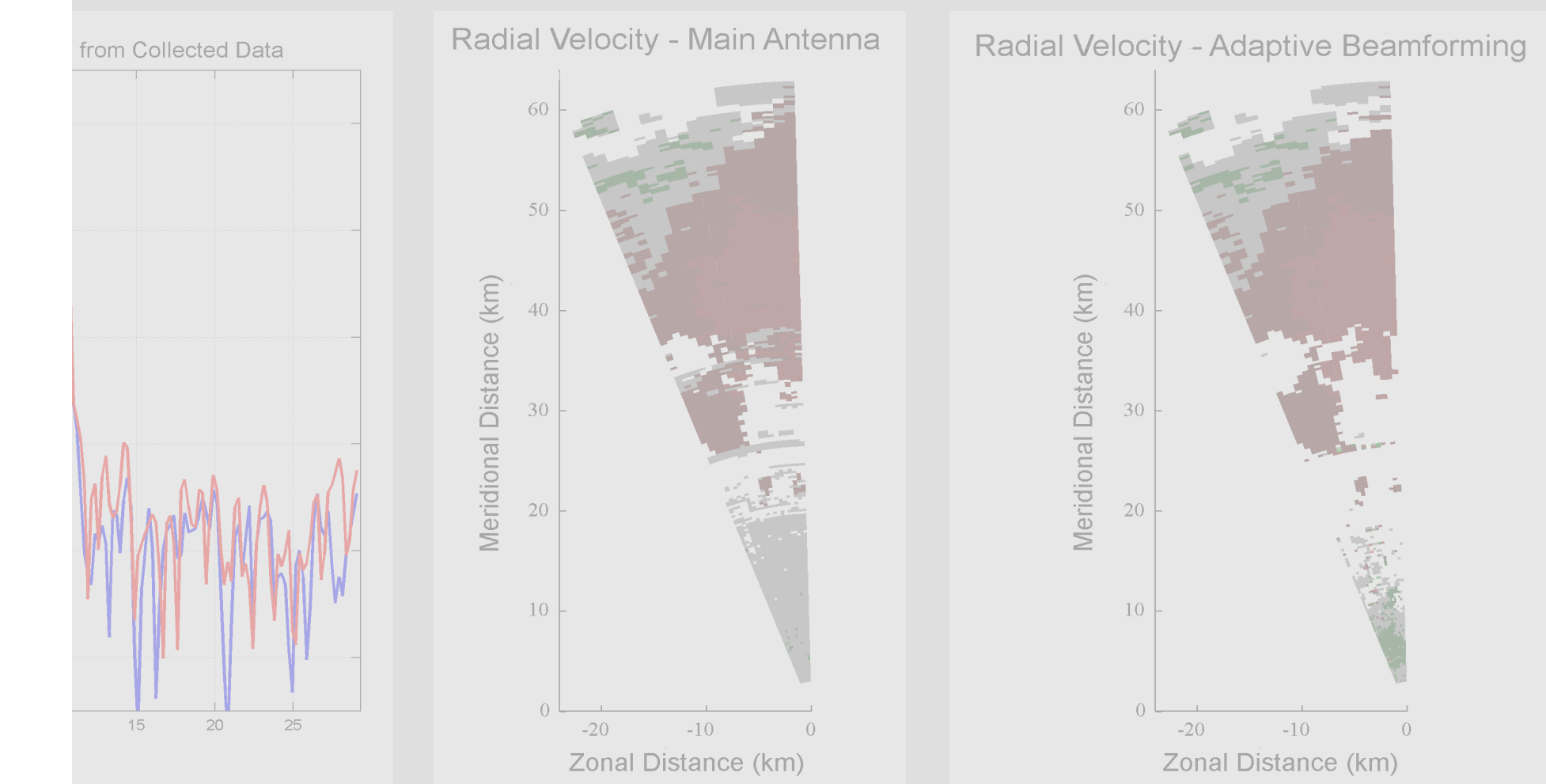


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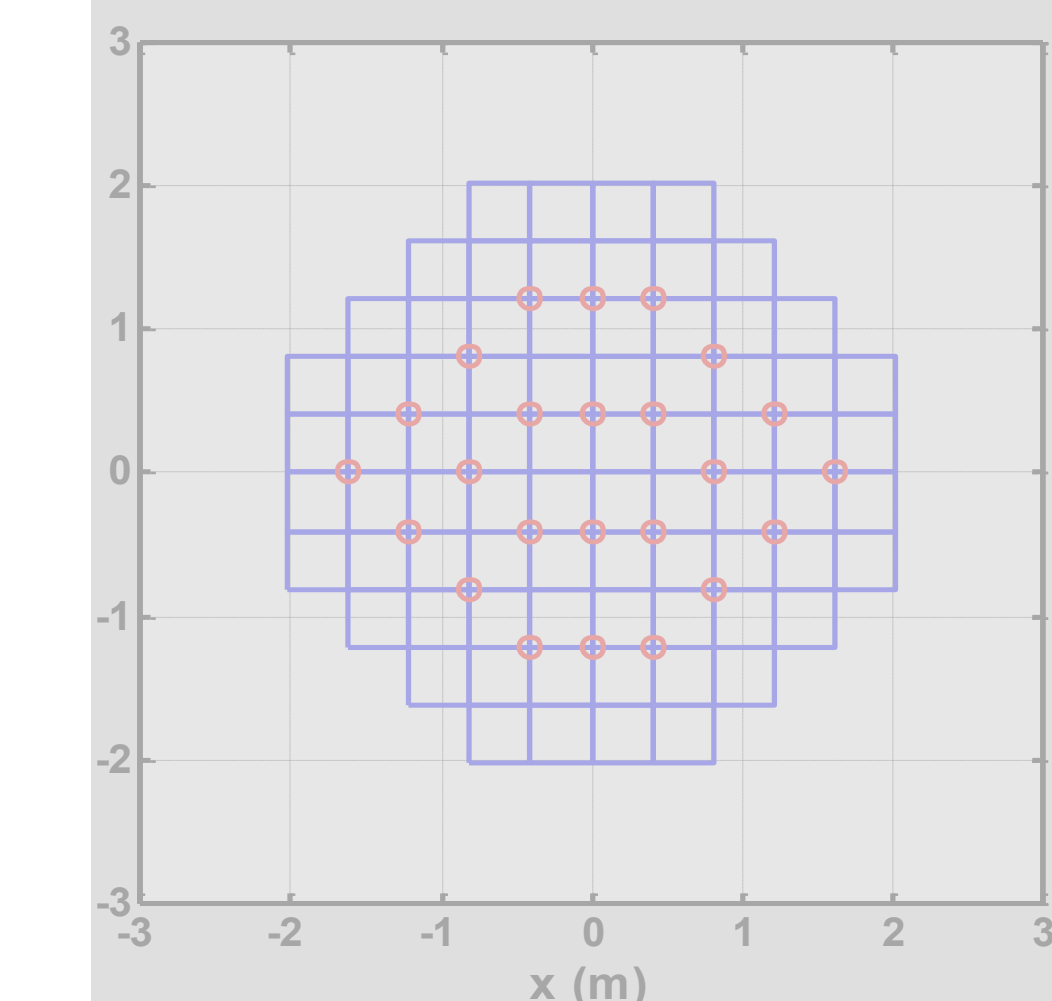
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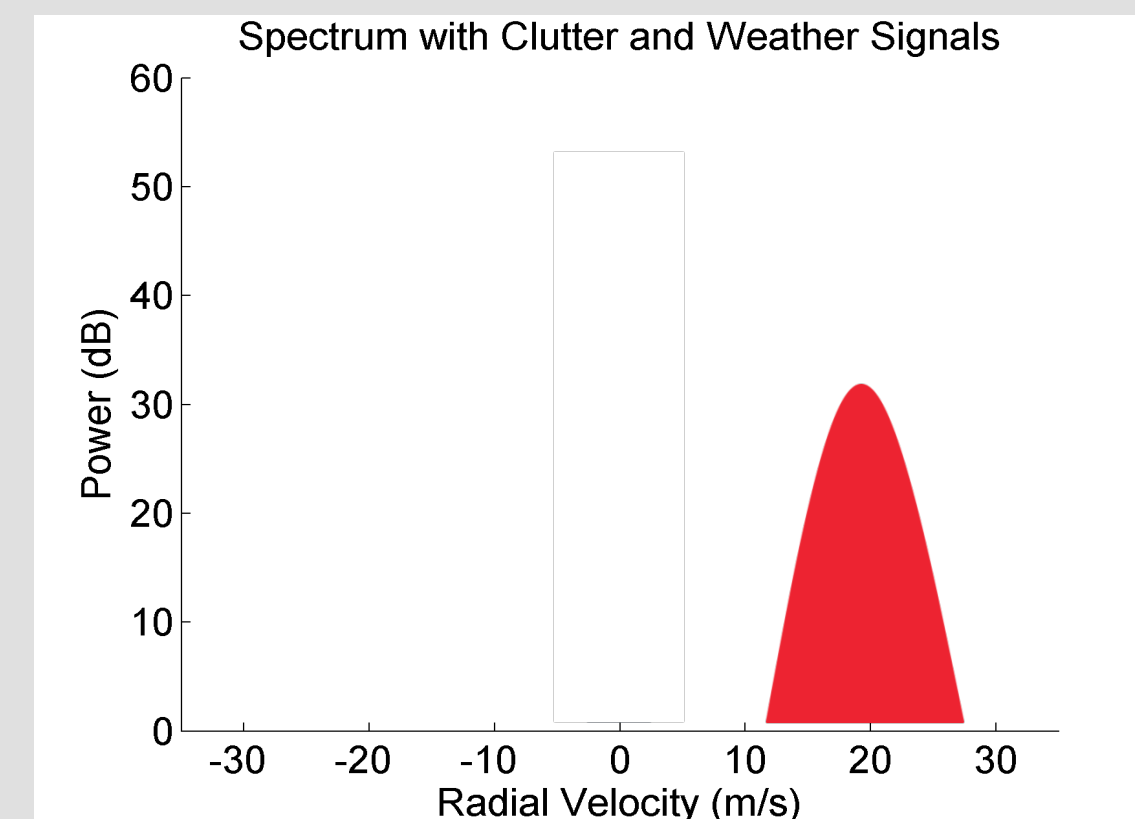
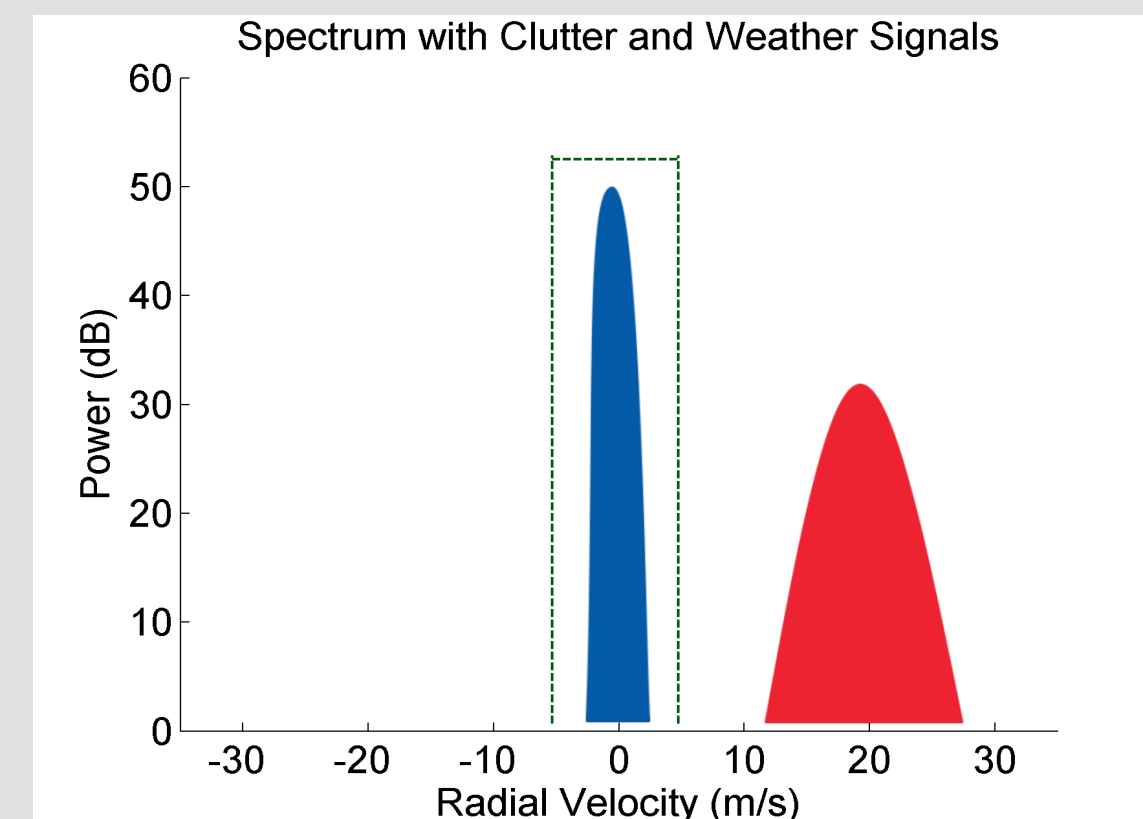
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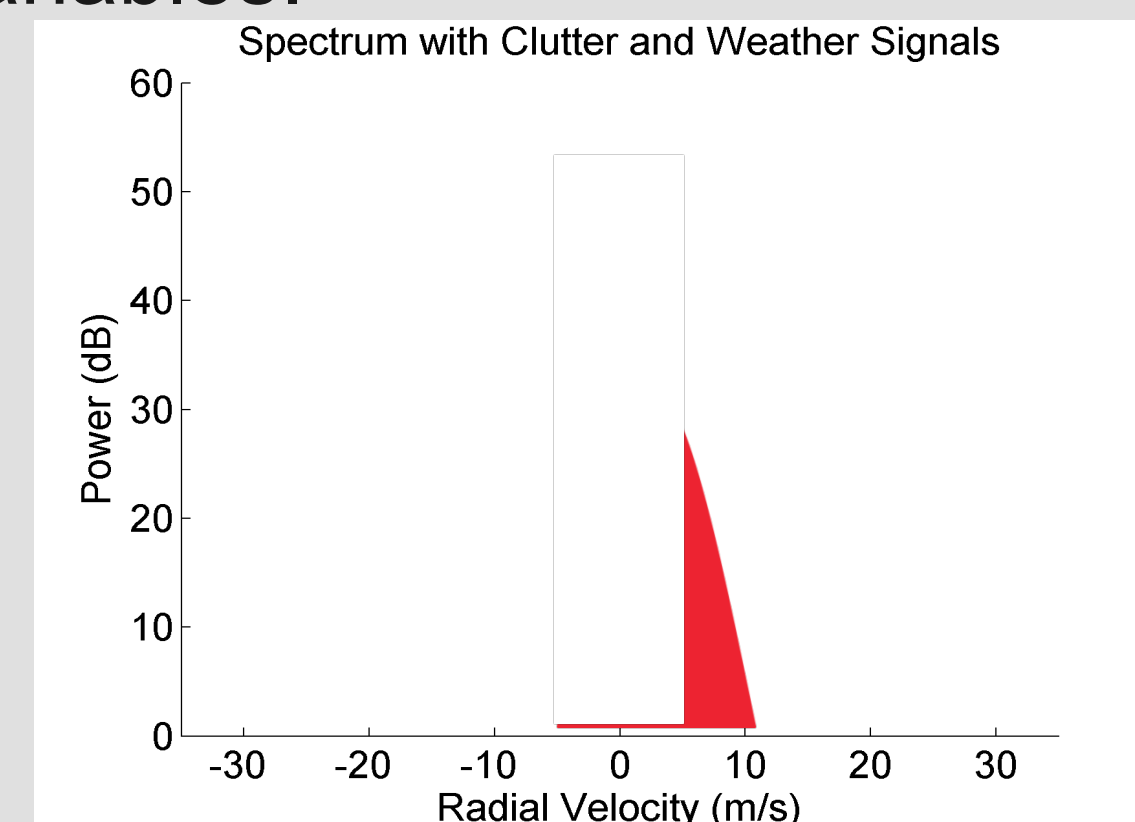
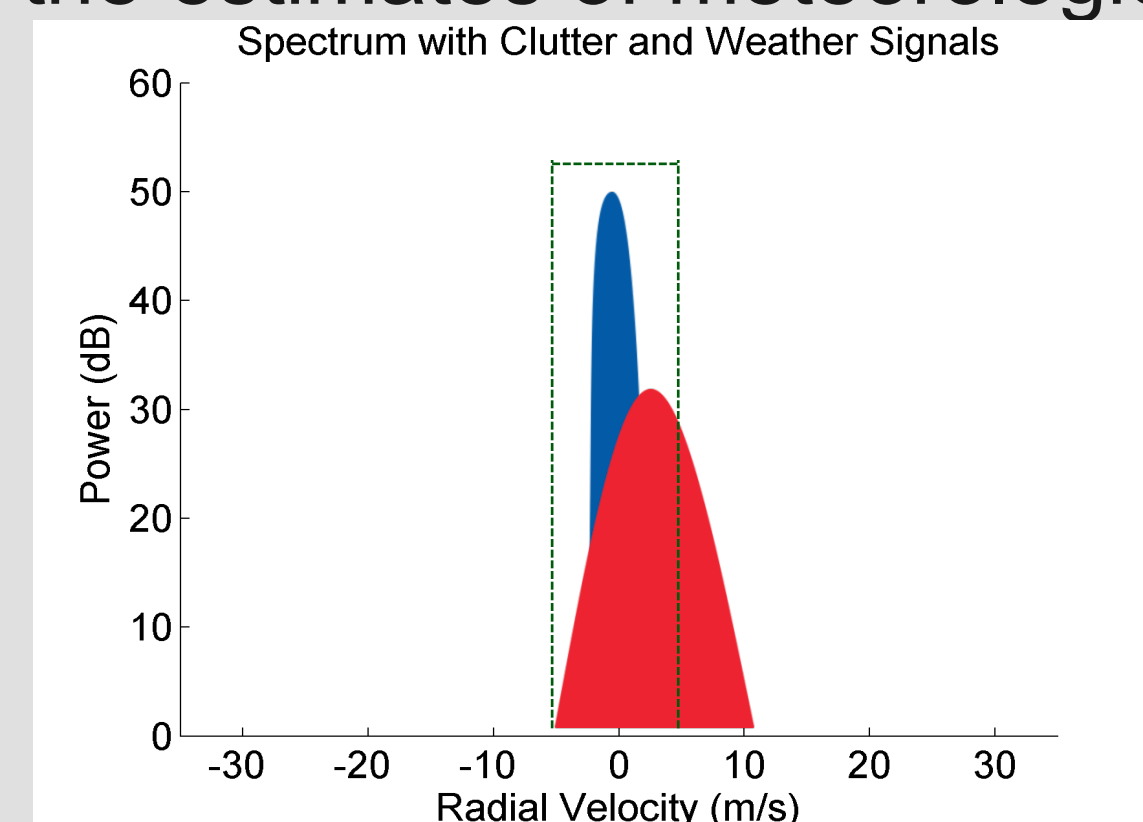
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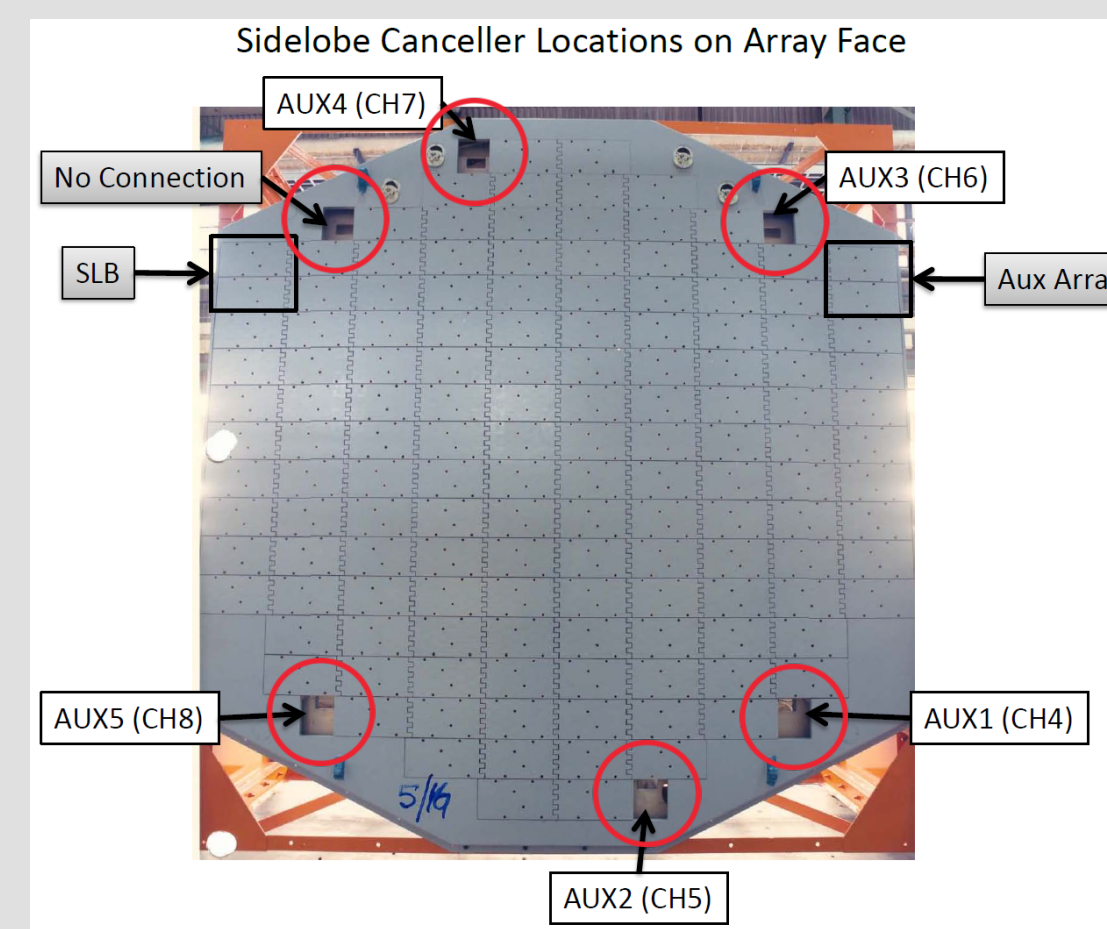
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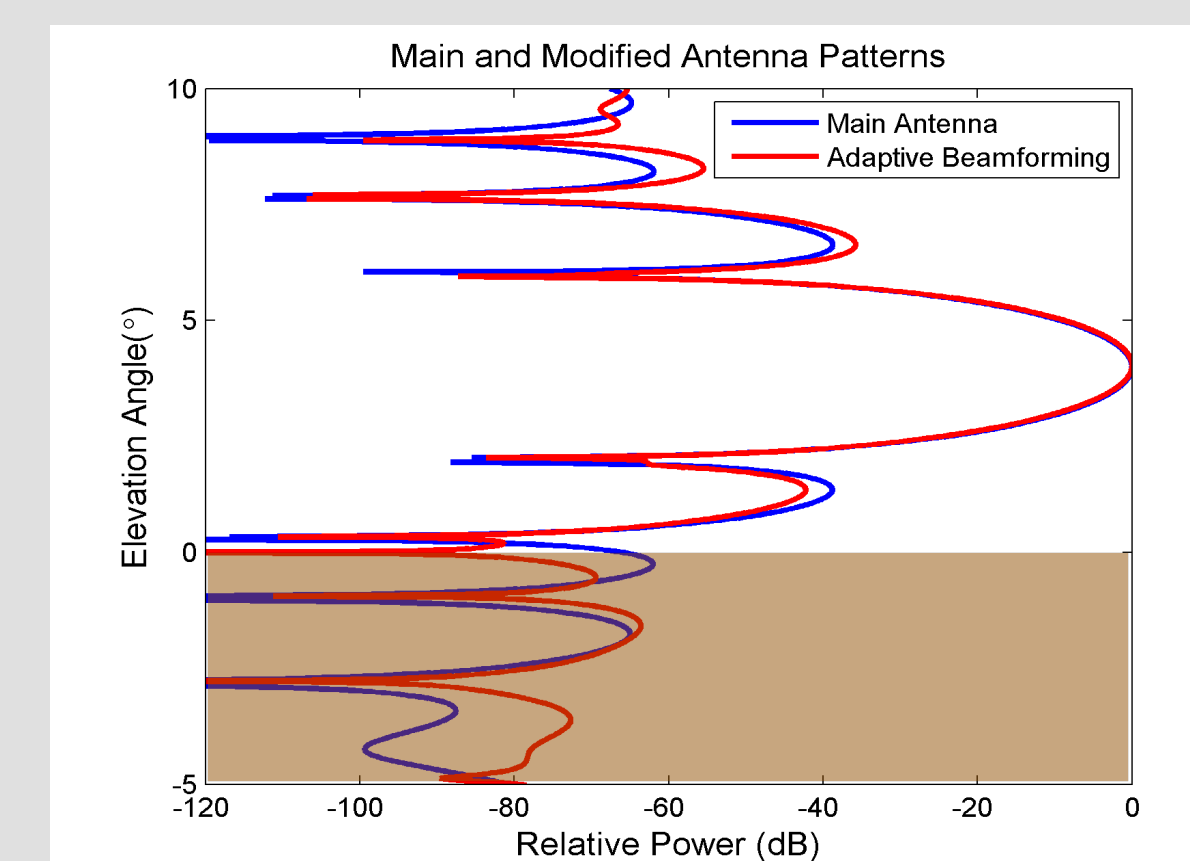
