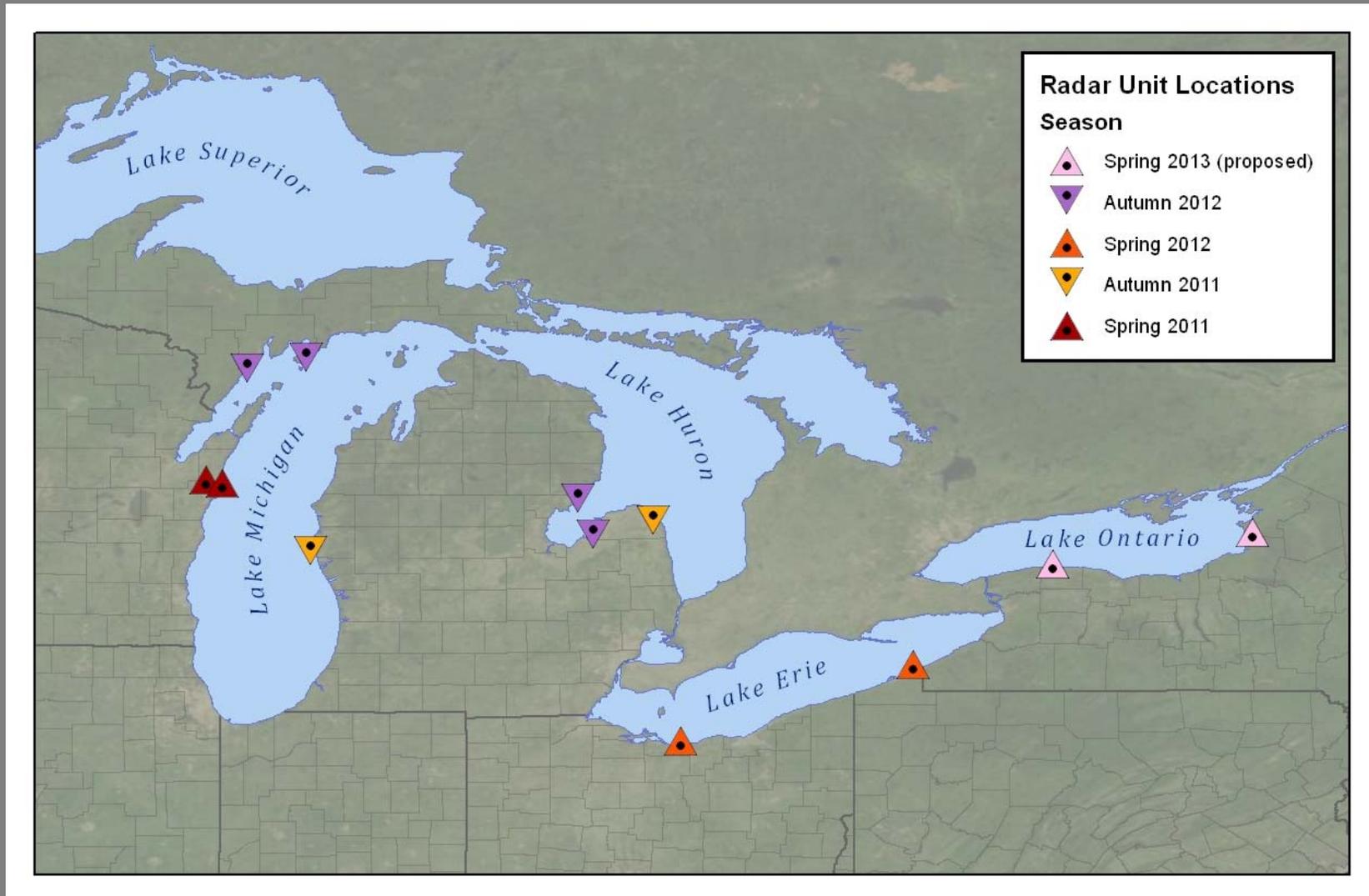


USING AVIAN RADAR TO QUANTIFY BIRD AND BAT MIGRATION ALONG THE SHORELINES OF MICHIGAN AND IMPLICATIONS FOR ANALYSIS AND PRE- CONSTRUCTION SURVEYS

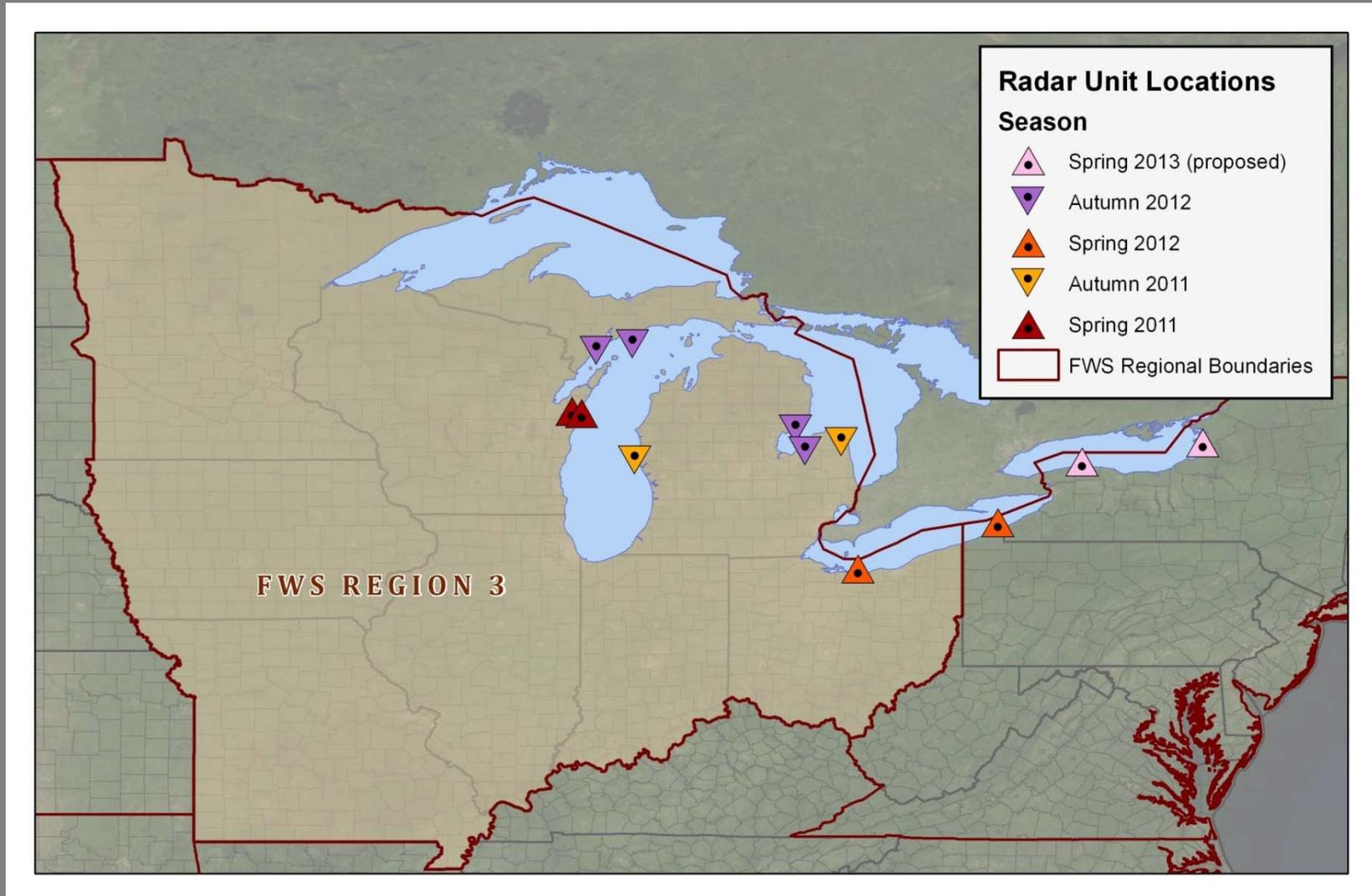
Jeffrey Gosse, Tim Bowden, David Larson, Daniel
Nolfi, Nathan Rathbun, Rebecca Horton, Erik Olson

