面向飞行模拟的云仿真及其实时绘制

佟志忠，姜洪洲，韩俊伟

哈尔滨工业大学 机电工程学院, 哈尔滨 150001

摘要

改进并建立了云光照模型，引入了大气密度与海拔高度间的关系，
并基于粒子尺度对散射相函数进行加权以提高仿真精度。针对飞行模拟的静态/动态云绘制，提出了基于粒子系统和Texture
Sprites实现云谱交互建模的有效方法。为达到实时绘制，
采用动态生成Impostor技术和GPU加速仿真及实时绘制。将本文提出的粒子云绘制技术集成于飞行模拟器的视景系统，
能够增强虚拟环境的真实感、沉浸感，并满足限时系统的交互要求。

关键词 计算机应用 云仿真 粒子系统 实时绘制 加速技术
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Cloud simulation and real time rendering for flight simulation

TONG Zhi-zhong，JIANG Hong-zhou，HAN Jun-wei

School of Mechatronics Engineering, Harbin Institute of Technology, Harbin 150001, China

Abstract

A cloud illumination model is proposed, in which the relationship between atmosphere density and altitude is taken into consideration, and based on the particle scale the scattering phase function is weighted to improve the simulation accuracy. For static or dynamic cloud rendering in flight simulation, a routing is proposed to model the cloud spectrum based on particle system and texture sprites. The technique of dynamic generation of impostor and simulation on GPU are employed to realize real time rendering. These techniques are integrated into the scenario system of flight simulation. Experiments show that the reality and immersion of virtual environment are significantly improved with better performance that satisfies the requirements of real time interactive simulation.

Key words computer application cloud simulation particle system real time rendering acceleration technique

DOI:

通讯作者 佟志忠 tongzhizhong@yahoo.com.cn

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