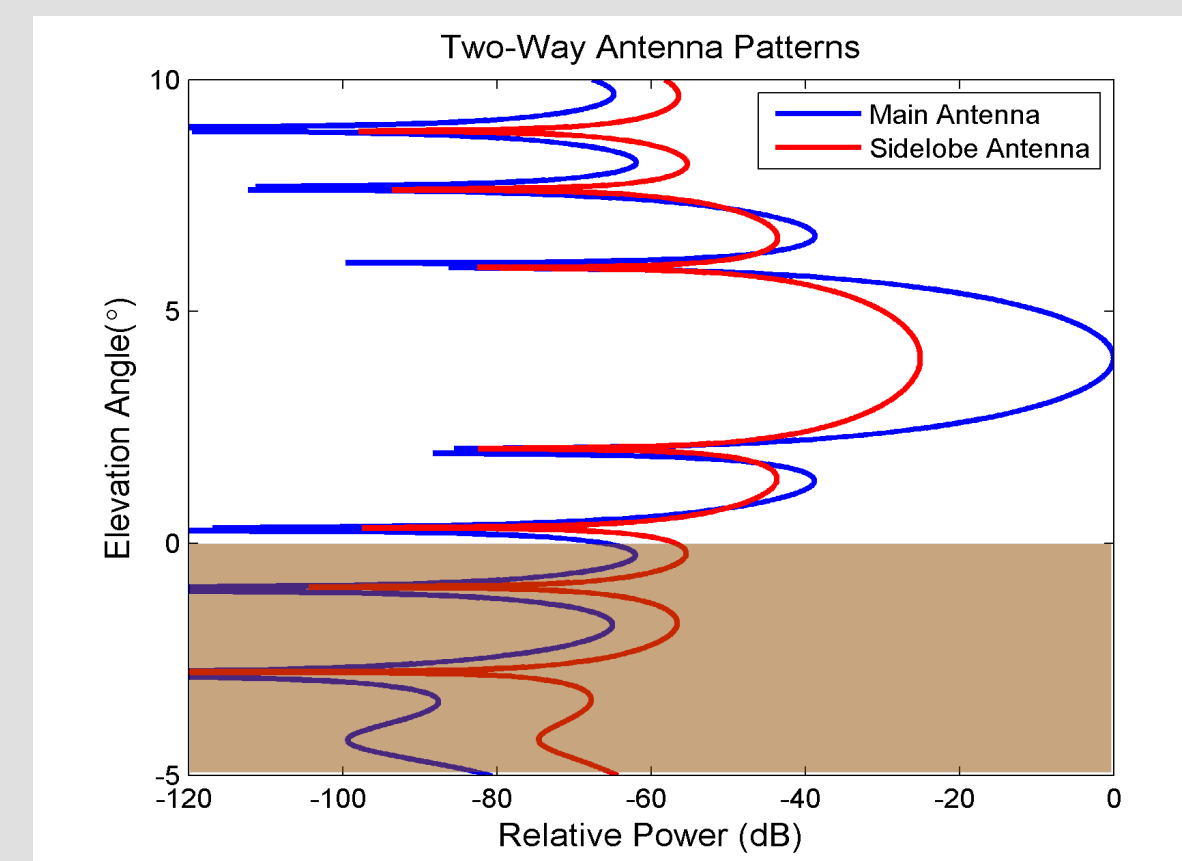
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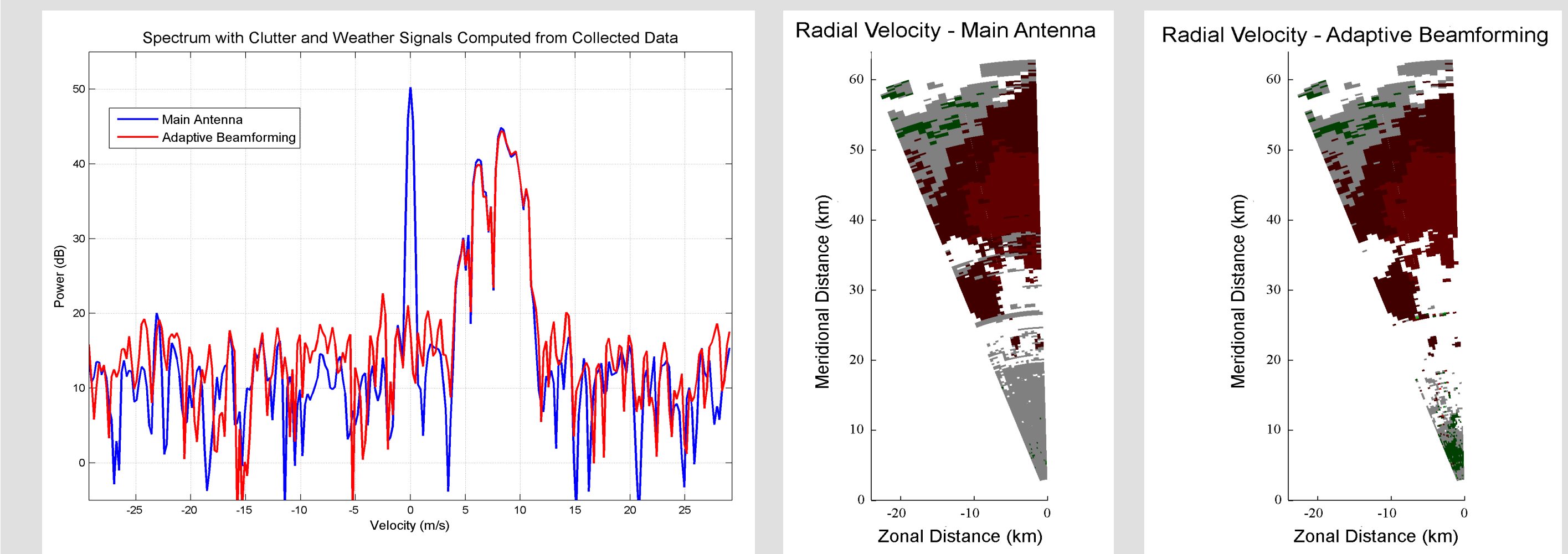
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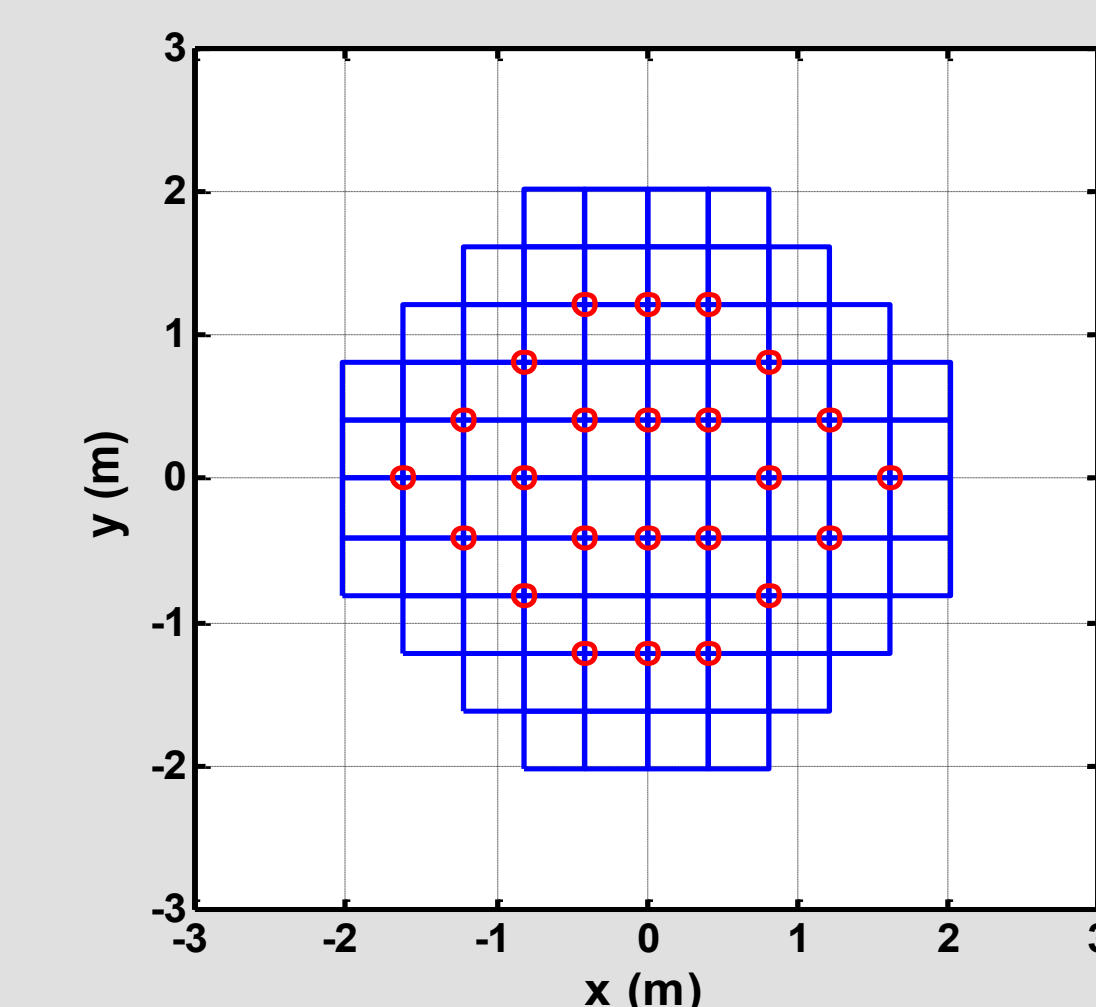
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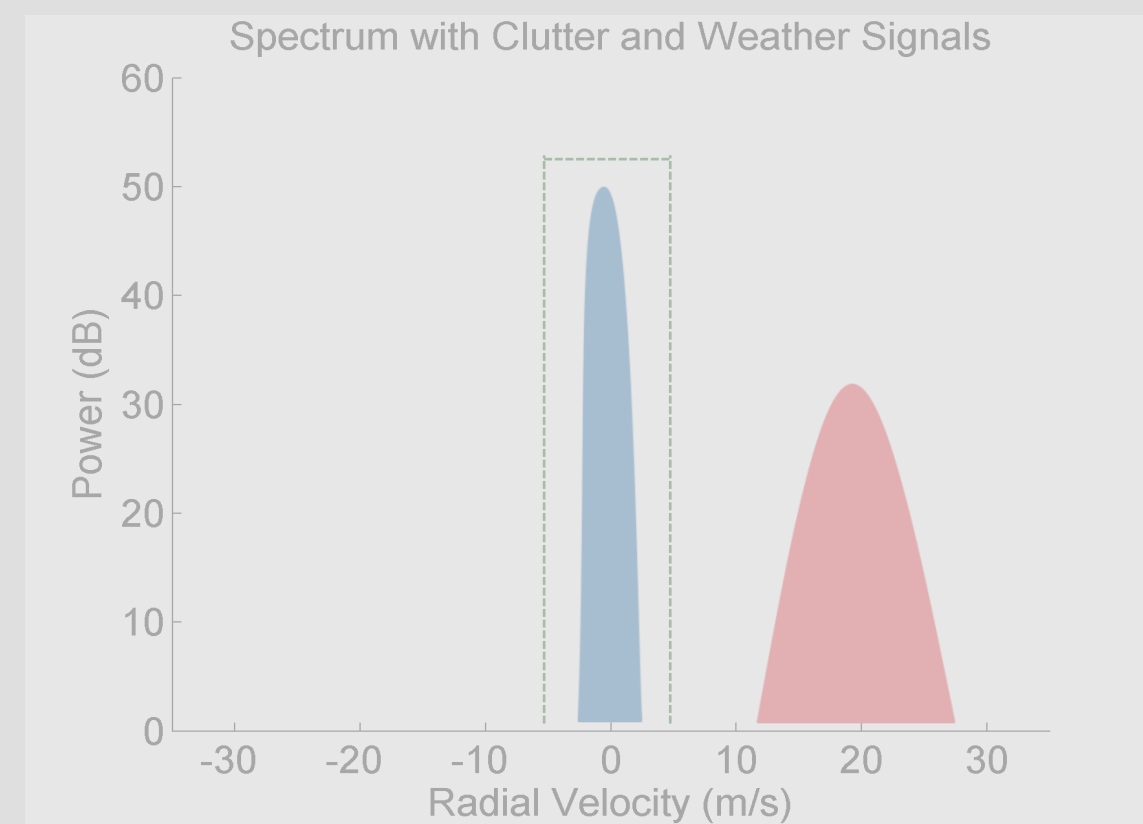
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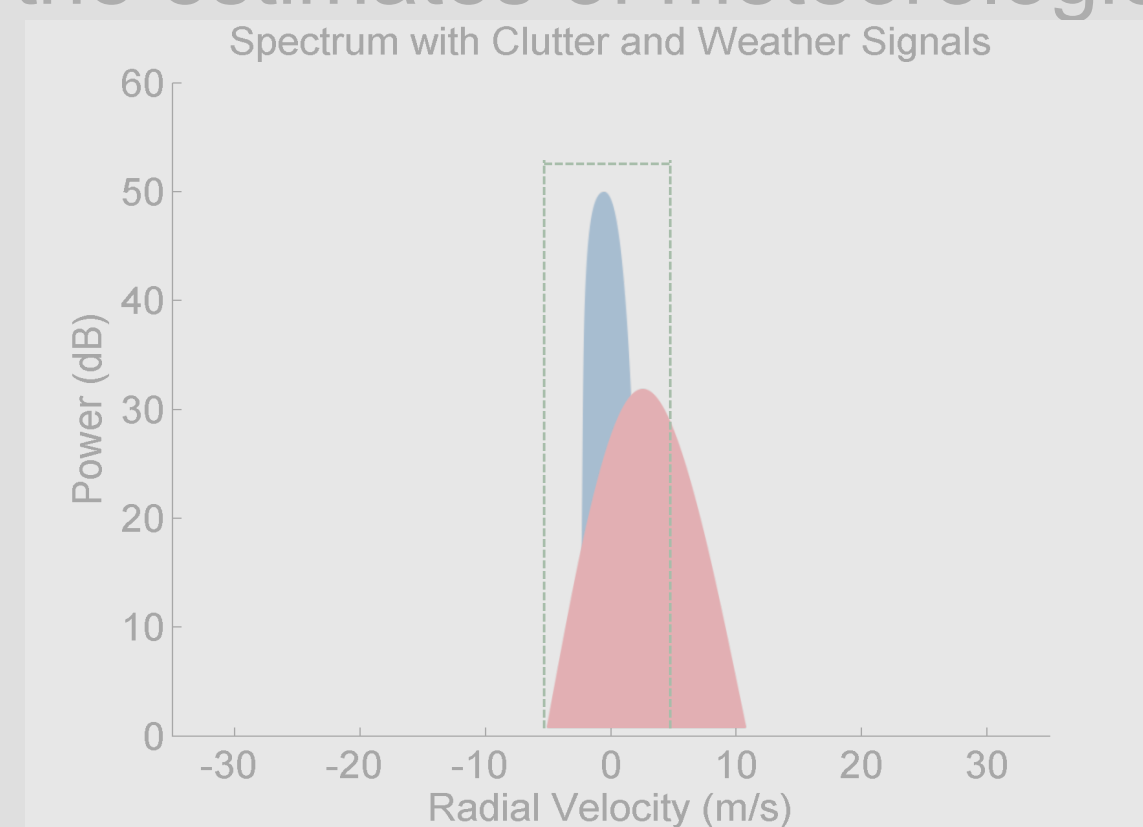
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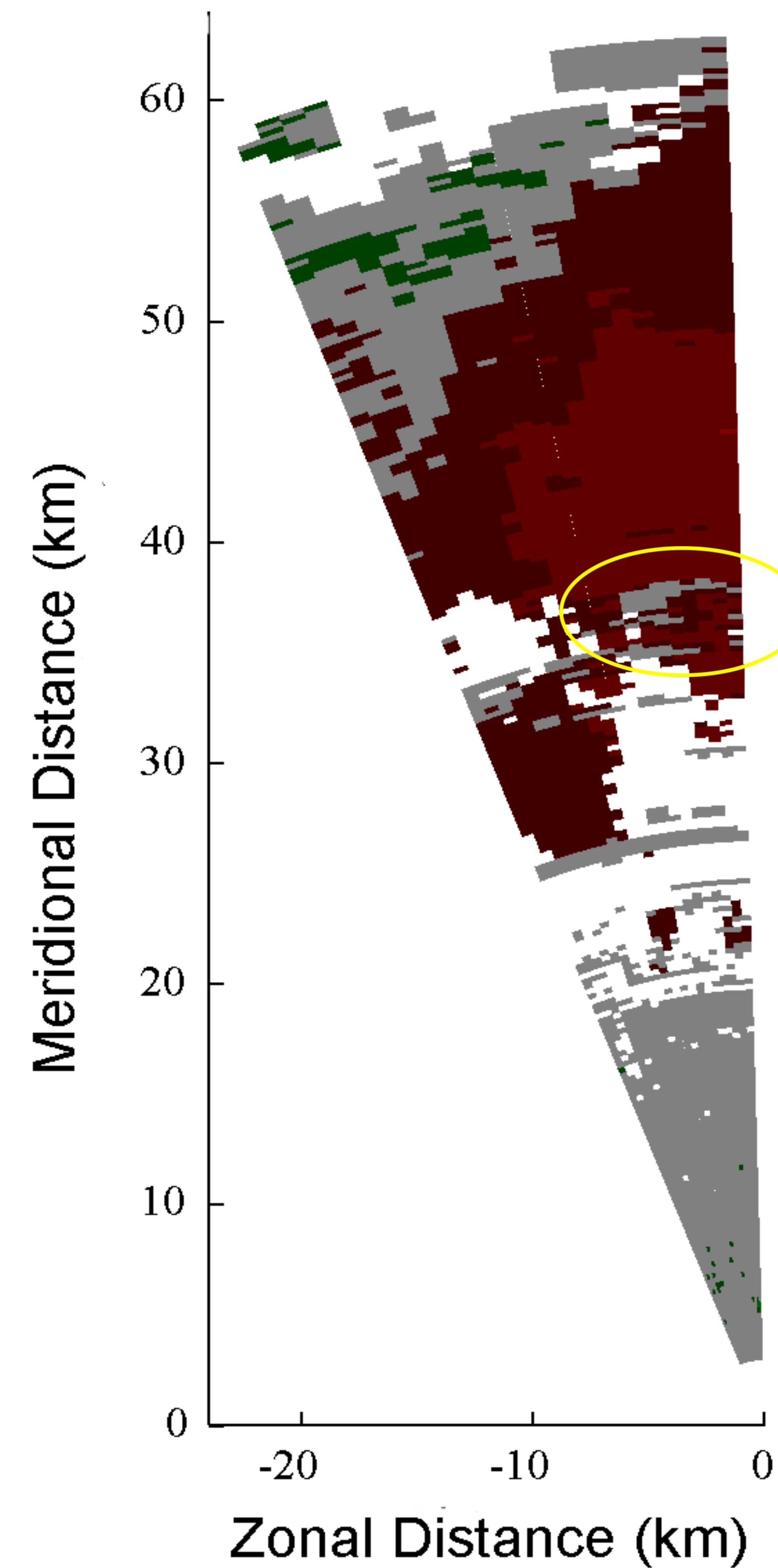