Region 3, U.S. Fish and Wildlife

Migration and Wind Energy



Region 3

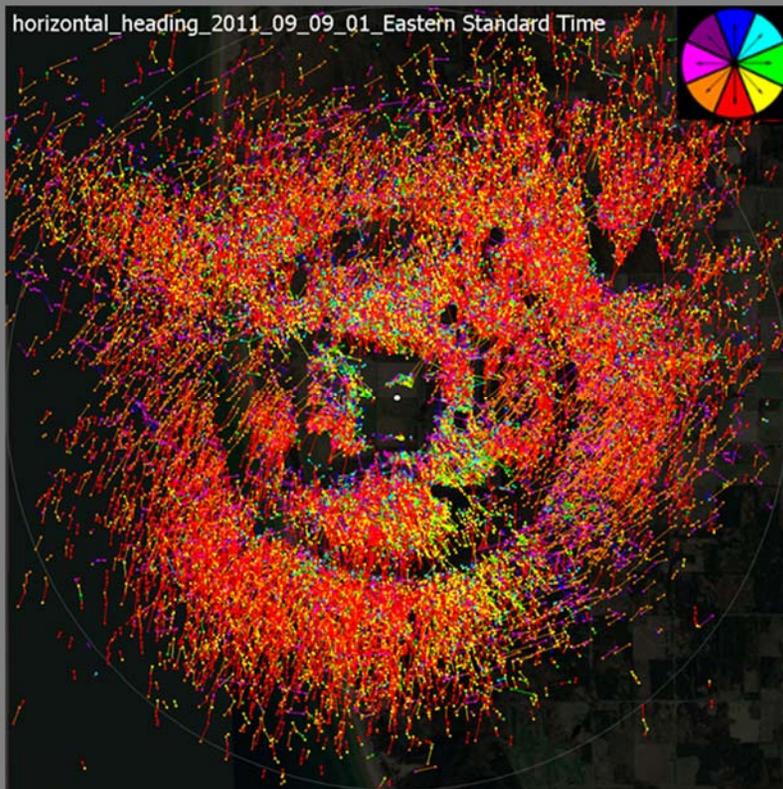


Equipment

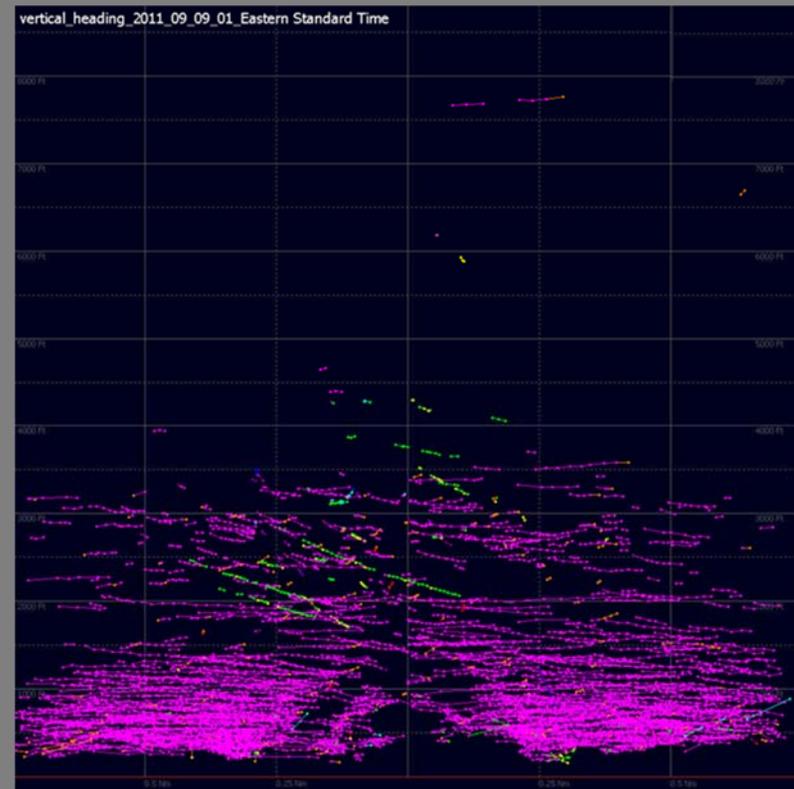


Vertical and Horizontal Scanning Radar

HORIZONTAL RADAR

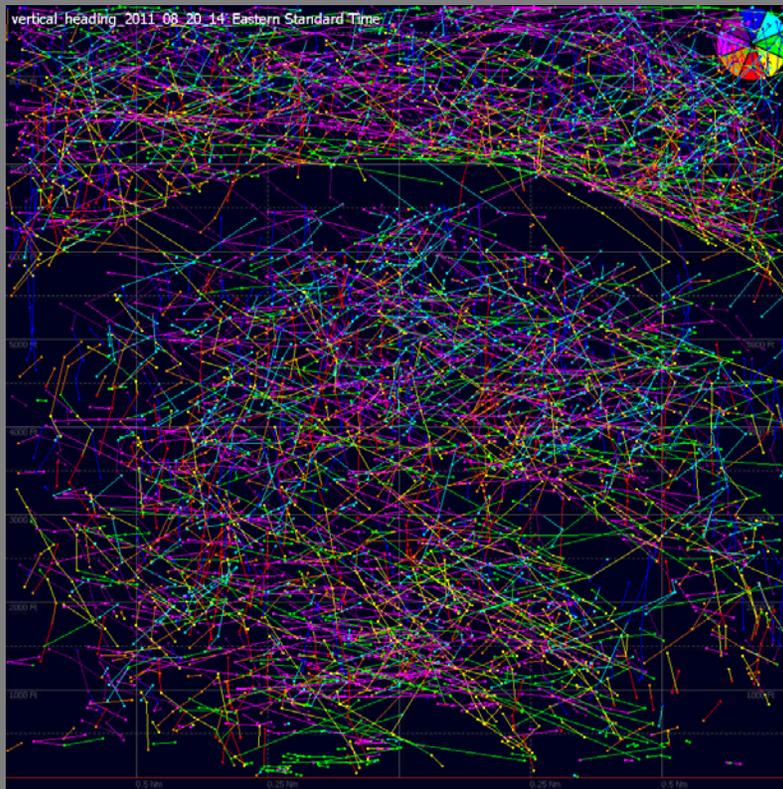


VERTICAL RADAR

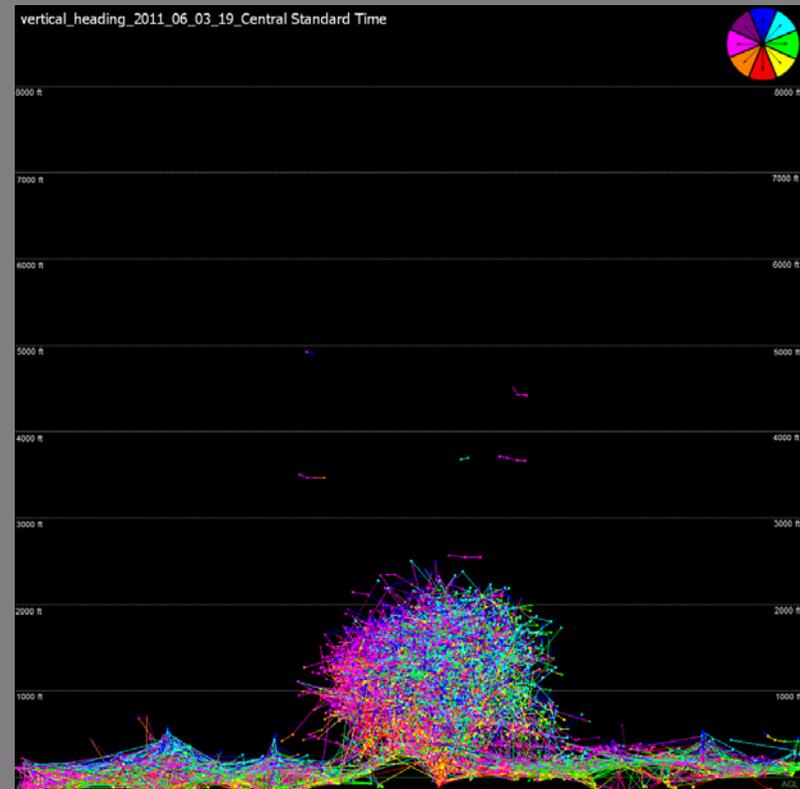


Contamination and Noise

RAIN EVENT ON S BAND VERTICAL RADAR

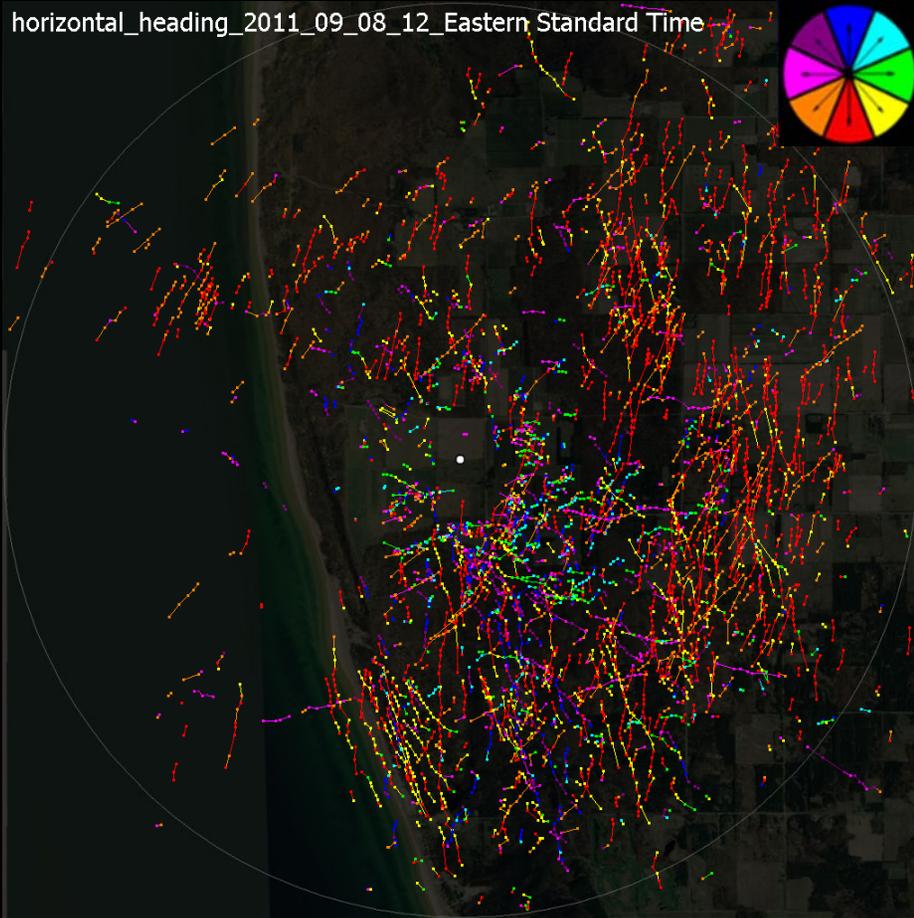


INSECT CONTAMINATION ON X BAND VERTICAL RADAR



September 8, 12:00

