

Spline-Based Workflows for Rapid Content Generation

PRIMARY AUTHOR

Brian Vacek

ADDITIONAL AUTHORS

Wen Zheng, John Hortenstine

ABSTRACT

Modern synthetic environments typically use a mix of raster and vector data, taking advantages of the former's computational simplicity and the latter's inherent scalability as the situation demands. However, as systems become more sophisticated it is desirable to leverage both data types in increasingly hybridized forms. There are many ripe possibilities in the run-time proximal stages, but this paper specifically examines combined vector-raster data usage during the content generation stage and how user interfaces can be tailored to those emerging workflows.

Vector data is particularly well-suited to non-complex curves, where maintaining smoothness at a variety of scales can be handled with numerous classical spline equations. GIS software packages have effectively defined workflows for generalized spline creation and editing, but we delve into optimizations specific to aviation simulation, especially the relatively well-regulated surfaces, markings, and lighting systems at airports. We also explore the implications of user interfaces that simultaneously provides both vector and raster versions of splines.

Continuing away from the math and deeper into the user experience, we study how digitizers and modelers work, common problems they encounter, and the types of solutions that make for rapid, intuitive workflows. Along the way we highlight the application of usability classics like snapping, mirroring, click-reduction, presets, and batch editing, discuss how to find the real needs at the core of overly specific requests, and learn lessons from some dead ends and failed designs.

BIO

PRIMARY AUTHOR

Brian Vacek is a Software Engineer V with FlightSafety International, specializing in AOI modeling software and usability. He leads development teams focused on vector modeling processes and large scale data conversions. Mr. Vacek has previously presented at IMAGE on data format ecosystems and reprogrammable converters. Outside of aviation simulation, Mr. Vacek writes on world cinema.