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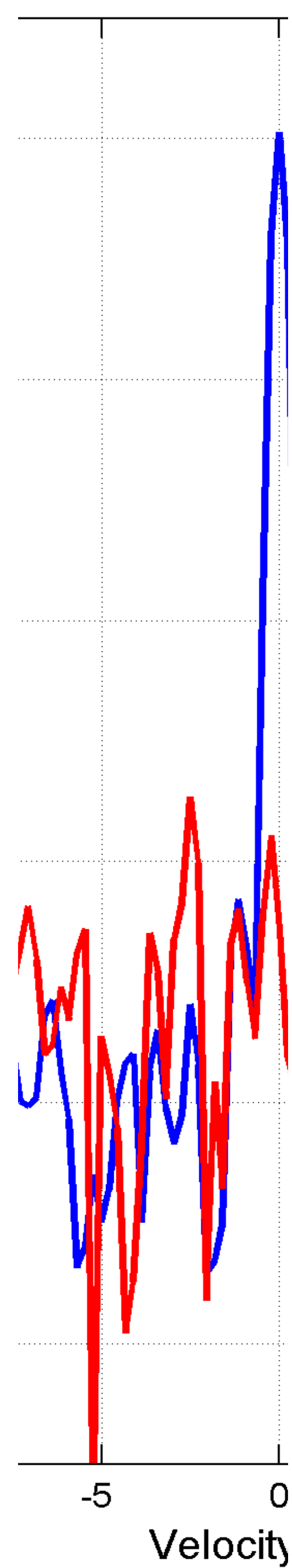


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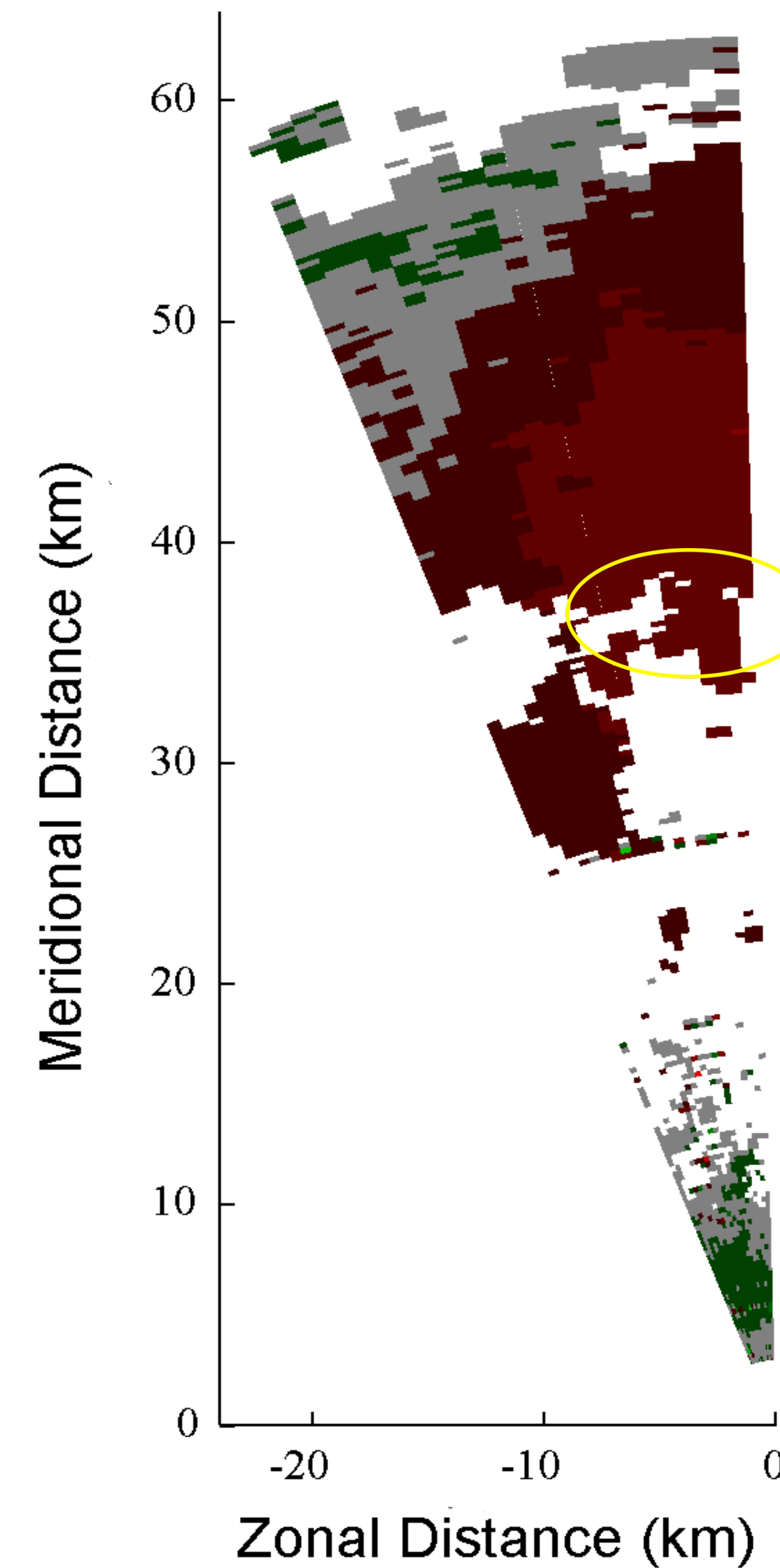
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## Weather Signal