horizontal_heading_2011_09_08_12_Eastern Standard Time

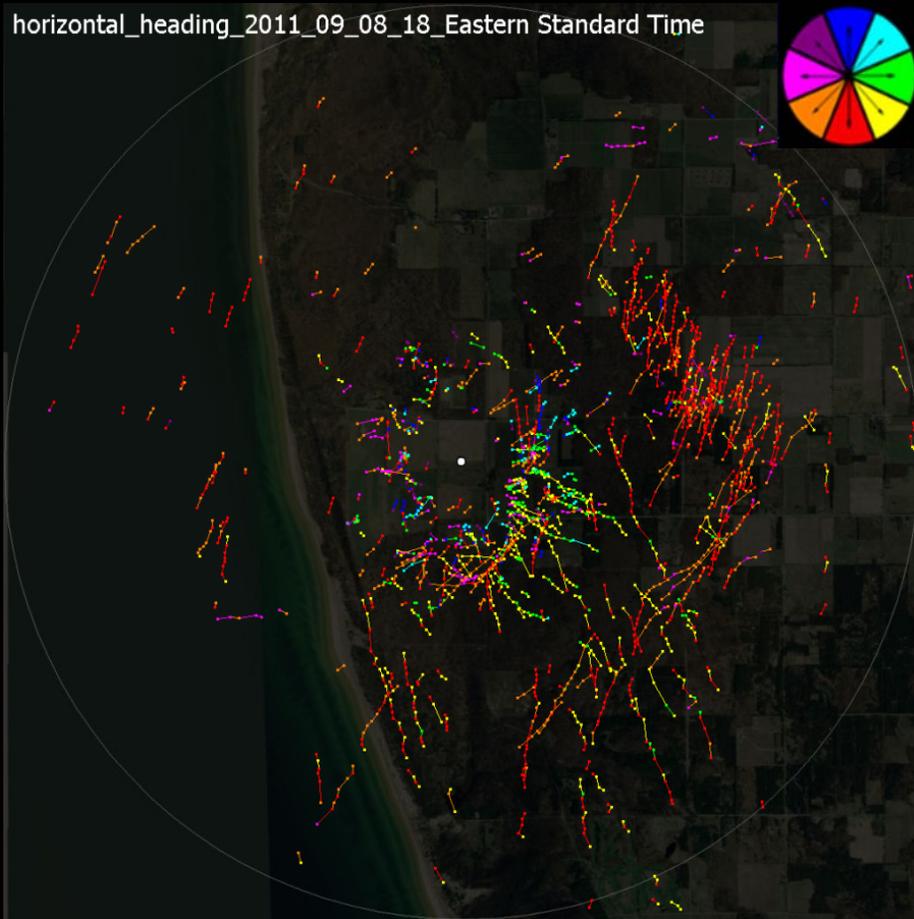


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September 8, 18:00

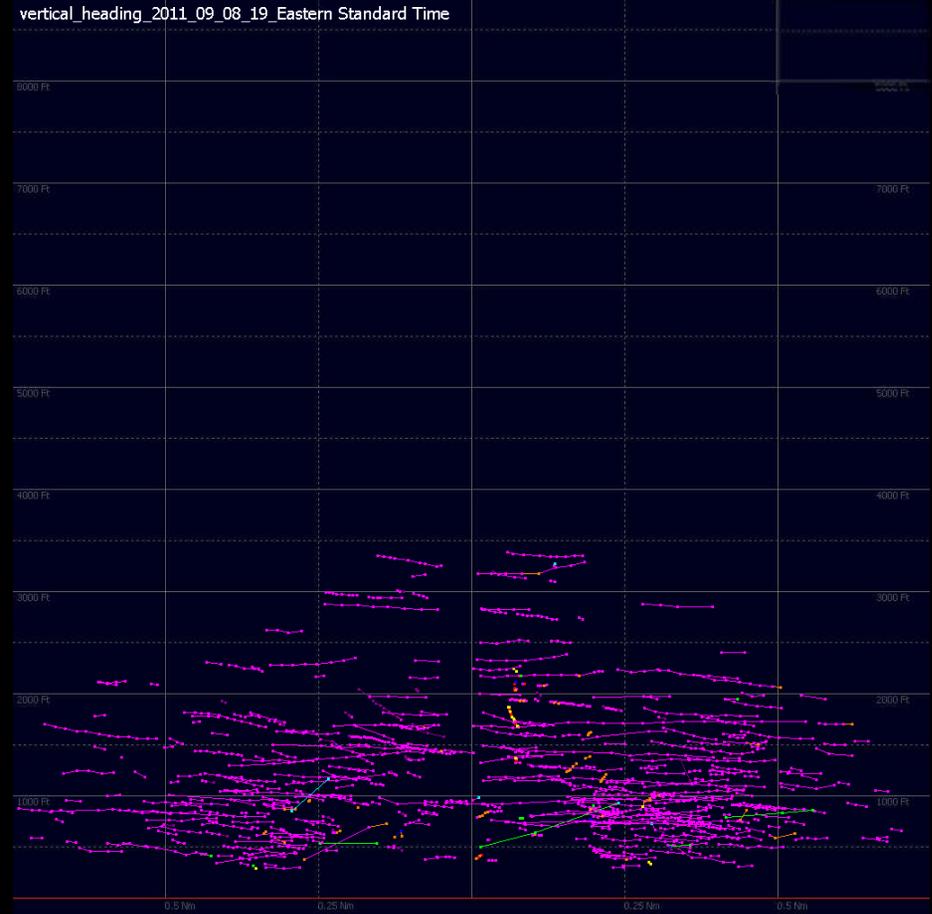
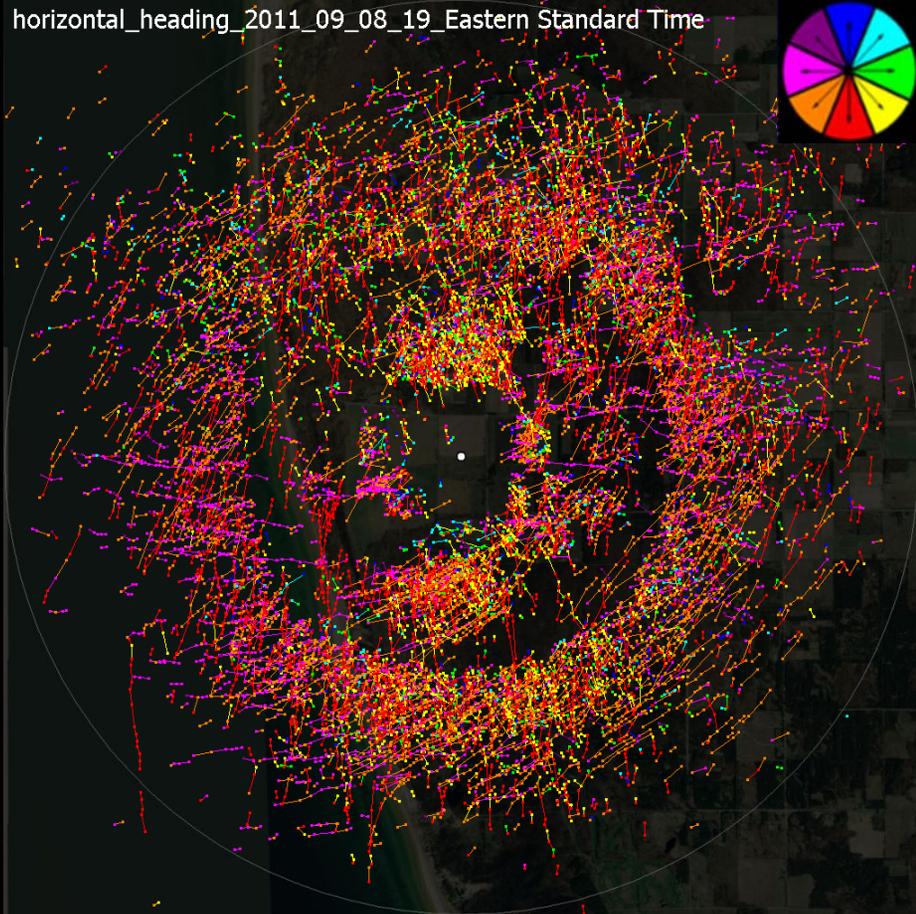
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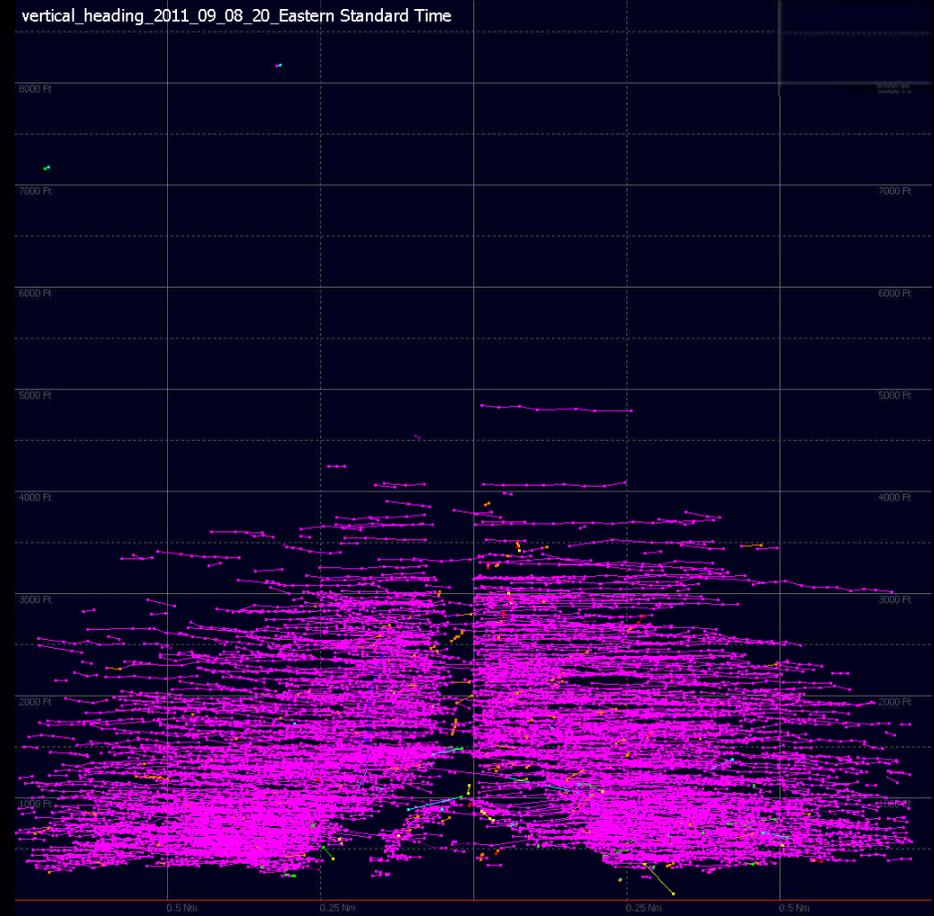
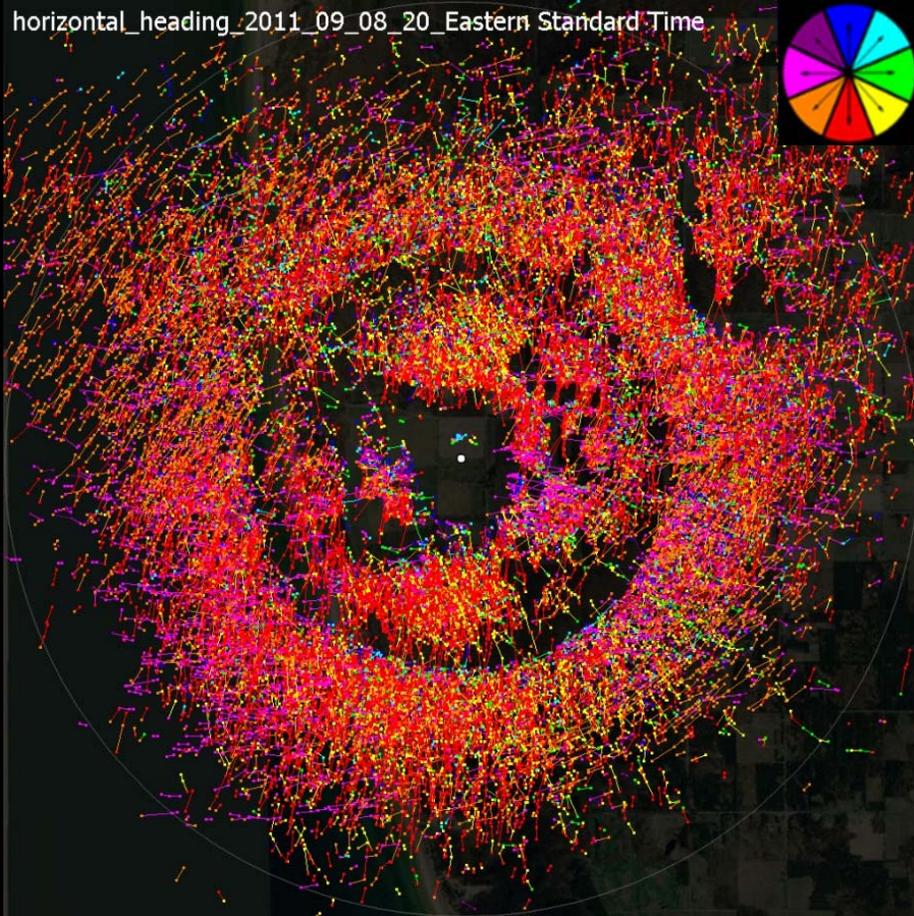
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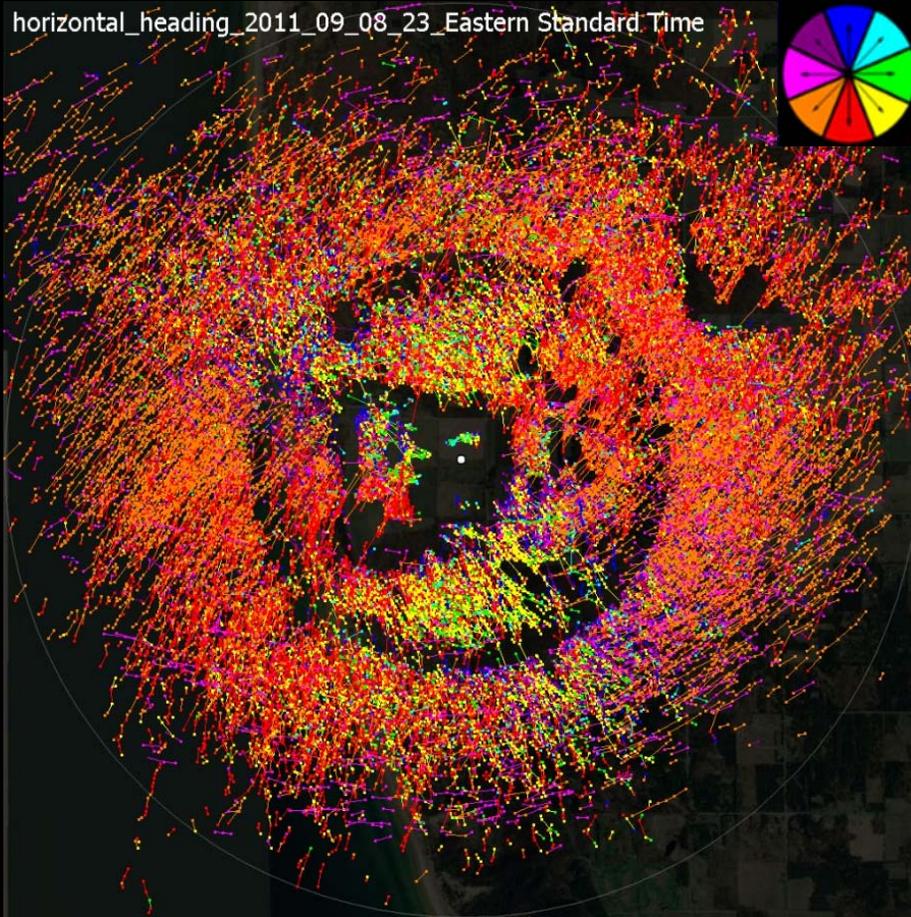


