

# Development of a New Inanimate Class for the WSR-88D Hydrometeor Classification Algorithm

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### Introduction

The current implementation of the Hydrometeor Classification Algorithm (HCA) on the WSR-88D network contains two non-hydrometeor-based classes: ground clutter/anomalous propagation and biologicals. A number of commonly observed non-hydrometeor-based phenomena do not fall into either of these two HCA categories, but often are misclassified as ground clutter, biologicals, or unknown. Some of these phenomena include chaff, sea clutter, combustion debris, and radio-frequency interference (RFI). In order to address this discrepancy, a new class (nominally named "inanimate") is being developed that encompasses many of these targets.



- Fuzzy logic uses aggregated membership functions for each variable to determine the most likely target type
- The current HCA often labels chaff, sea clutter, combustion debris, and RFI as biologicals, big drops, or unknown
- A new class to distinguish these targets from existing classes is being developed



Membership Functions and Weights Must be Determined for a New Class

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Sample Chaff/Weather Data

Hundreds of cases were selected for manual truthing by a human

Cells were contoured and allowed to be placed into multiple categories



- Human-truthed data is used along with

# Human Truthing



Truthed Chaff/Weather Data

Inanimate Variable Histograms



## Inanimate Class Results



Sample Sea Clutter Case



Sample RFI Case

### Summary and Future Work

Preliminary Sub-Classing Example

- A database of inanimate cases was used to optimize membership functions and weights for a new HCA class
- Human truthing was used to compare with non-inanimate cases to maximize detection and minimize false alarms
- Chaff, sea clutter, combustion debris, and RFI have similar enough polarimetric characteristics to fall into the same new class
- Future/ongoing work involves sub-classing the inanimate class using machine learning