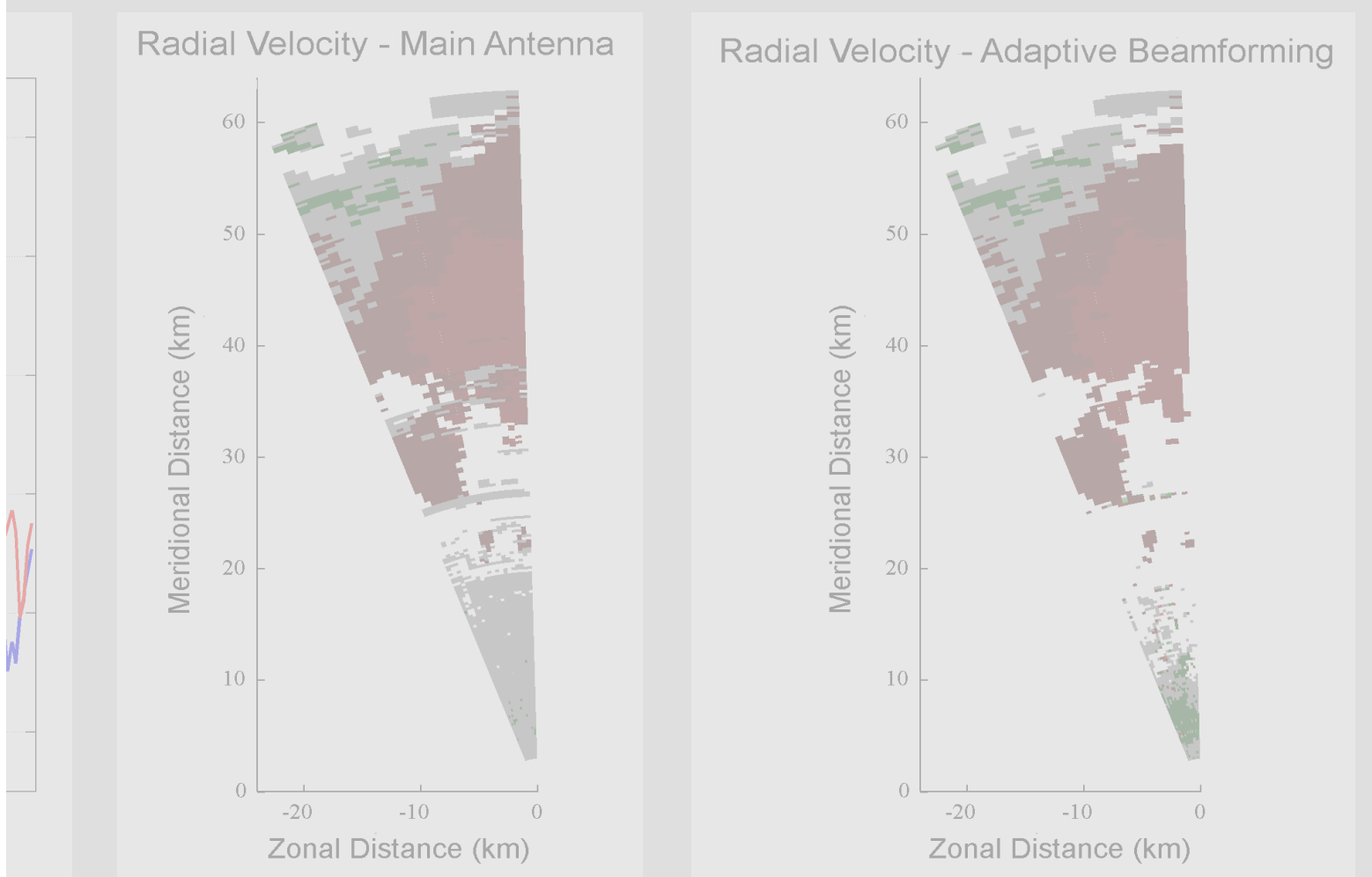


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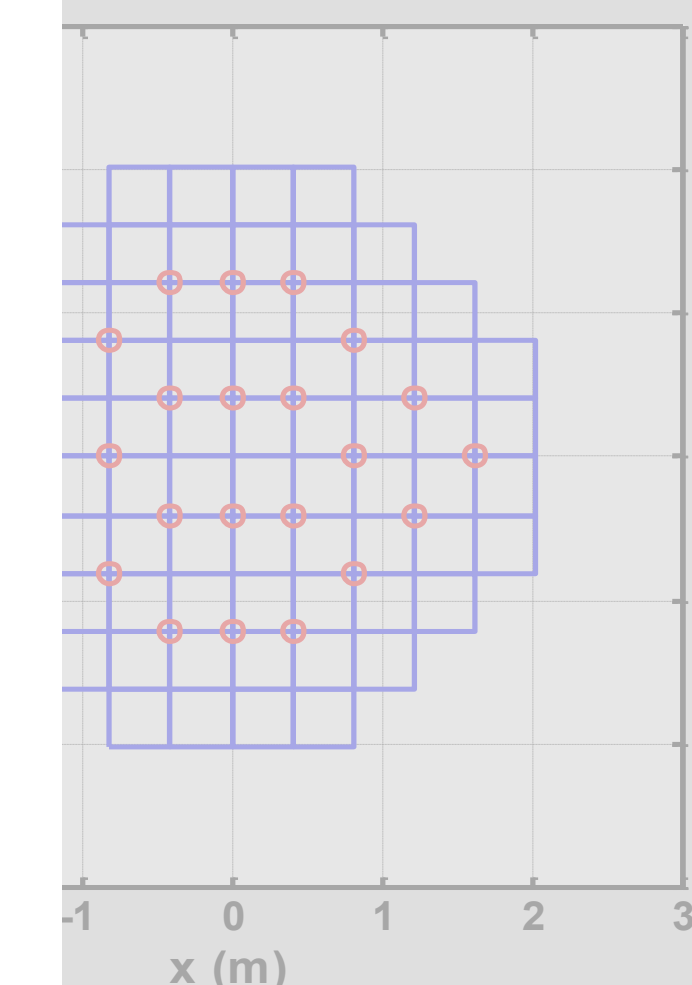
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Through clutter channels, ground clutter can be removed.