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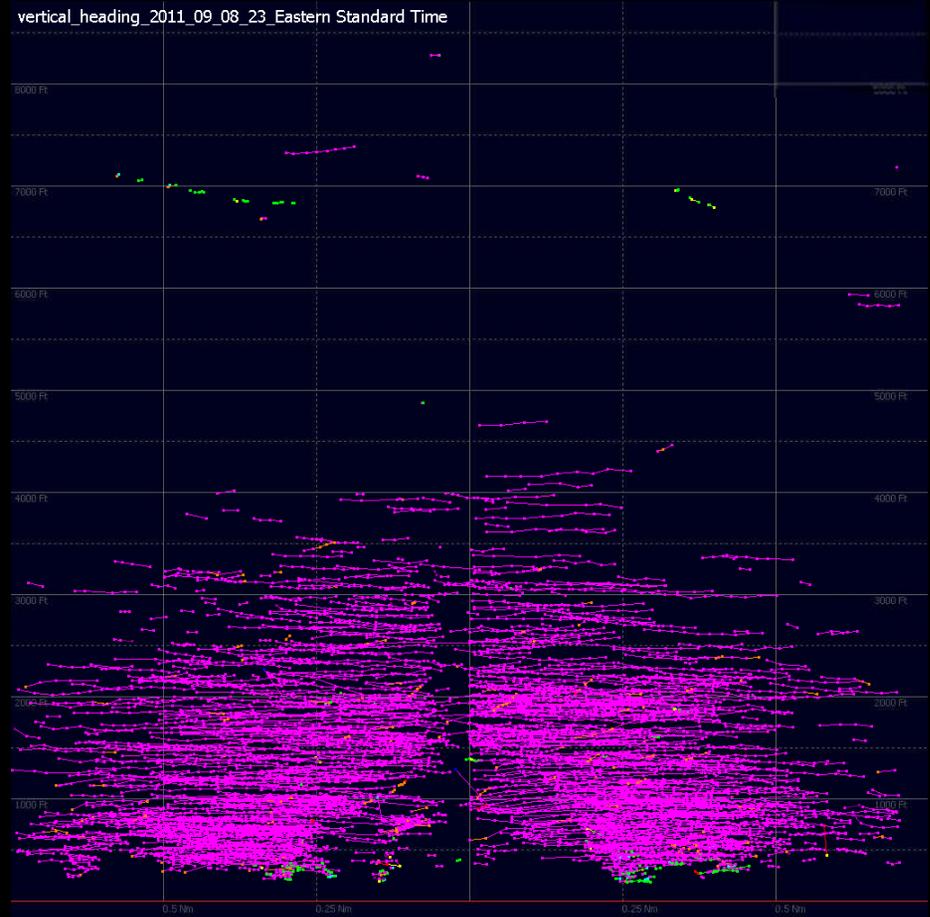


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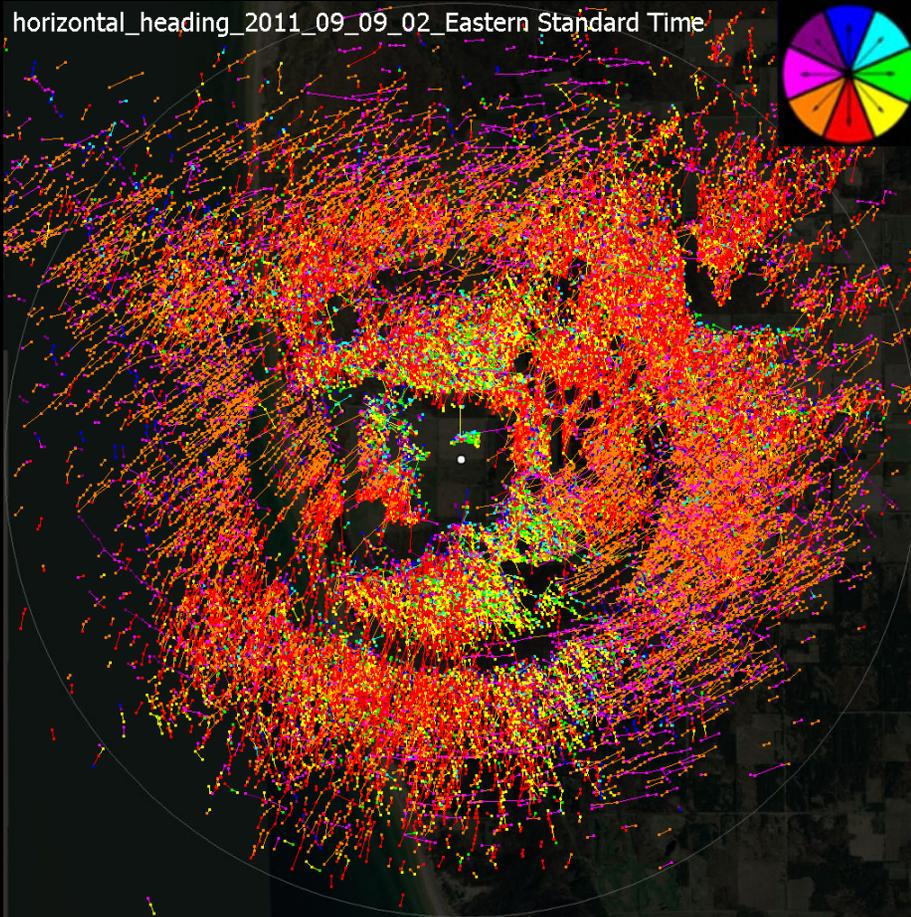


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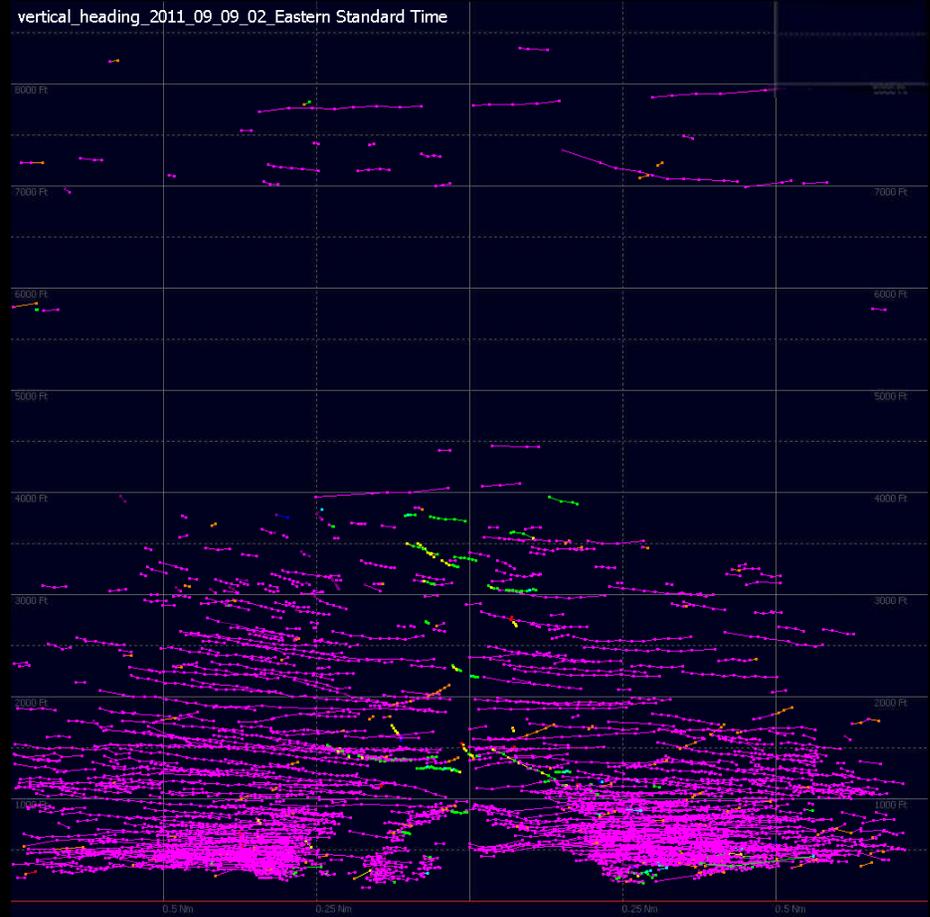


