

# **AMAP™ and Blueberry 3D Application Hands-on Workshop**

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Bionatics' core technology derives from the research work carried out at **CIRAD** since 1978. It has led to the creation of a computer software system for simulating a plant's growth while respecting an expression for its genetic program and obtaining the plant's morphology and natural esthetics using 3D computer graphics.

This new technology, called AMAP™ (Atelier de Modélisation et d'Architecture des Plantes – Plant Architecture and Modeling Workshop) quickly gained a reputation among the international scientific community.

AMAP™ technology is first and foremost designed for computer graphics professionals. It was first designed to run on major computer graphics software applications such as Wavefront® and Softimage® to quickly and easily reproduce plants while maintaining the highest degree of realism. It was then discovered by landscape designers, architects, city planners (who were becoming highly computerized) and the research offices working in land planning..

Having perfectly mastered AMAP® technology, Bionatics' engineers are today allowing the company to continue to develop a new line of high tech software : growth motors, 3D modelers, scene placement tools...thus positioning itself to become a world market reference in plant simulation.

Amap is now being used through a variety of workflows based on specific technical environments: Autodesk 3DS Max, Alias, Open flight stand alone generator realnat Premium and plug in into Multigen Paradigm Creator, Autodesk Viz, Autodesk Architectural Desktop.

For Real Time Digital landscape visualisation and simulation, Bionatics can offer two of its latest technologies with unique approaches, Realnat Premium and Blueberry 3D.

## **1 Realnat Premium**

Originally created two years ago by the R&D team at Bionatics, it has evolved successfully in the video games market relying on a procedural and volumetric modeling solution, generally known as “hybrid”. The result is low polygonal geometry, instantly compatible with the constraints of Real Time.

The “hybrid” modeling solution offers a compromise between 2D and 3D. Low polygonal trees are generated with high realistic results taking into account the limits of system's performance. The “hybrid” models may vary with each other with respect to levels of

detail complexity based on the original 3D model and based on multiple definitions for each one according to distance from the camera.

REALnat<sup>®</sup> Premium<sup>™</sup> is a new generation plant modeling tool which aims to solve three main issues for the real time simulation industries:

- Increase realism and the feeling of immersion in real time 3D scenes
- Offer technological innovation without disrupting existing workflows
- Advise and support cost effectively the evolutions of these workflows towards more physics simulation and interactivity with vegetation (wind, collision, penetrability, infrared).

## 2 Blueberry 3D

In october 2004, Bionatics acquired Blueberry3D from STVRS in order to improve the visualisation of terrains and ecosystems on an infinite scale. Blueberry 3D uses advanced fractal mathematics and procedural geometry. The ability to create terrain details only when needed allows incredibly complex and detailed scene to be built quickly and visualized in no time. The rendering of the smallest details of a landscape is now possible in realtime on a regular PC.

Our unique mathematics based fractal engine makes virtual unlimited detail achievable on a mid-range PC. Geometrical shapes are created procedurally only when needed.

Thanks to procedural geometry, you can rapidly design and create terrain of several hundred square miles. An advanced material classification system allows you to manage erosion, cultivation, density, etc. Create a variety of construction forms ranging from hedges, roads, walls, rivers or even tank tracks. No irregularities appear as they are fully integrated into the terrain.

The physics engine of Blueberry3D uses real mechanics computations and collision detections for both terrain and all objects of the world.

The making of a landscape is processed with mathematical equations creating a natural dispersion of the vegetation on the terrain and along the roads. Trees do not grow on highways and bushes are naturally seeded around the rocks and beside the lakes.

### **Current references include:**

VINCI, Aéroports de Paris, University of Stirling, Sheffield, Birmingham, East Anglia, Glasgow, ETSI Montes, Lafarge Granulats, Boeing, Bae Systems, Rheinmetall Electronics, CAE, Belge et Japonais, Vivendi Environnement, SCETAUROUTE, BETURE Infrastructure, DEREK LOVEJOY, Direction de l'Agriculture et de la Forêt (34), Atelier Jean NOUVEL, Cabinet C. de Portzamparc, RTKL, Foster & Partners, PRP Architects, Benoy Architect, Nightingale Associates.