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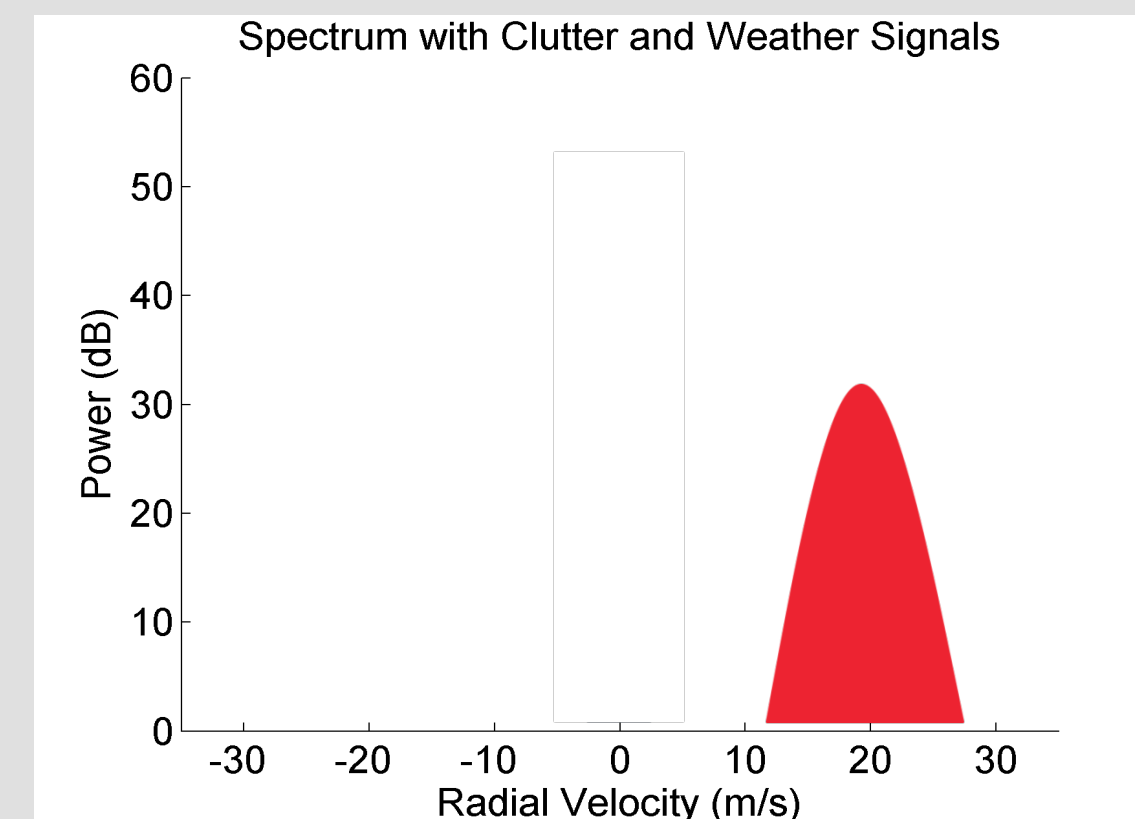
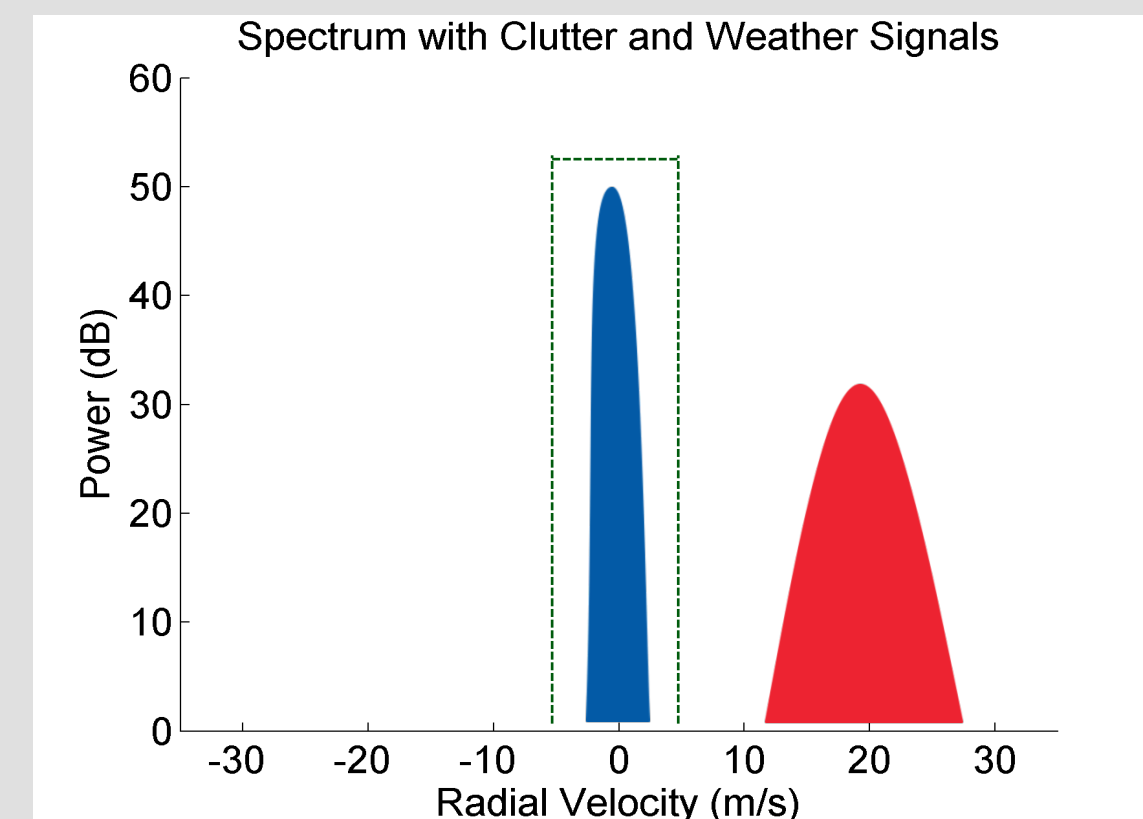
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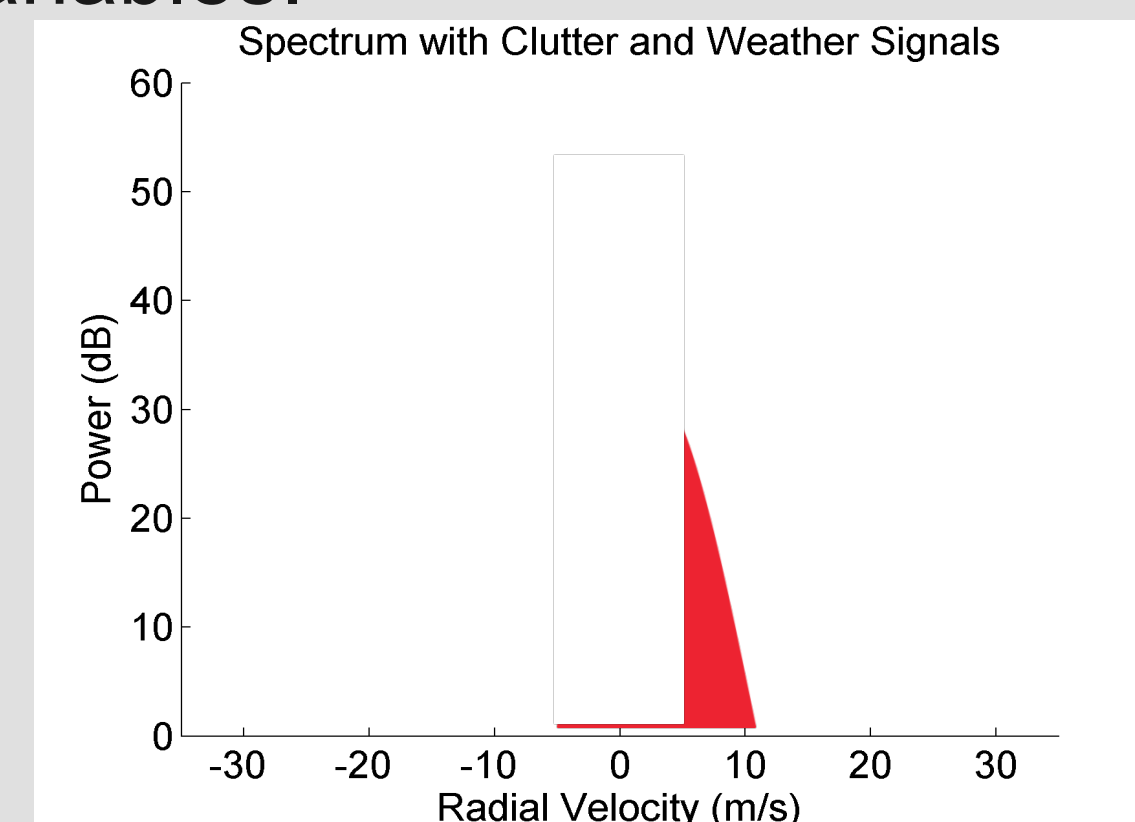
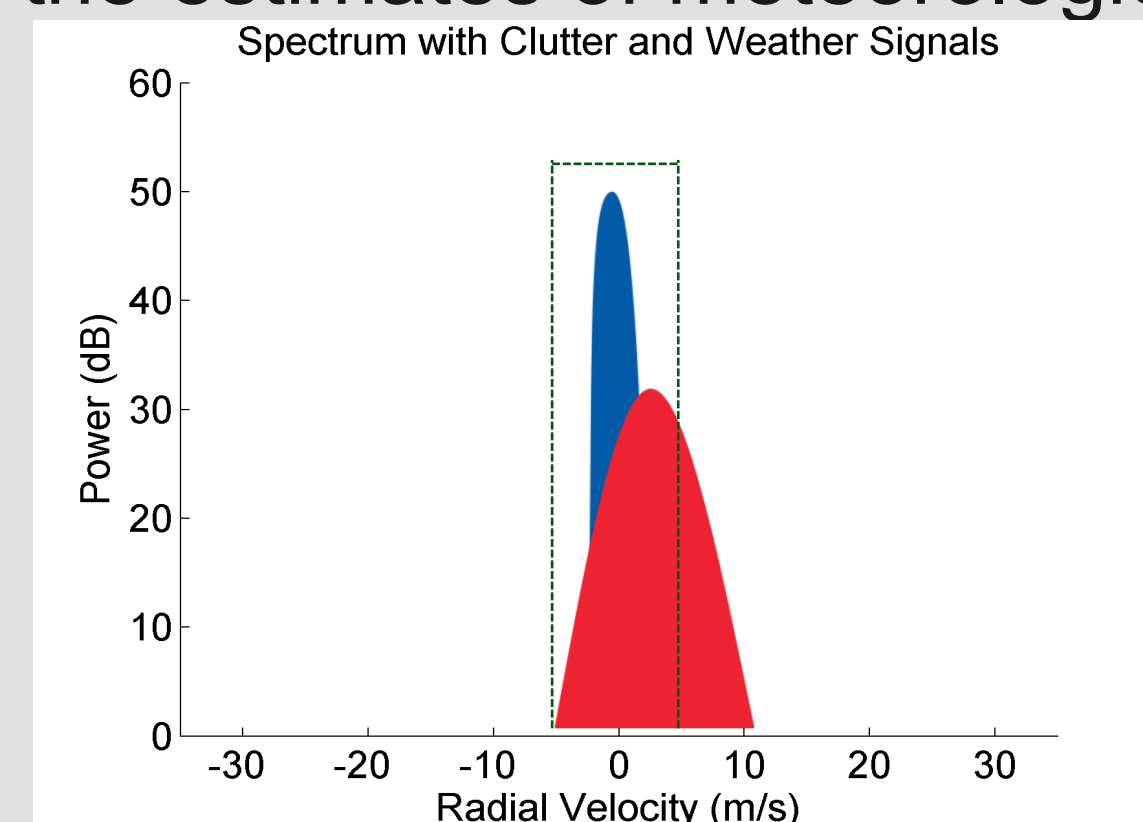
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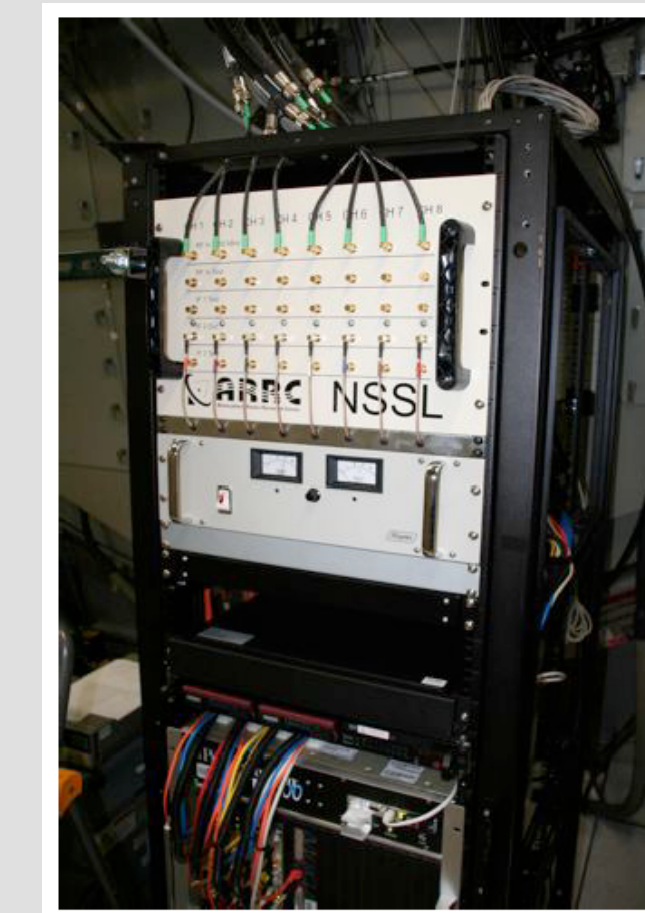
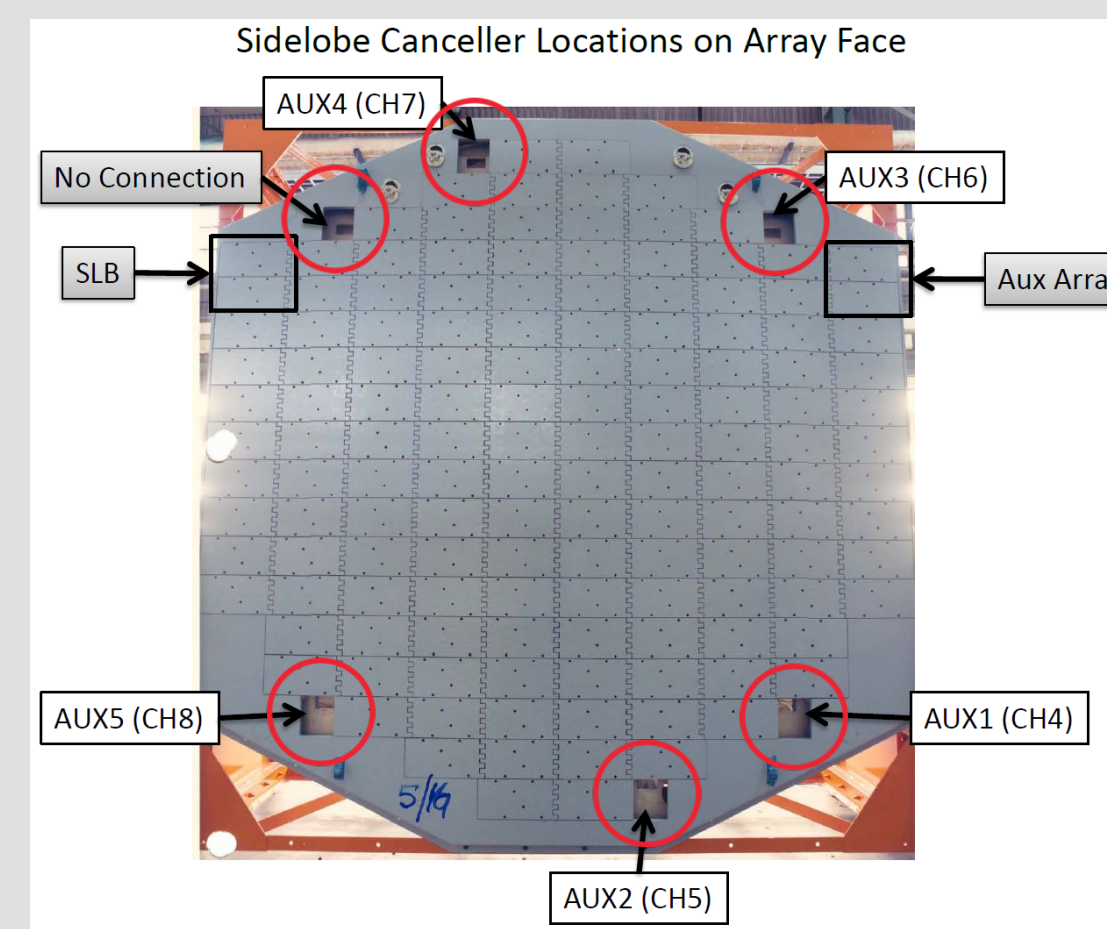
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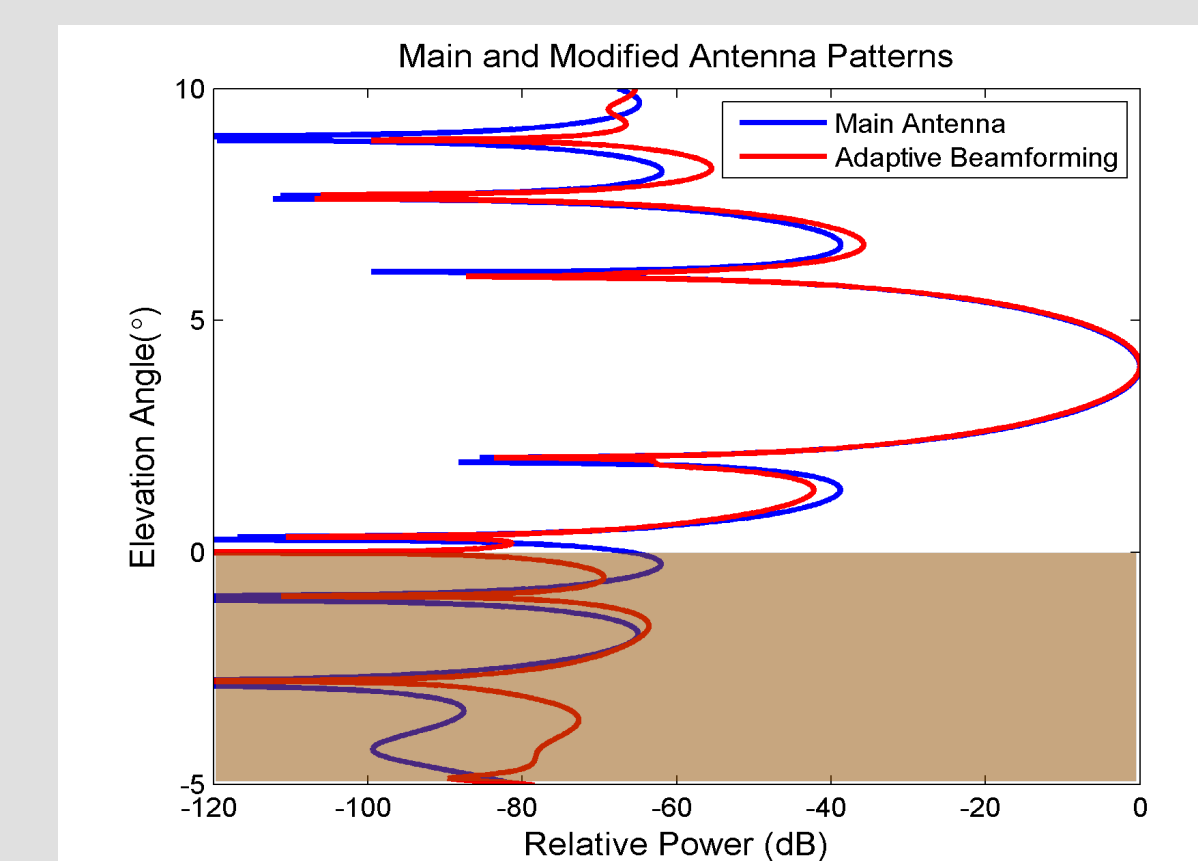
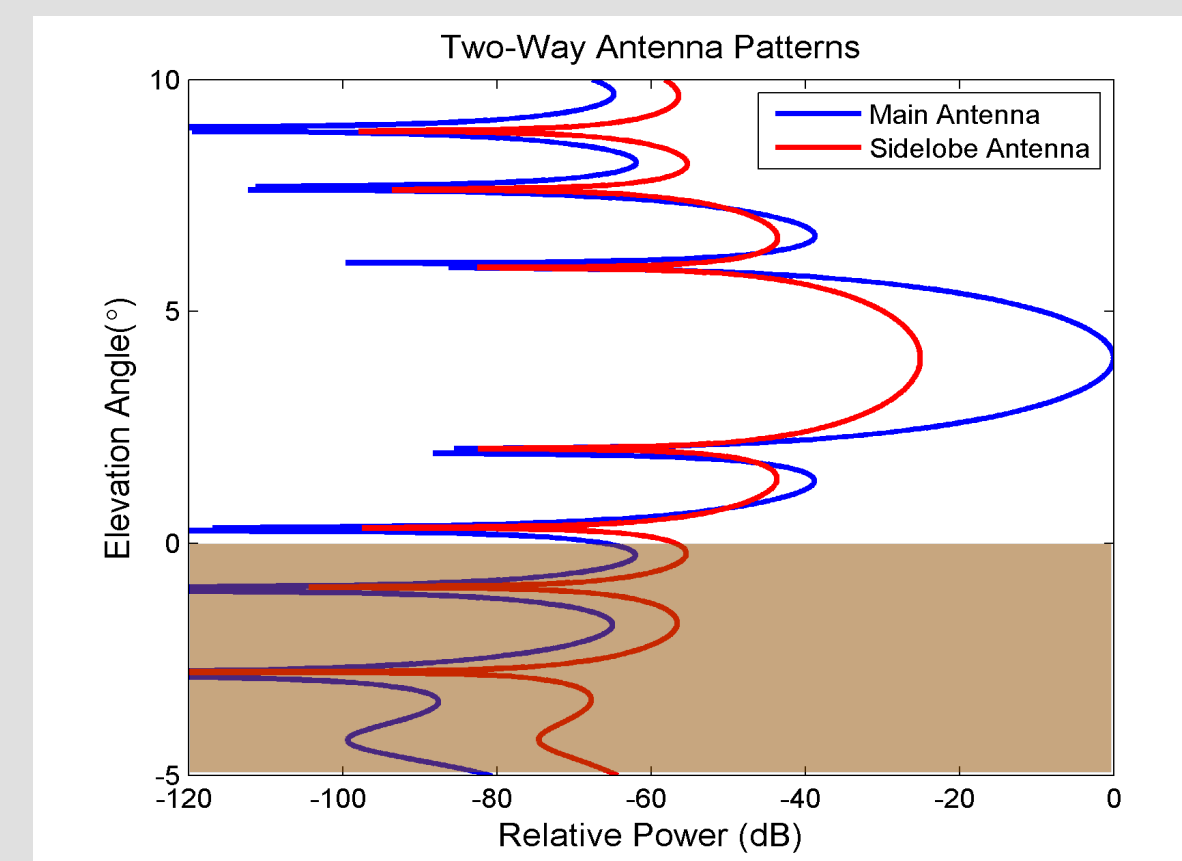
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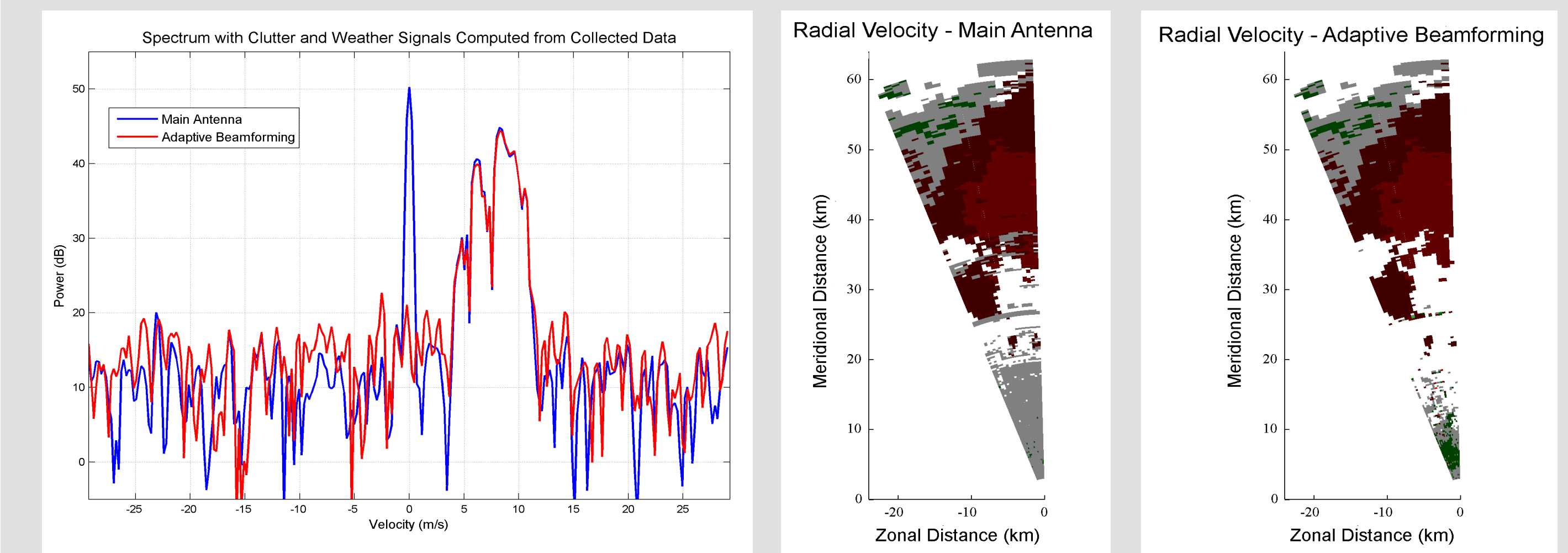
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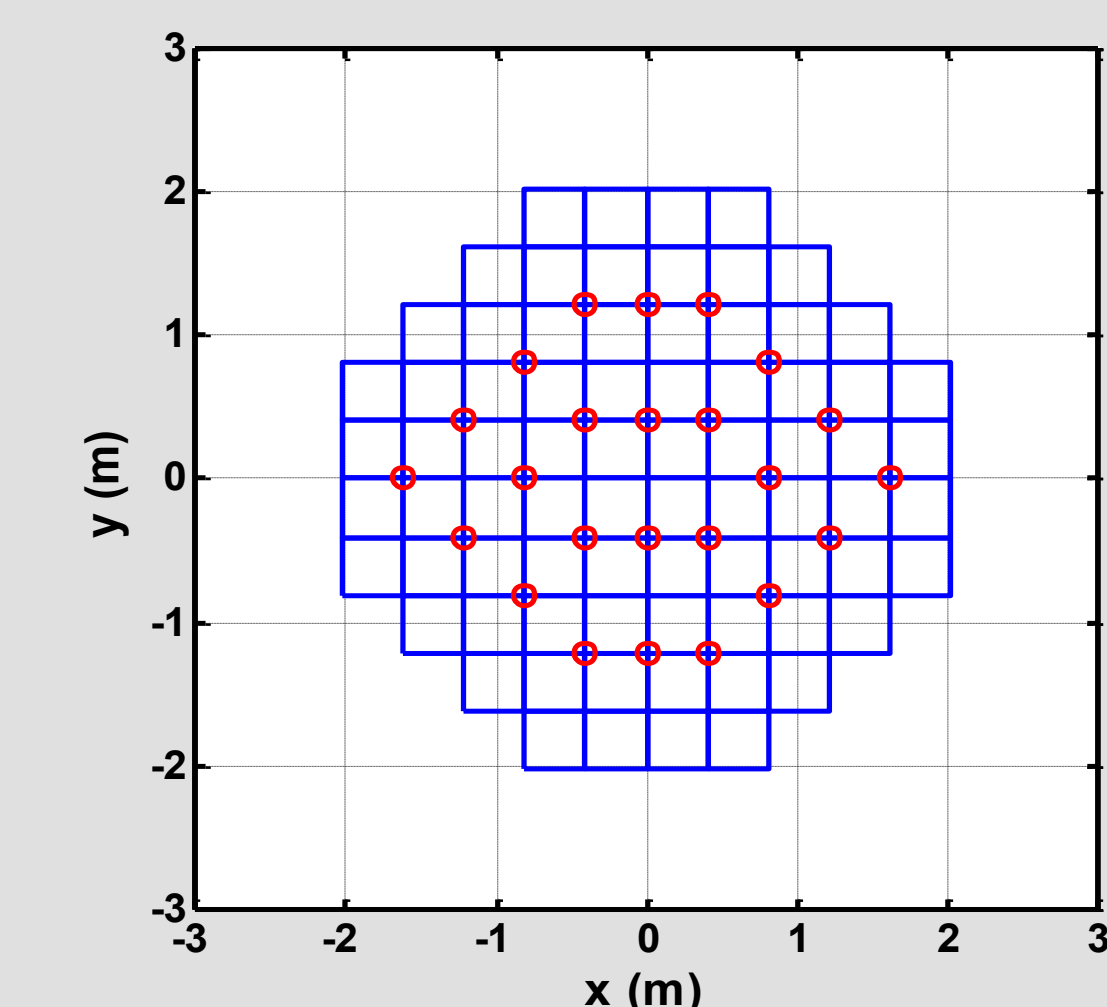
## NWRT Multi-Channel Results