September 9, 02:00

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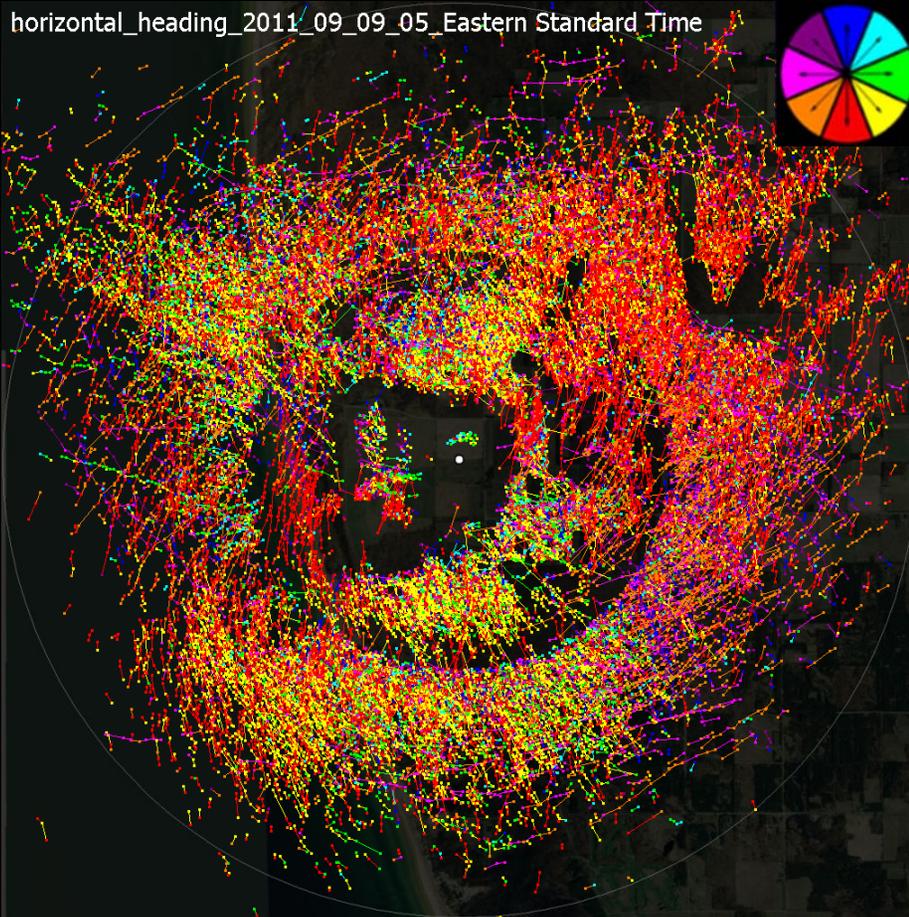


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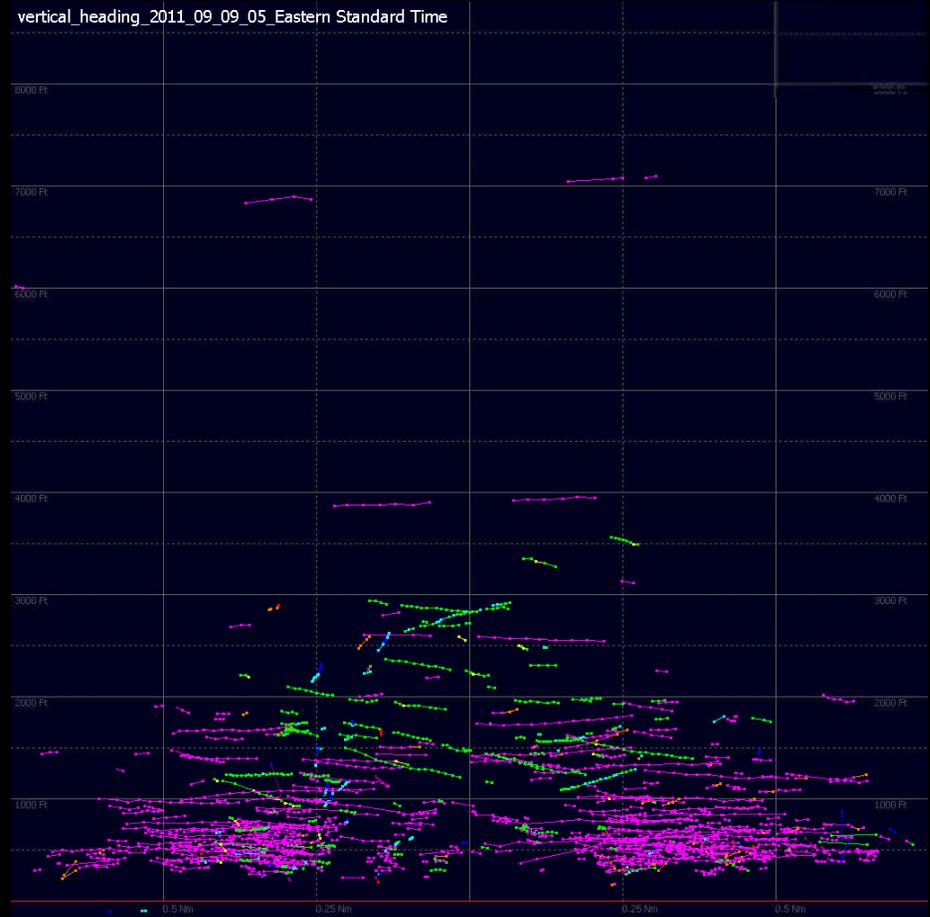


September 9, 05:00

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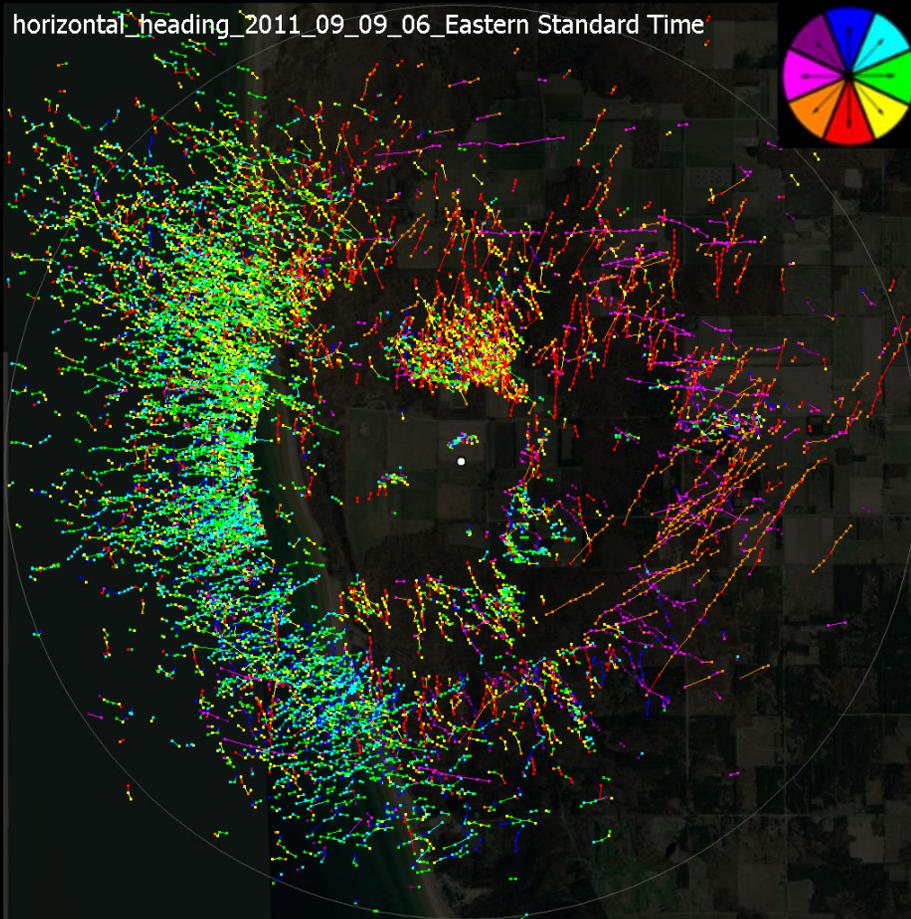


