David Vanderhaeghe (http://www.dlyr.fr/stuff/)

vdh@irit.fr (mailto:vdh@irit.fr)

Master Internship Position: line based rendering of point clouds

2016-11-22 (HTTP://WWW.DLYR.FR/STUFF/2016/11/MASTER-INTERSHIP-POSITION-LINE-BASED-RENDERING-OF-POINT-CLOUDS/) DLYR (HTTP://WWW.DLYR.FR/STUFF/AUTHOR/DLYR/)

(http://www.dlyr.fr/stuff/2016/11/master-intership-position-line-based-rendering-of-point-clouds/)

We are looking for a highly motivated Master student for a research internship.

- **Keywords**: Line based rendering, Point Cloud, Realtime Rendering, Computer Graphics
- **Advisor**: David Vanderhaeghe, Nicolas Mellado
- **Location**: Laboratoire IRIT, équipe VORTEX (Groupe AGGA), Université Paul Sabatier – Toulouse
- **Duration**: from February/March 2017, 5-7 months

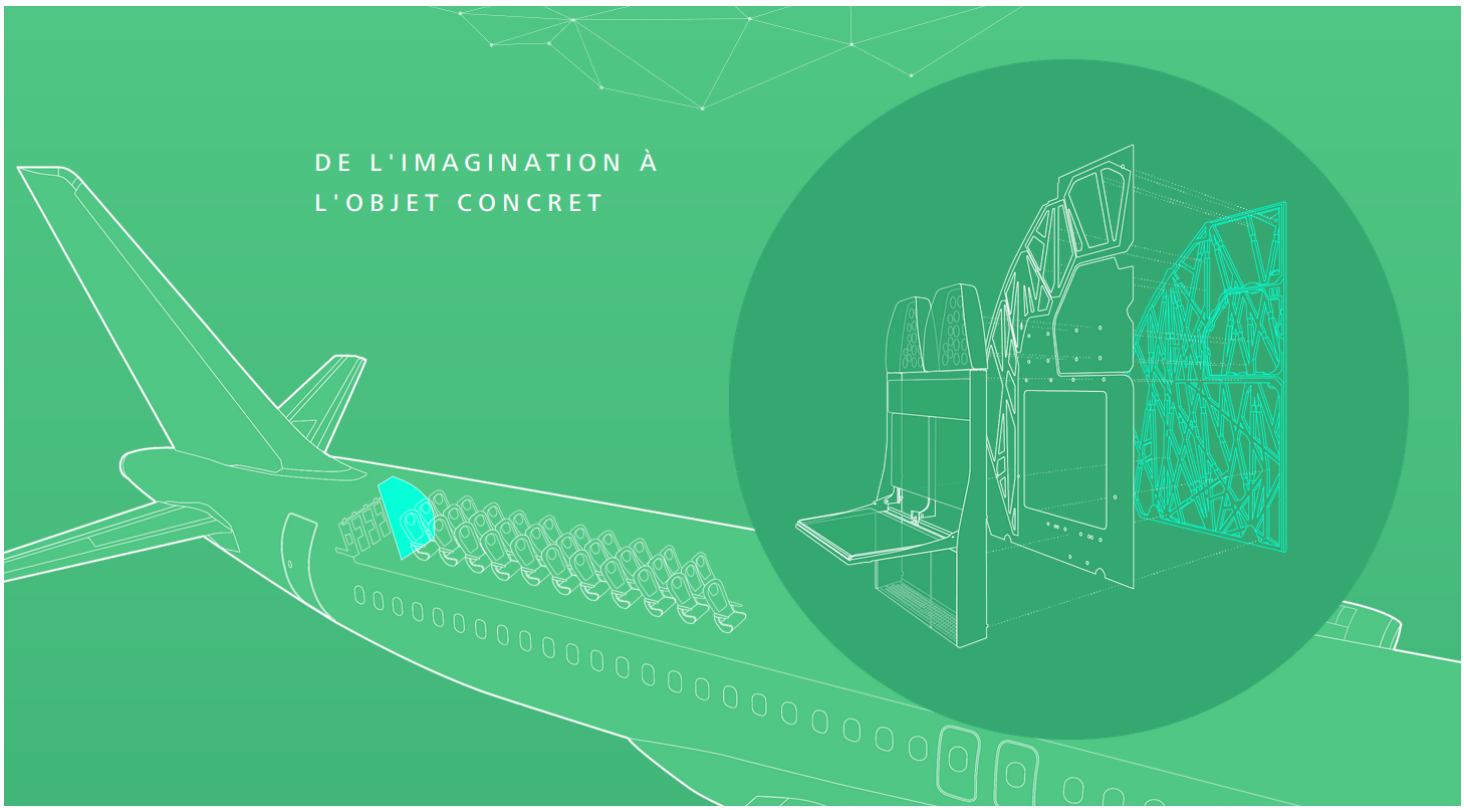
The internship will take place in the IRIT laboratory, on the Université Paul Sabatier, campus of Toulouse. The recruited intern will be a full member of the research team, integrated with other team members, PhD students and permanent researches. He/she will participate to working groups, scientific seminars and other activities of our group.