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## Modern Active Arrays

Modern active arrays such as the Advanced Technology Demonstrator provide more channels and a different array geometry, leading to new research opportunities.



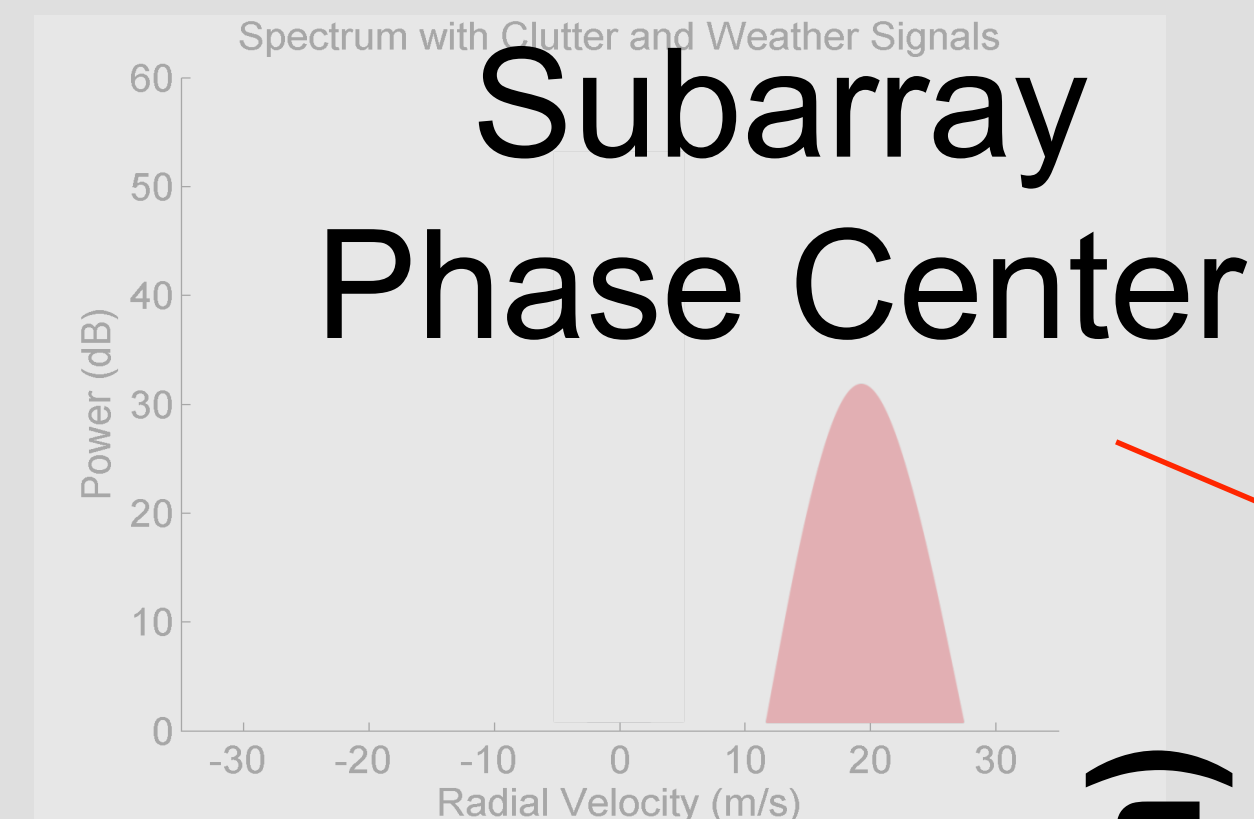
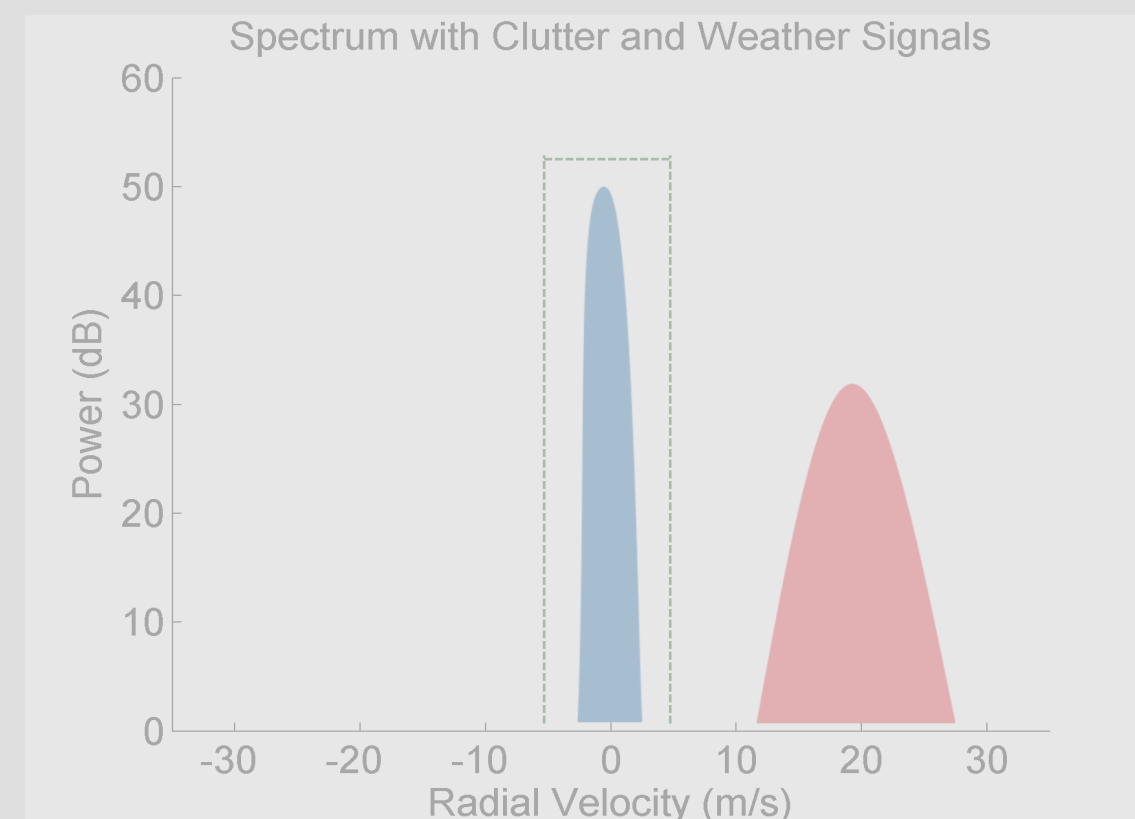
# PAR to the Rescue: Improving Clutter Mitigation with Adaptive Beamforming

Christopher Curtis

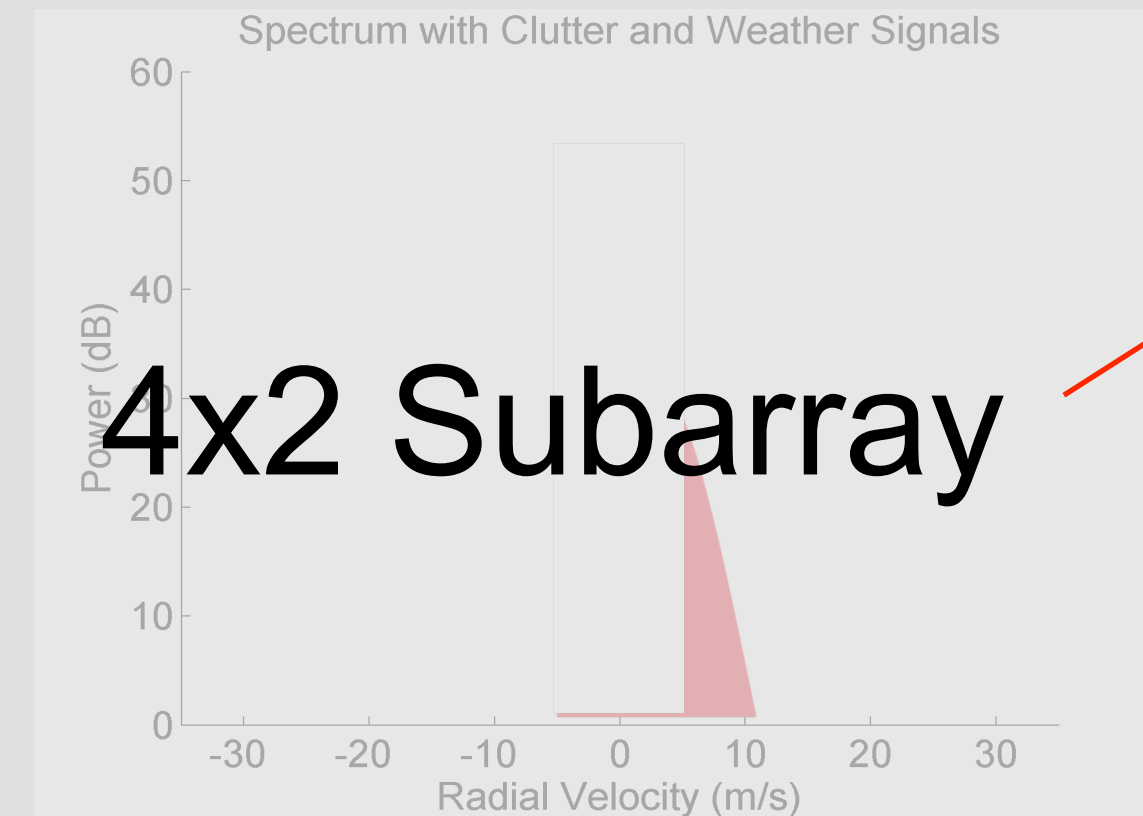
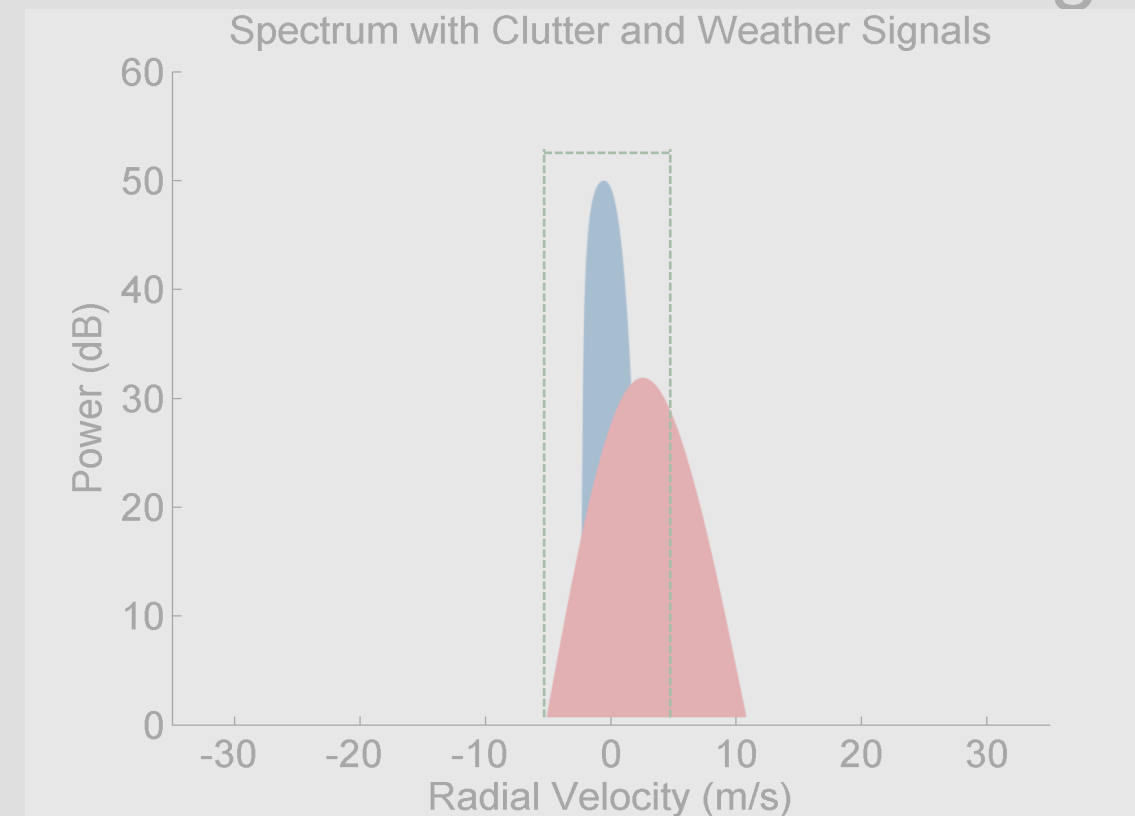
## Clutter Filtering Challenges

Conventional ground clutter filters discriminate between clutter and weather based on radial velocity.

- When clutter and weather have sufficiently different velocities, they work very well.