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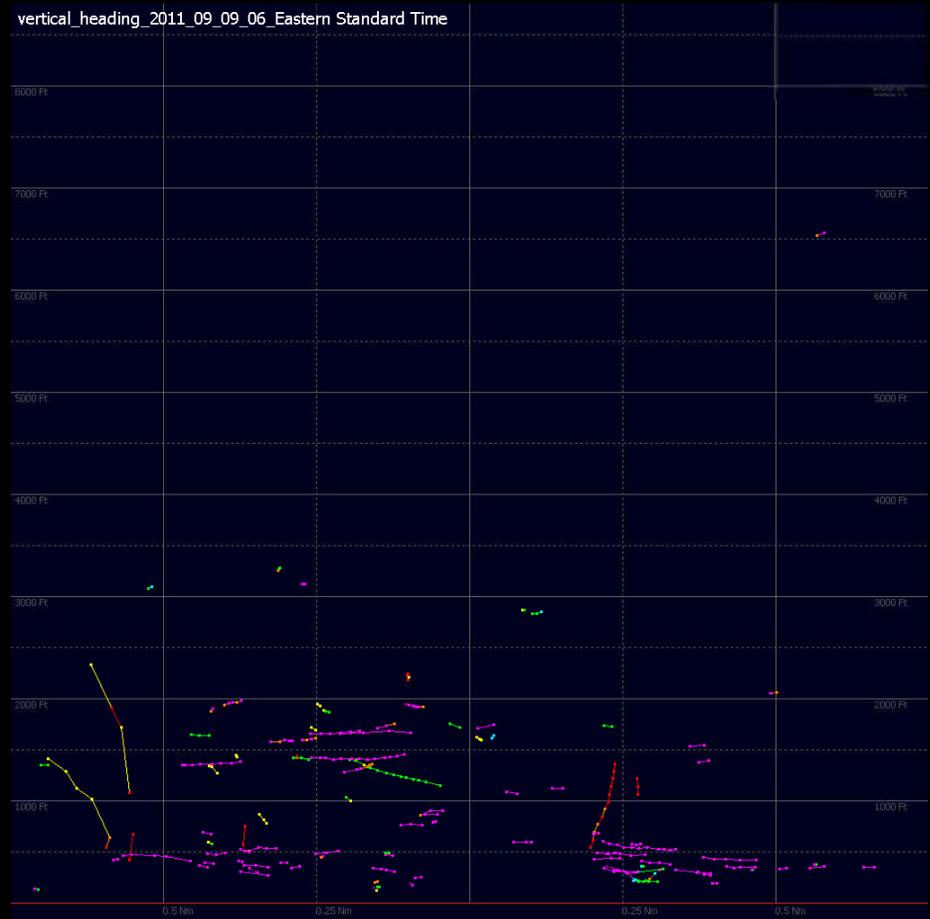


September 9, 06:00

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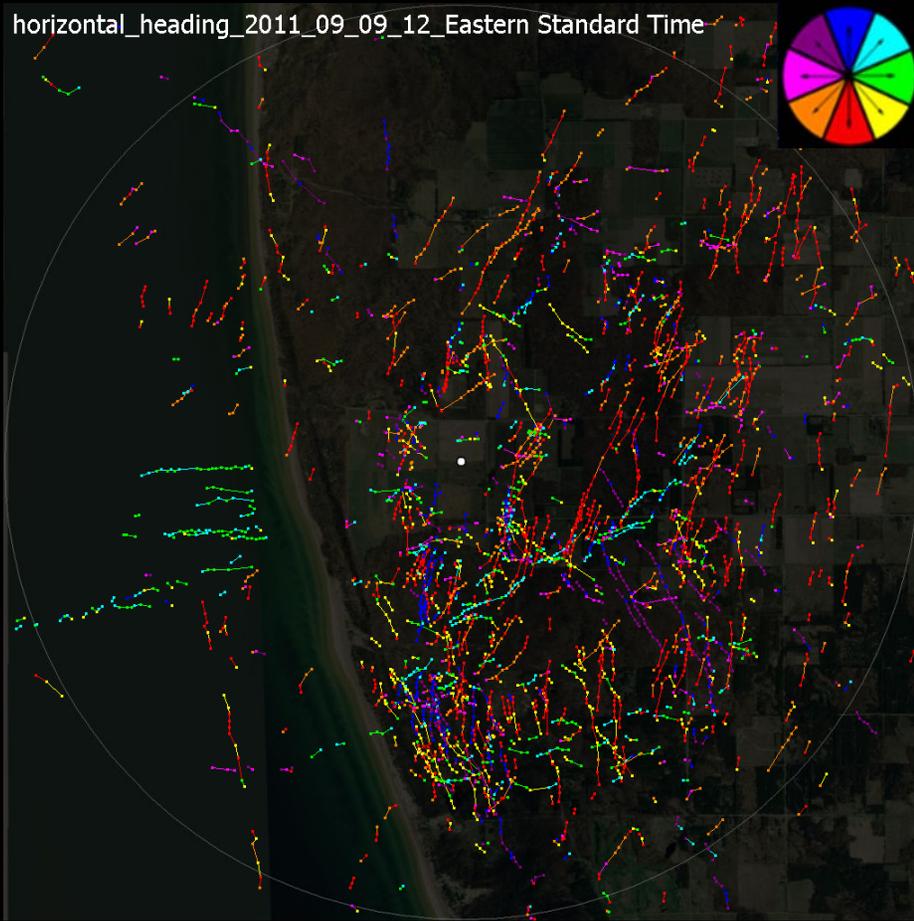


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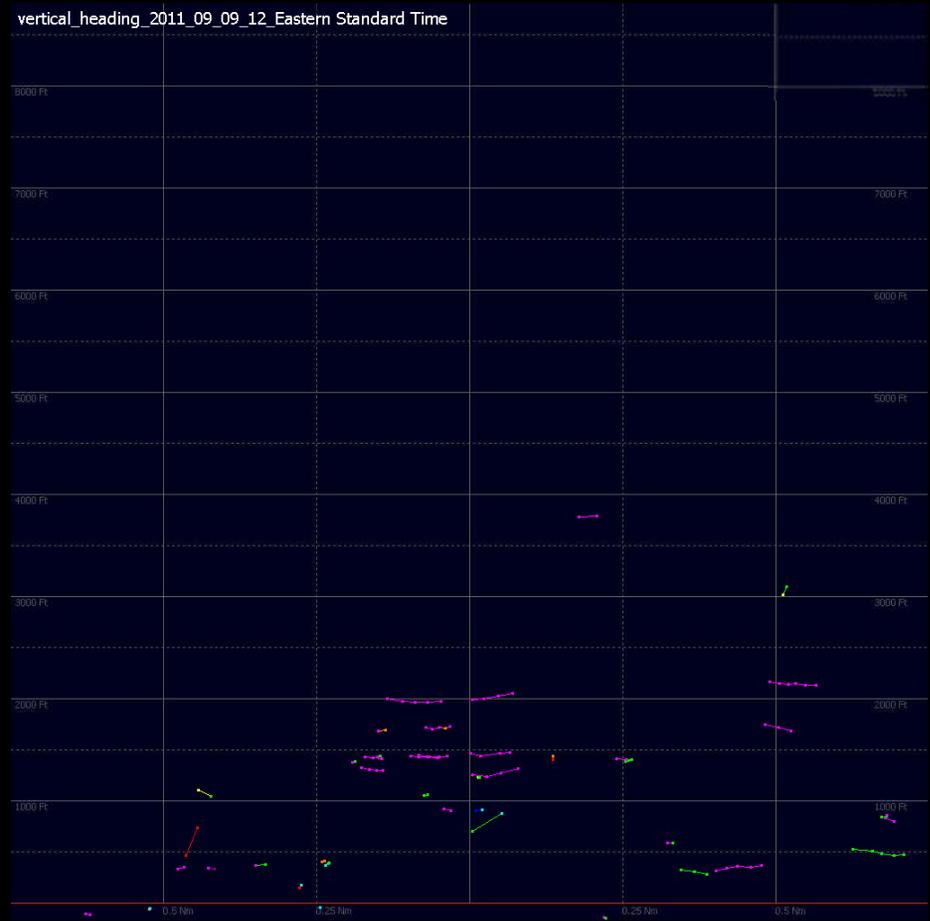


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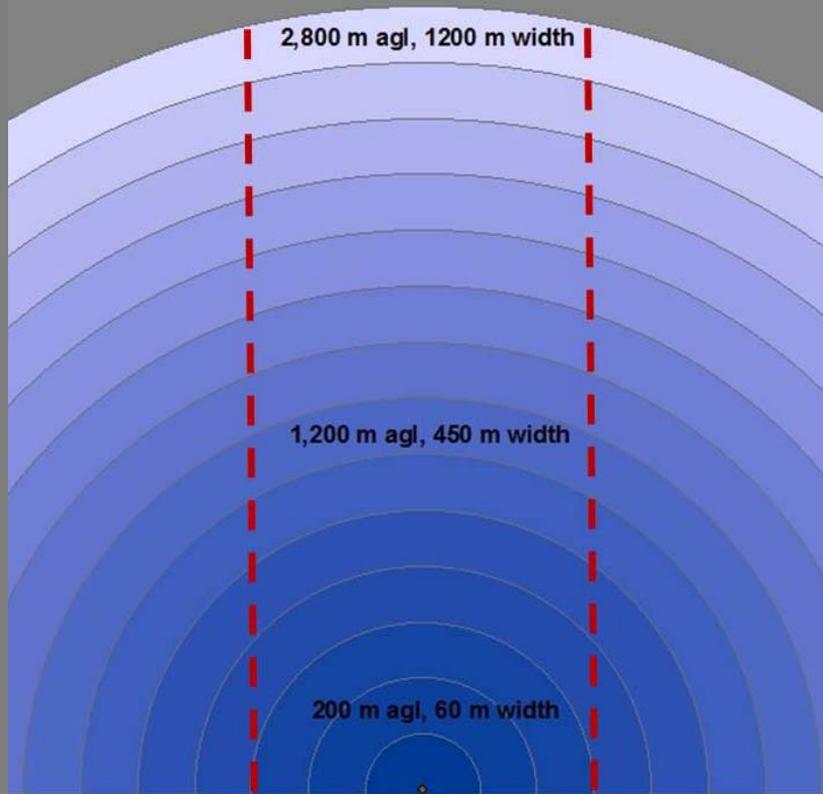


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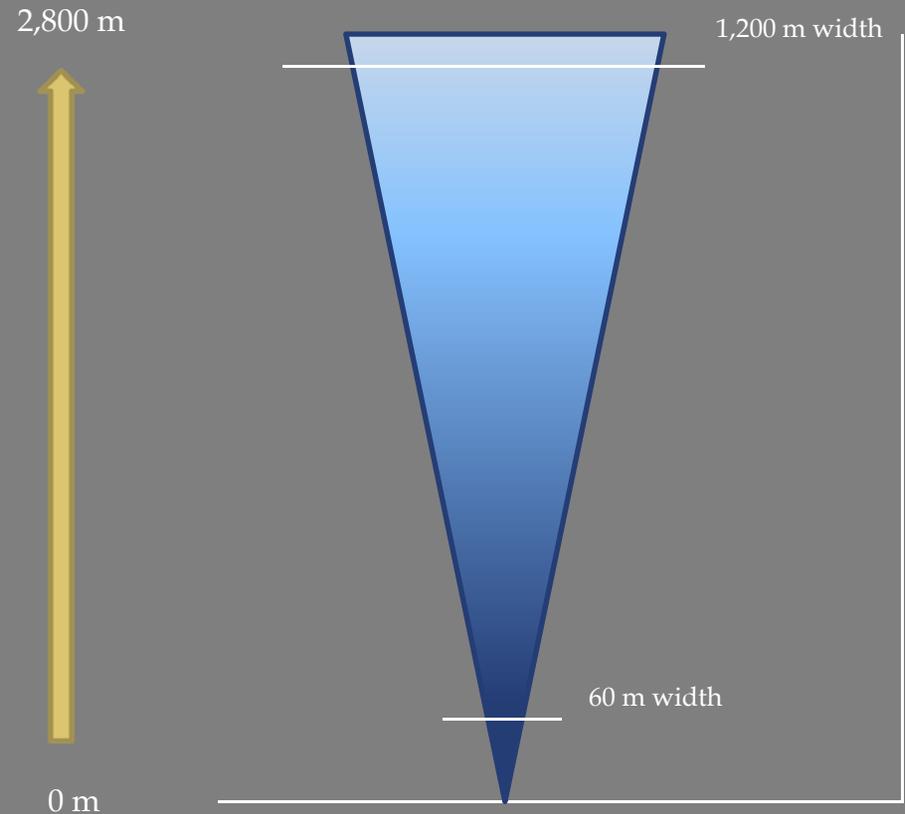