Context

3D scanner and point data acquisition hardware are more and more used in the industry to capture CAD models (Fig 1.) A wide range of application exploit point clouds, for instance, retro engineering, analysis of used part, or realtime 3D manual for technical intervention.

Fig 1. A Go!Scan3D (https://www.goscan3d.com/en) portable point cloud scanner

Objectives



Line base rendering from an airplane, made with Autodesk Softwares (http://www.autodesk.fr/customer-stories/airbus?mkt-var004=683625&internalc=true)

One standard visualization for CAD models is line based drawing (see Fig. 2). To automatically render a line based drawing from the 3D data, state of the art approaches define lines from geometry analysis of the 3D surface. This computation involve a parameterization of the surface. Points cloud are not well

adapted for a global parameterization and are first fitted to a mesh (Fig 3.) before performing the line based rendering. These fitting is time consuming and prone to approximation errors.

The goal of our project is to directly extract line information from the 3D point sets, using a local analysis, without global 3D surface parameterization.

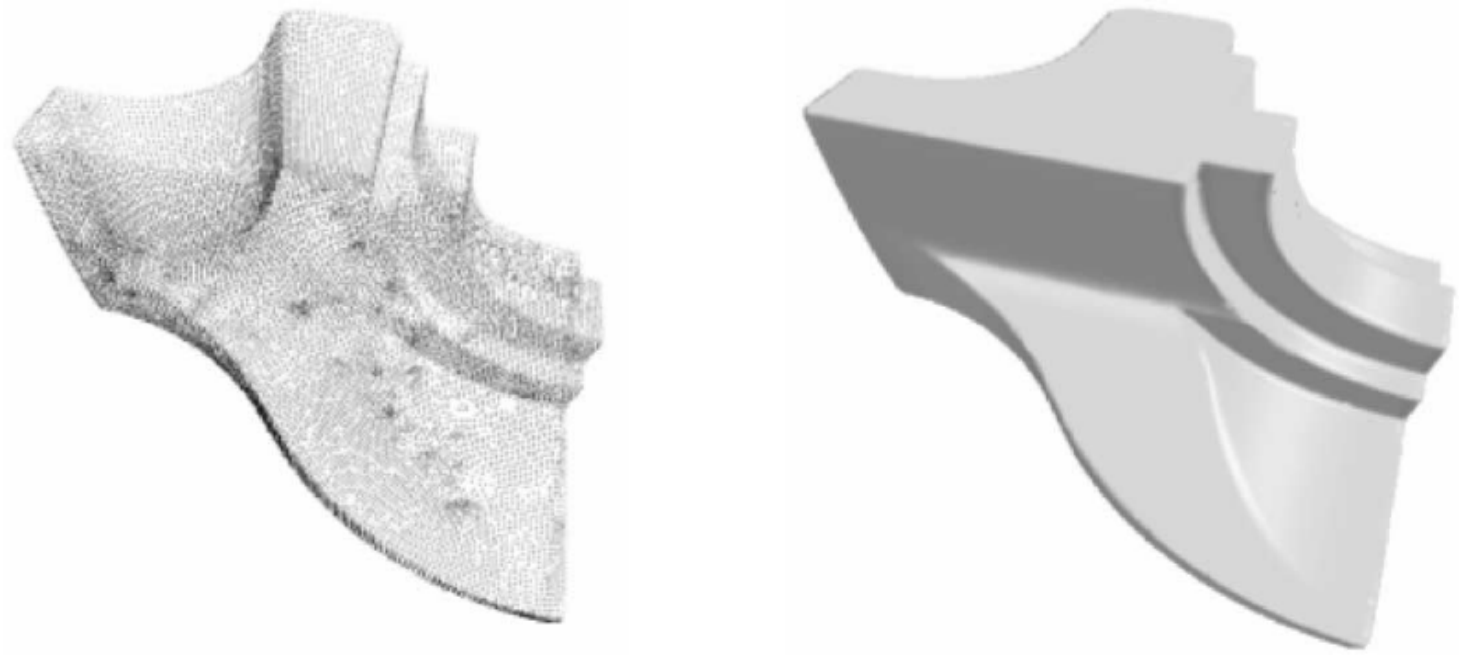


Fig 3. A 3D mesh is reconstructed from a scan point cloud (https://www.researchgate.net/publication/220583420_A_mesh_reconstruction_algorithm_driven_by_an_intrinsic_property_of_a_point_cloud/figures?lo=1)

Student profile

- Master student in Computer Science or Applied Mathematics
- Strong programming skills (C++), GPU programming (OpenGL)
- Basic knowledge on computational geometry, surface analysis, point clouds
- Fluent English or French spoken

How to apply

Send your application to David Vanderhaeghe (see mail above)

- a complete CV,
- previous internship reports if available,
- reference name/email address (optional)

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CG conference calendar » (http://www.dlyr.fr/stuff/2016/12/cg-conference-calendar/)

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