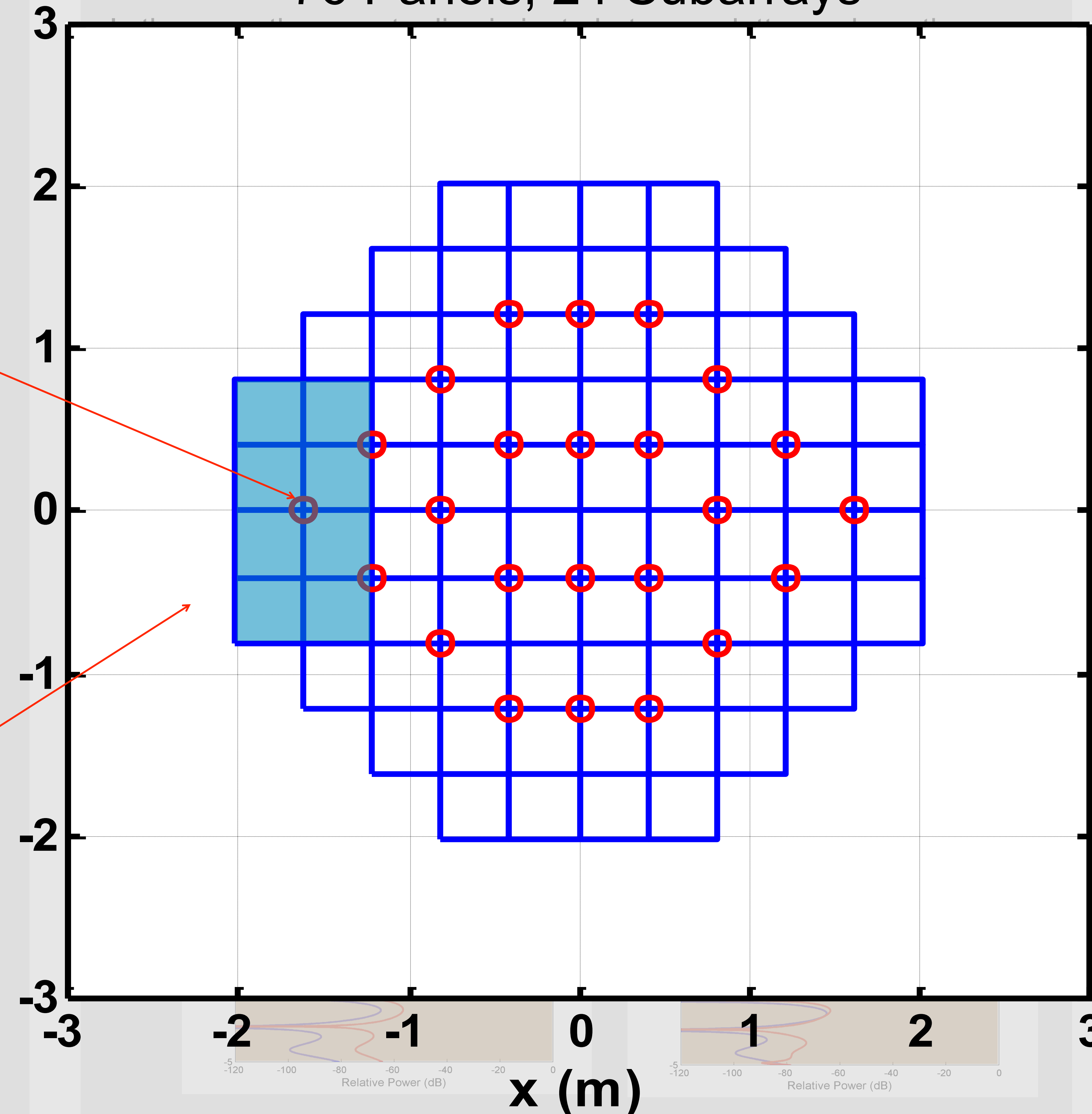
- When the weather velocity is near zero, clutter filtering can affect the estimates of meteorological variables.



- Clutter filtering is also difficult when collecting a small number of pulses (e.g., detection scans, beam multiplexing), techniques that could be useful on a phased array