Quantifying Target Passage Index

BEAM VIEW PERPENDICULAR TO
DIRECTION OF ROTATION
(1-KM STANDARD FRONT)

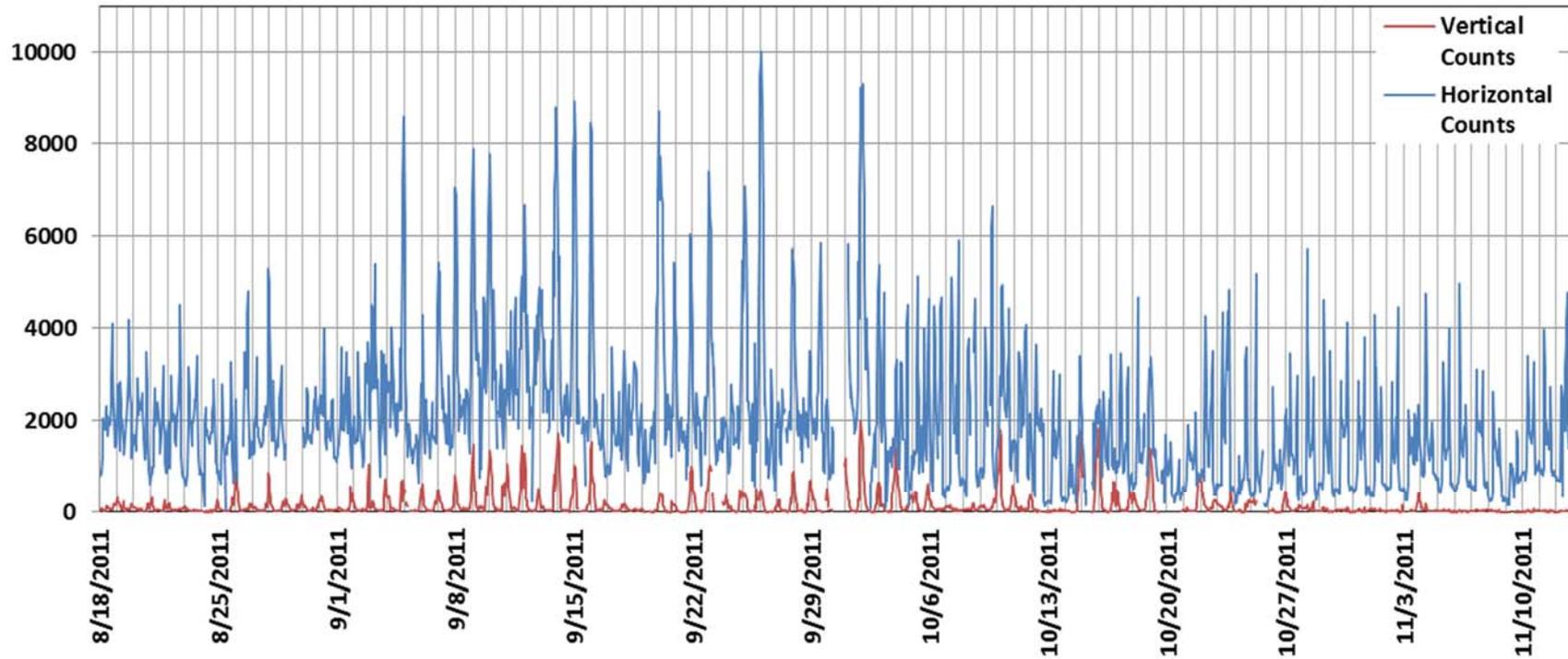


BEAM VIEW PARALLEL TO
DIRECTION OF ROTATION



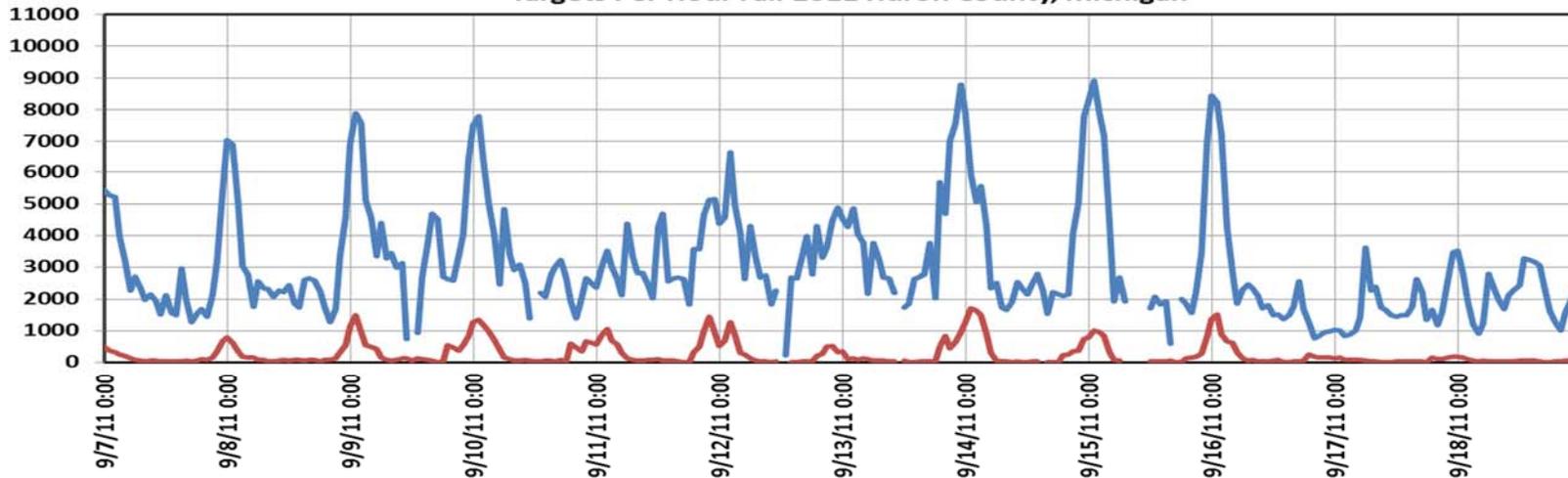
Season Duration

Targets Per Hour Fall 2011 Huron County, Michigan

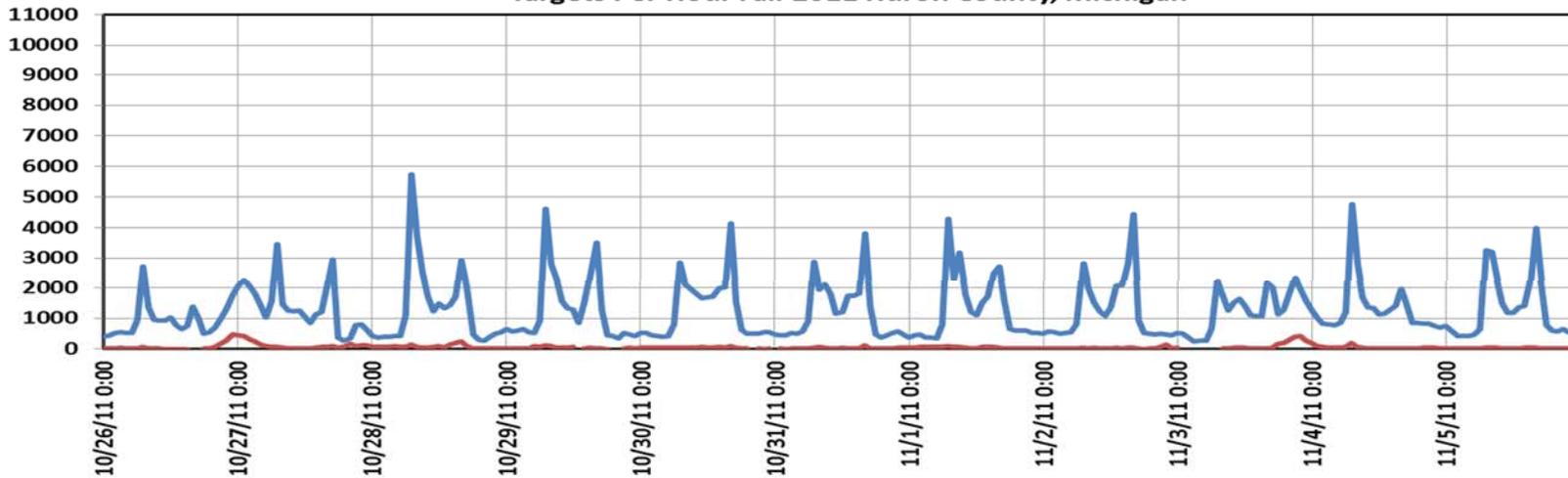


Migration and Low Migration

Targets Per Hour Fall 2011 Huron County, Michigan



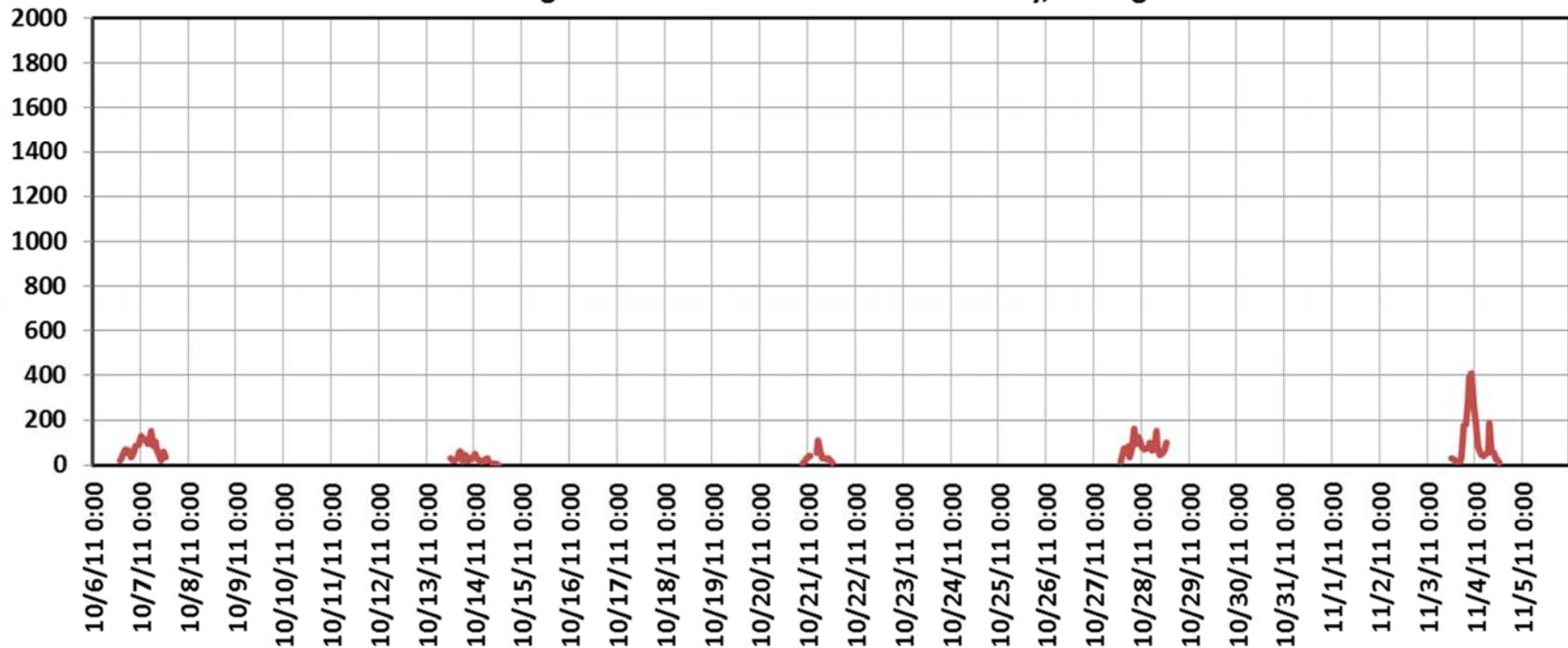
Targets Per Hour Fall 2011 Huron County, Michigan



Sampling Schedule

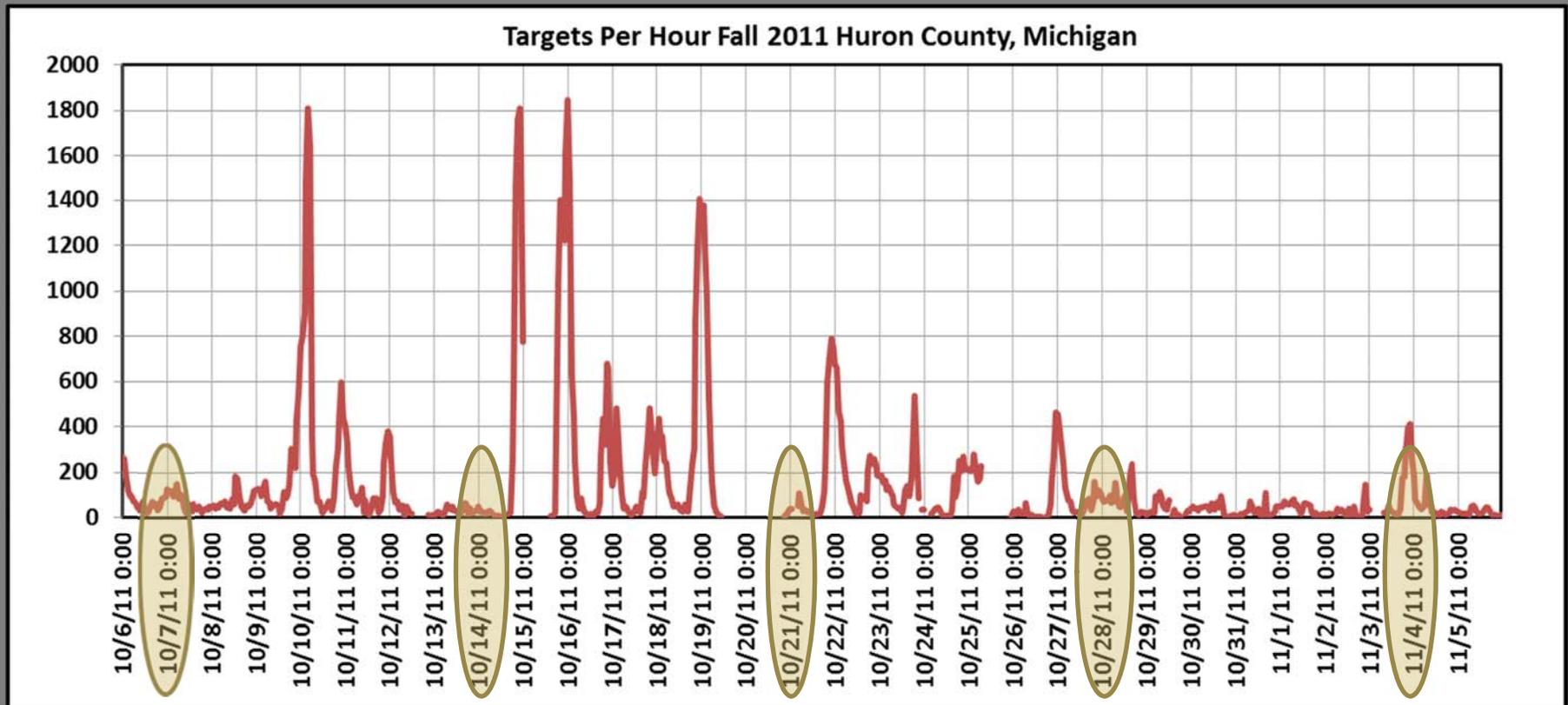
10/6 - 11/5

Targets Per Hour Fall 2011 Huron County, Michigan



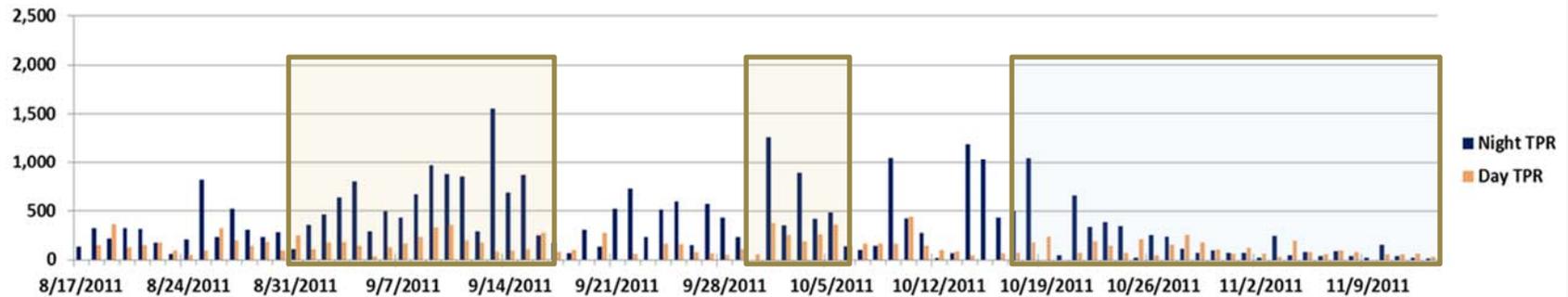
Sampling Schedule

10/6 - 11/5

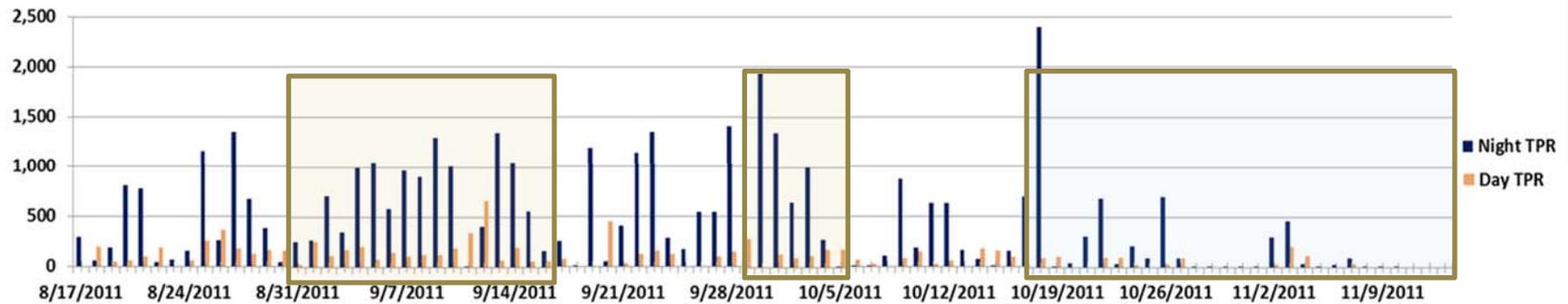


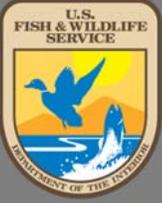
Target Passage Rate

Mean Daily and Nightly Target Passage Rate (Targets/1-KM Front/Hour) in Huron County, MI Fall 2011



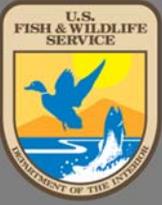
Mean Daily and Nightly Target Passage Rate (Targets/1-KM Front/Hour) in Oceana County, MI Fall 2011





Summary

- ❑ Radar is useful for documenting migration, particularly for nocturnal migrants.
- ❑ Migration indicated by: uniformity of direction, high numbers, and general increase and decrease of targets over the course of the night.
- ❑ Recommend surveys for the entire spring and fall season unless supporting data available.
- ❑ Multiple years may be necessary.
- ❑ Migration occurs in pulses, sampling should be continuous for however long sampling occurs.



Summary

- ❑ Sampling 24 hours per day is useful to understand local traffic and to see differences.
- ❑ However, data must be analyzed separately between day and night, may need to look at 1 hour to 15 minute blocks to observe changes.
- ❑ Comparisons between VSR and HSR is very useful and informative.
- ❑ Measurements of altitude currently have inherent biases in how the data is collected.



Funding Provided by:

Great Lakes
RESTORATION

A blue silhouette map of the Great Lakes region, showing the outlines of Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario.