

Demonstration of HeloVis: a 3D Immersive Helical Visualization for SIGINT Analysis

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HeloVis is a typical contribution to Immersive Analytics, it is a 3D interactive visualization that relies on immersive properties to improve user performance during SIGnal INTelligence (SIGINT) analysis. HeloVis uses perceptive biases, highlighted by Gestalt laws, and depth perception to enhance the recurrence properties contained in the data. Each radar pulse is represented by an object positioned on a helical scale depending on its time value. The period value can be modified by the end-user and impact the helical scale by twisting or untwisting it (Cantu & al. 2018).

As SIGINT analysis requires a correlation on several dimensions, HeloVis encodes information thanks to the visual variables of color and third dimension: radius of the cylinder (see Figure 1). Being able to differentiate values of frequency or pulse width thanks to color strengthens the cluster detection provided by the helical representation and permits to identify outliers. Using the radius to represent information increases also the cluster detection and improves the selection of clusters (Brath 2014).

3D tools offer the user direct access to the numeric value of the data (Level, Frequency, Pulse Width, ...) or differences between two pulses.

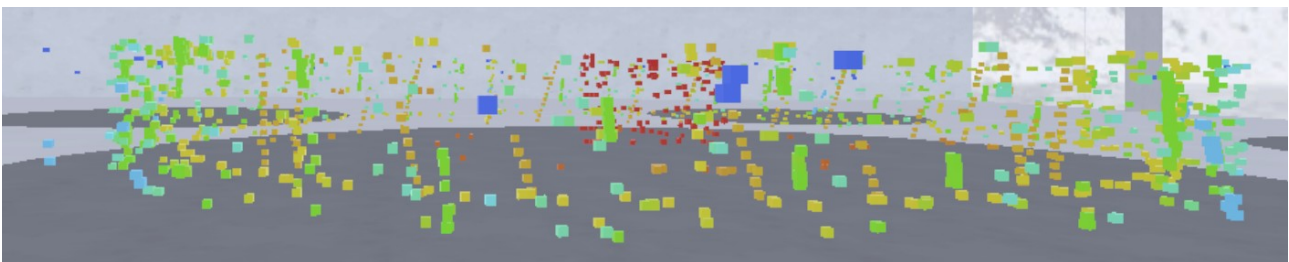


Figure 1. View encoding frequency on both the color of the pulses and the radius of HeloVis.

References

Brath, R. 2014. 3D InfoVis is here to stay: Deal with it. 2014 IEEE VIS International Workshop on 3DVis.

Cantu, A., Duval, T., Grisvard, O. & Coppin, G. 2018. HeloVis: a Helical Visualization for SIGINT Analysis Using 3D Immersion. 11th IEEE Pacific Visualization Symposium (PacificVis 2018)