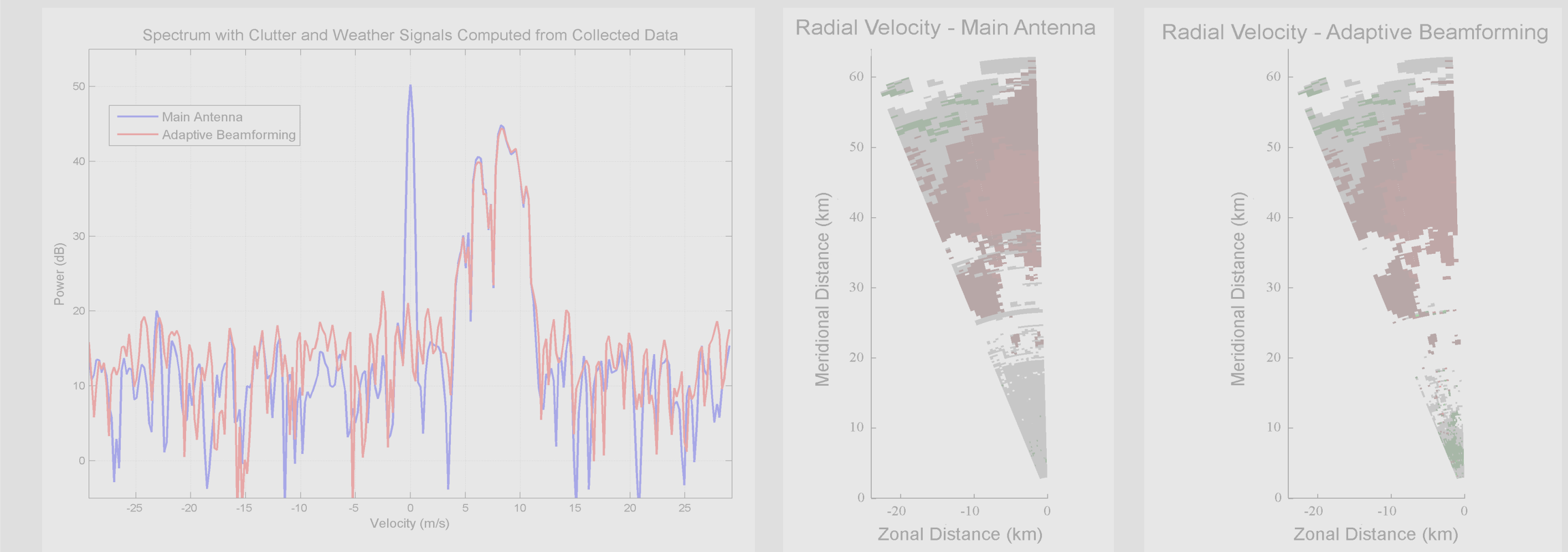
## NWRT as a Proof-of-Concept

76 Panels, 24 Subarrays



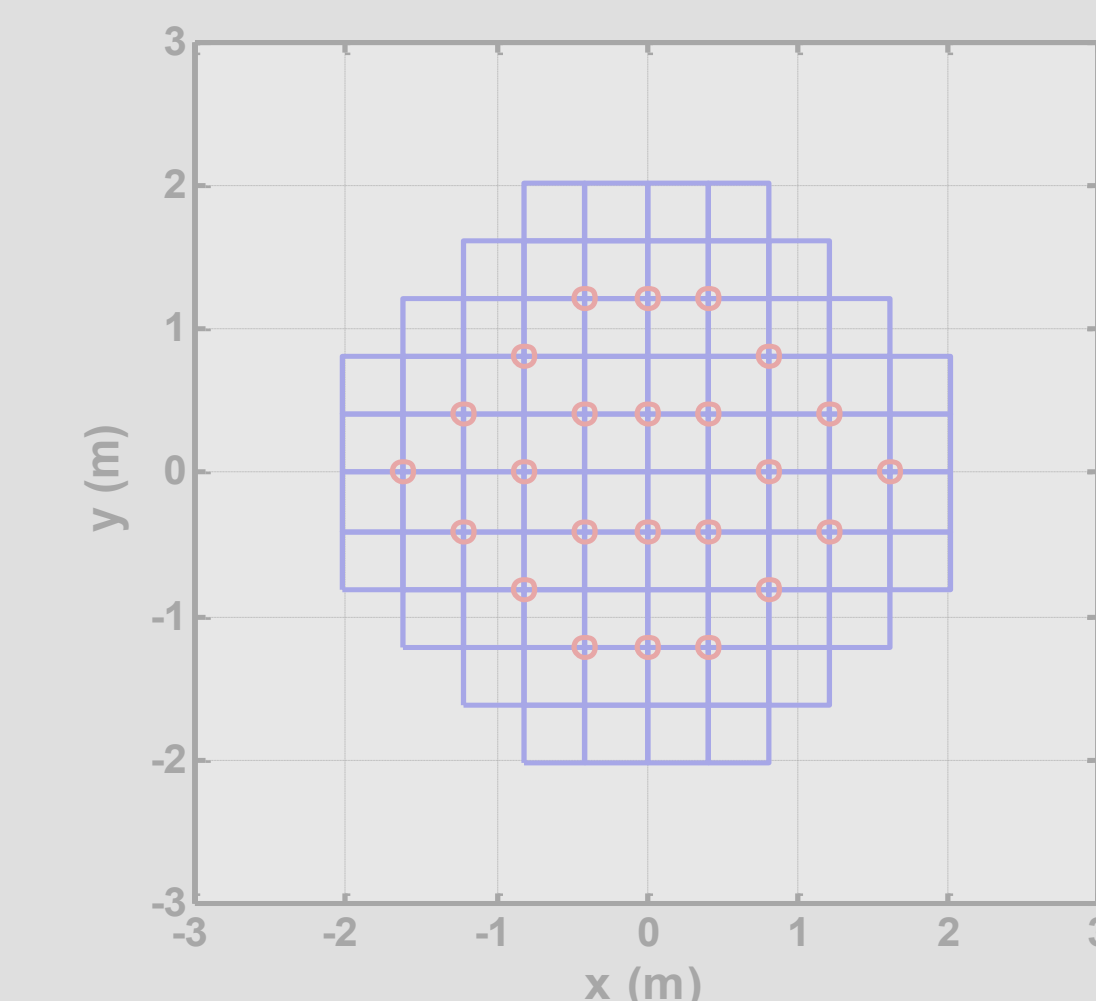
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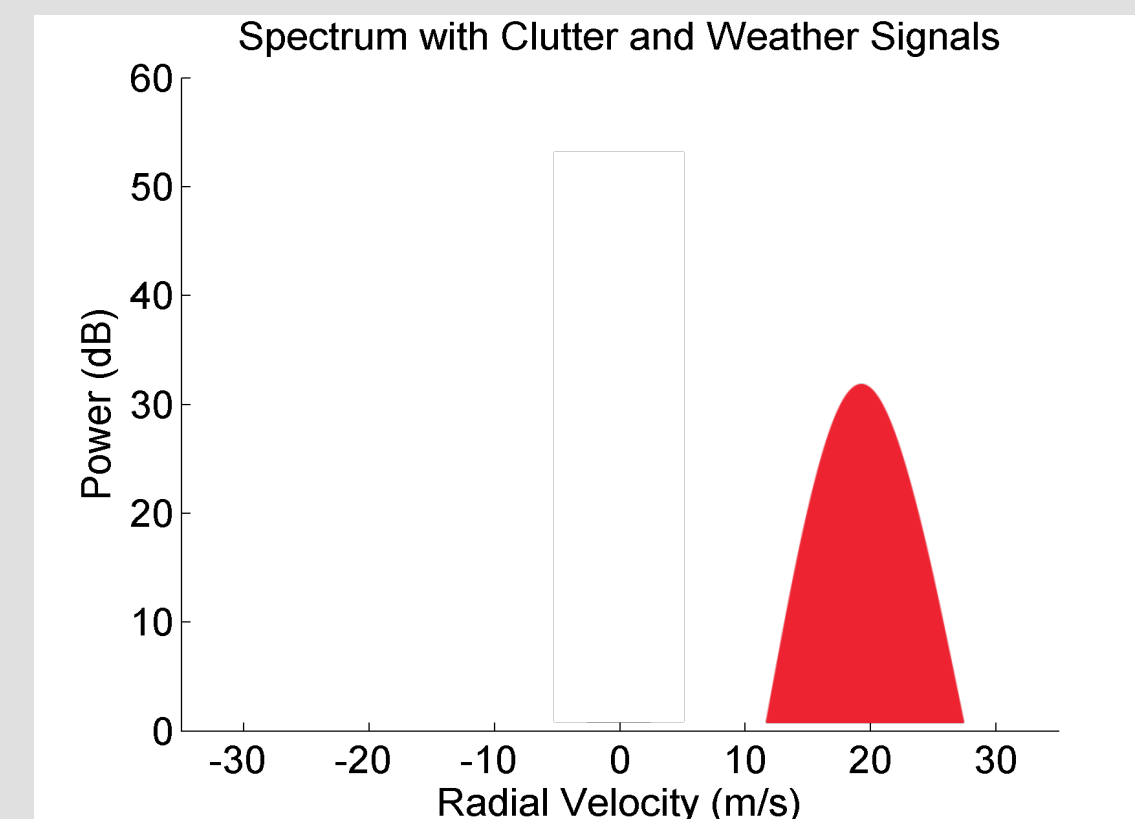
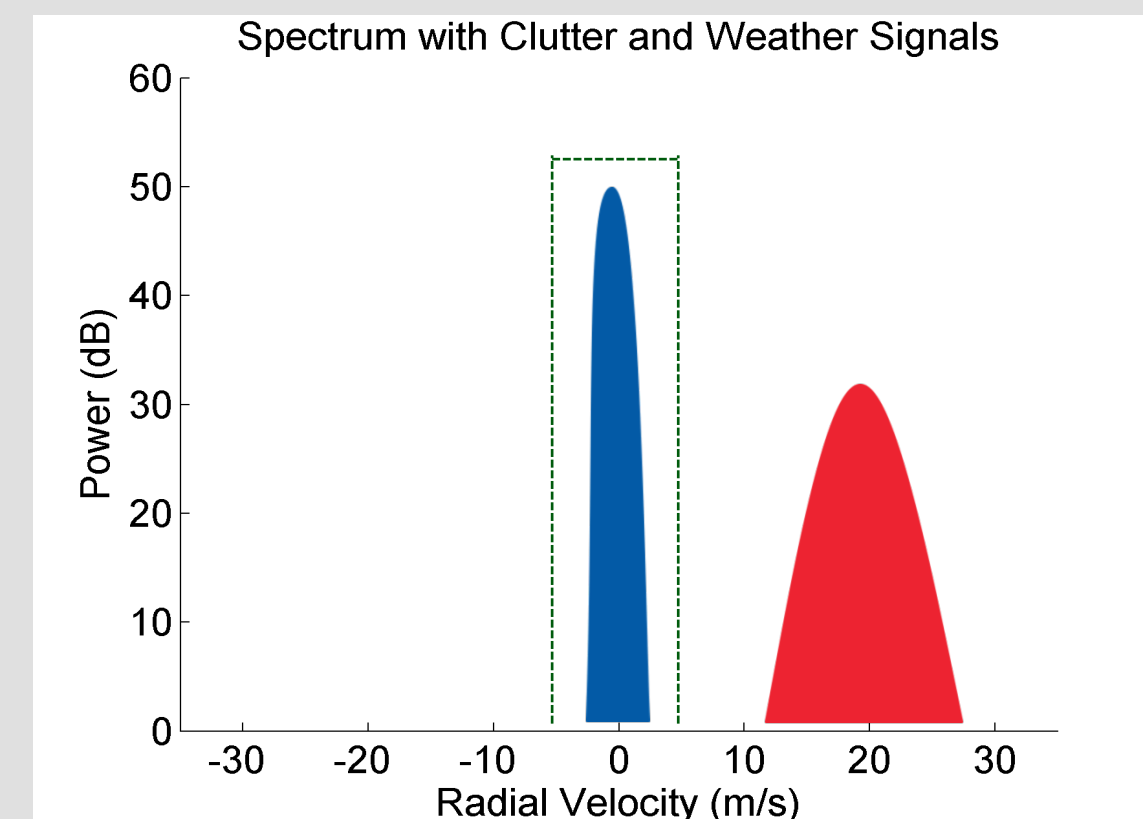
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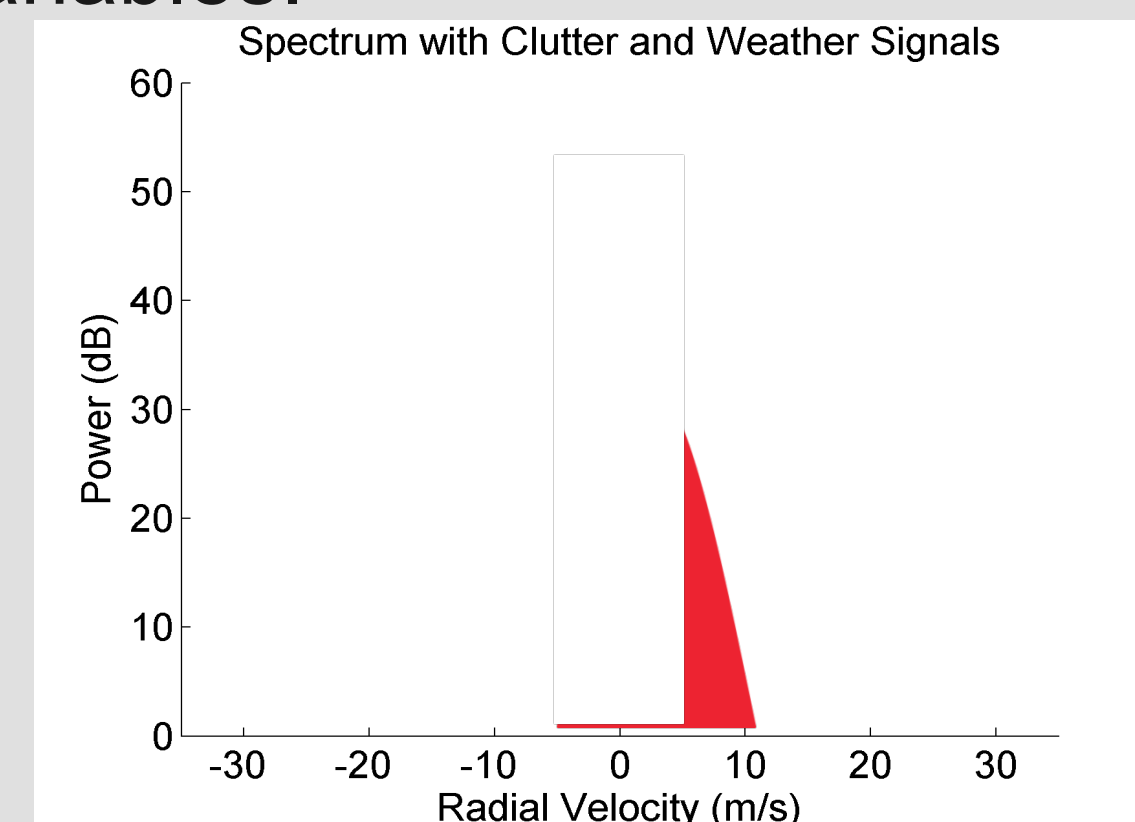
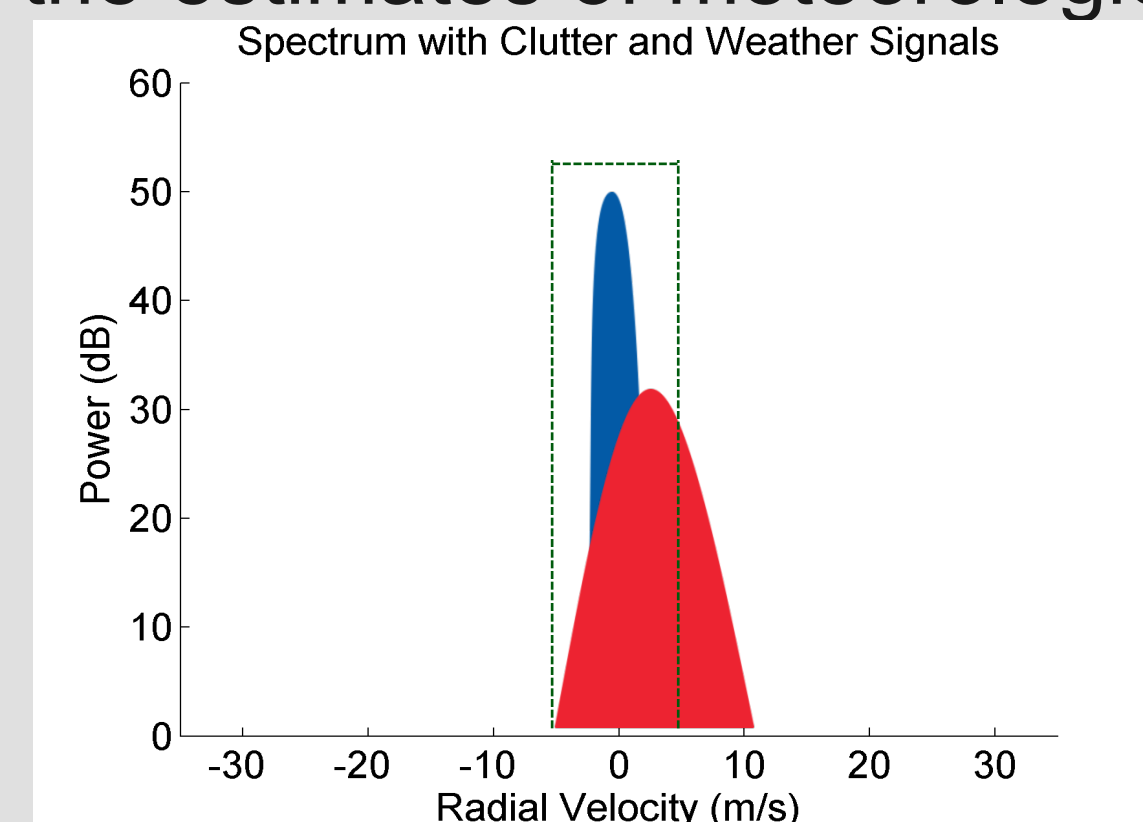
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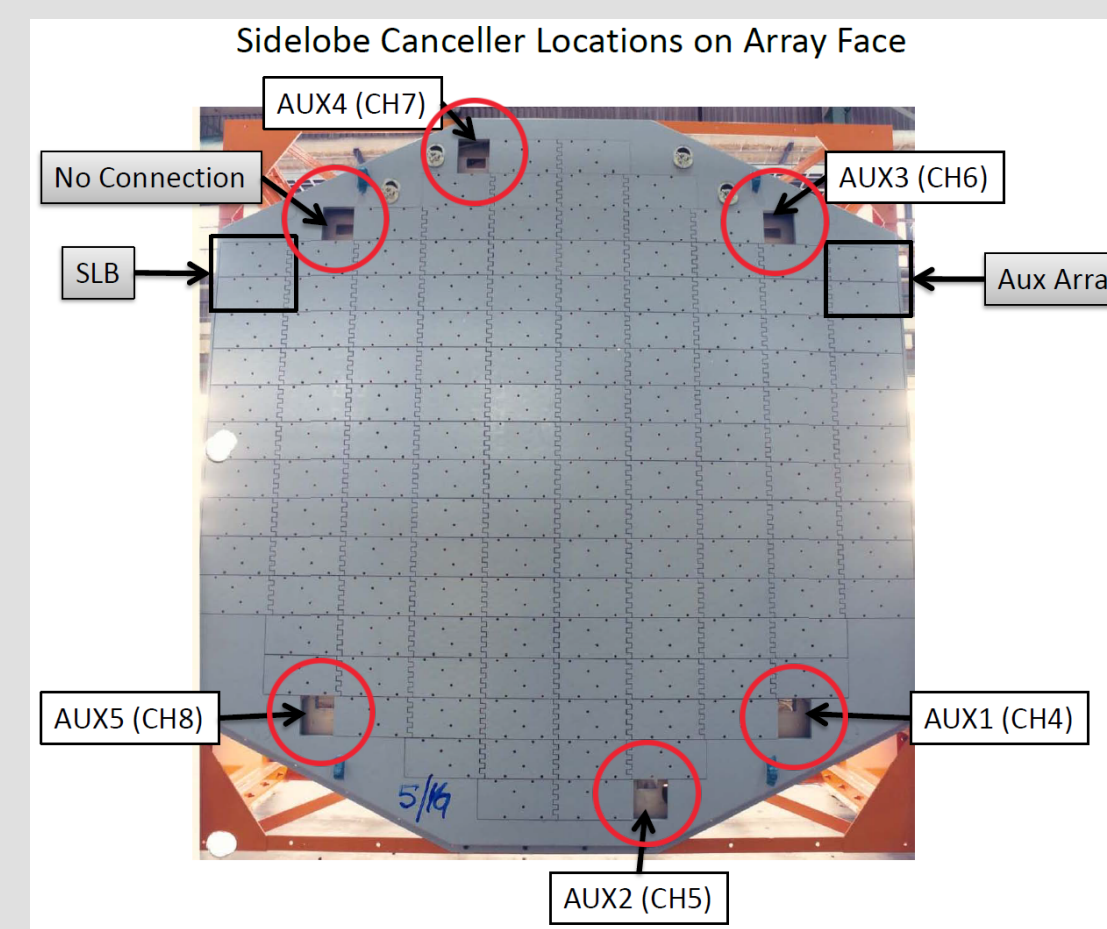
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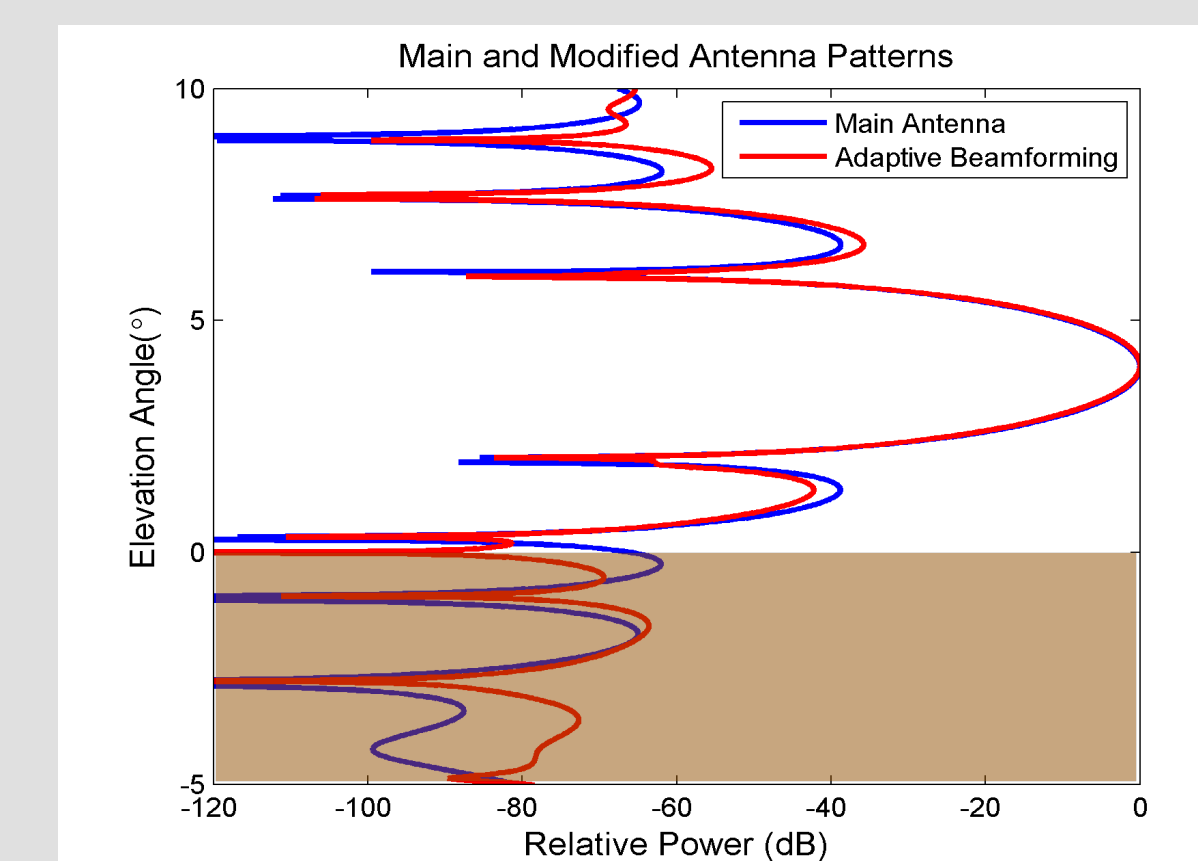
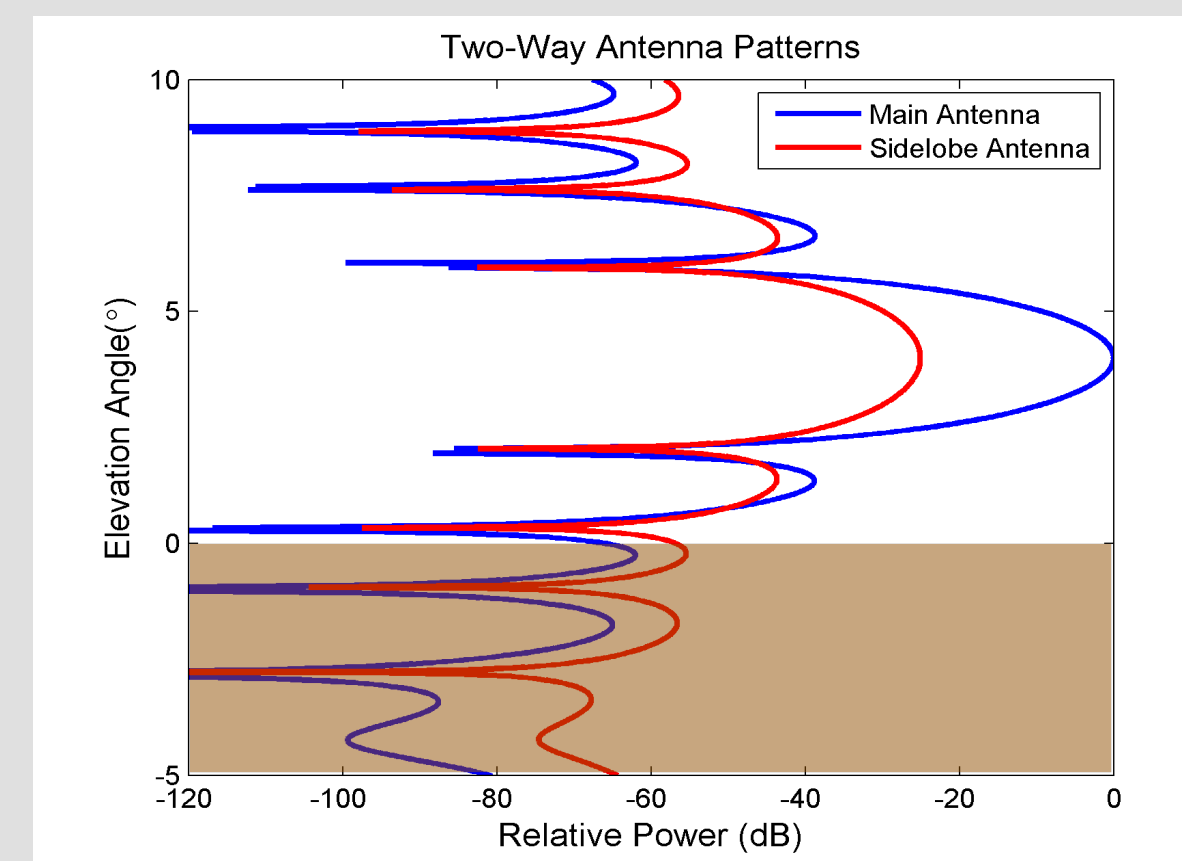
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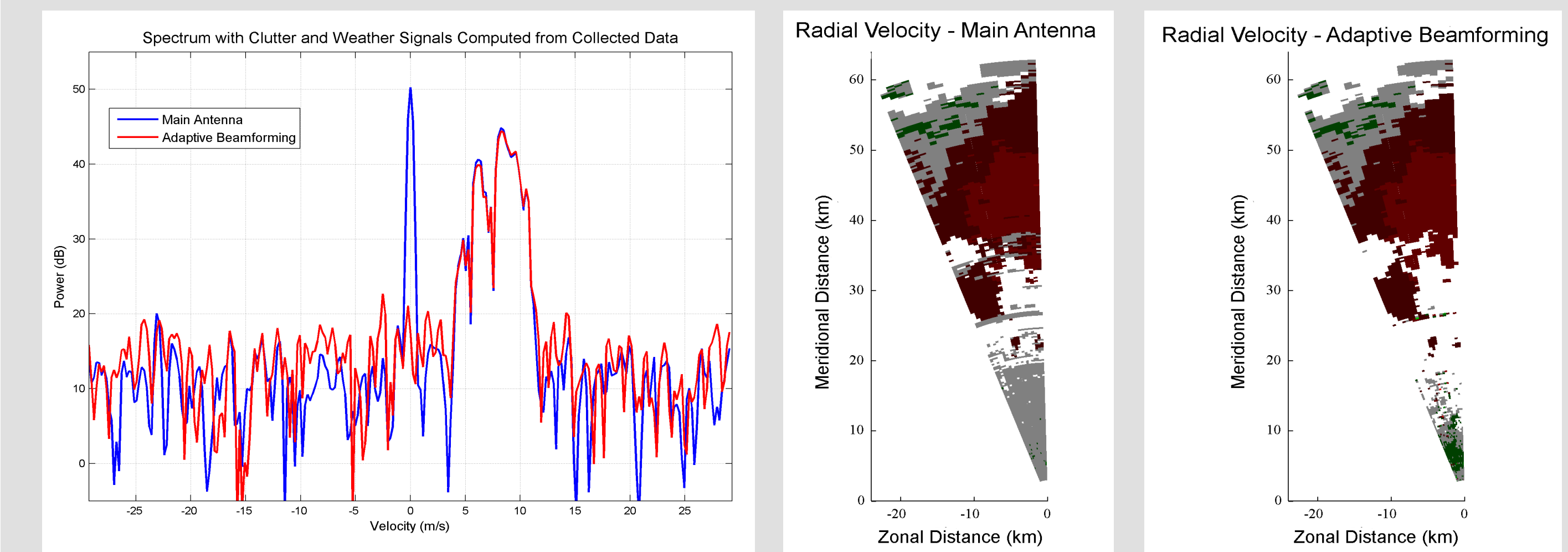
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