

AVIRO

Concept Of A Modular Perception System For Space Robotics

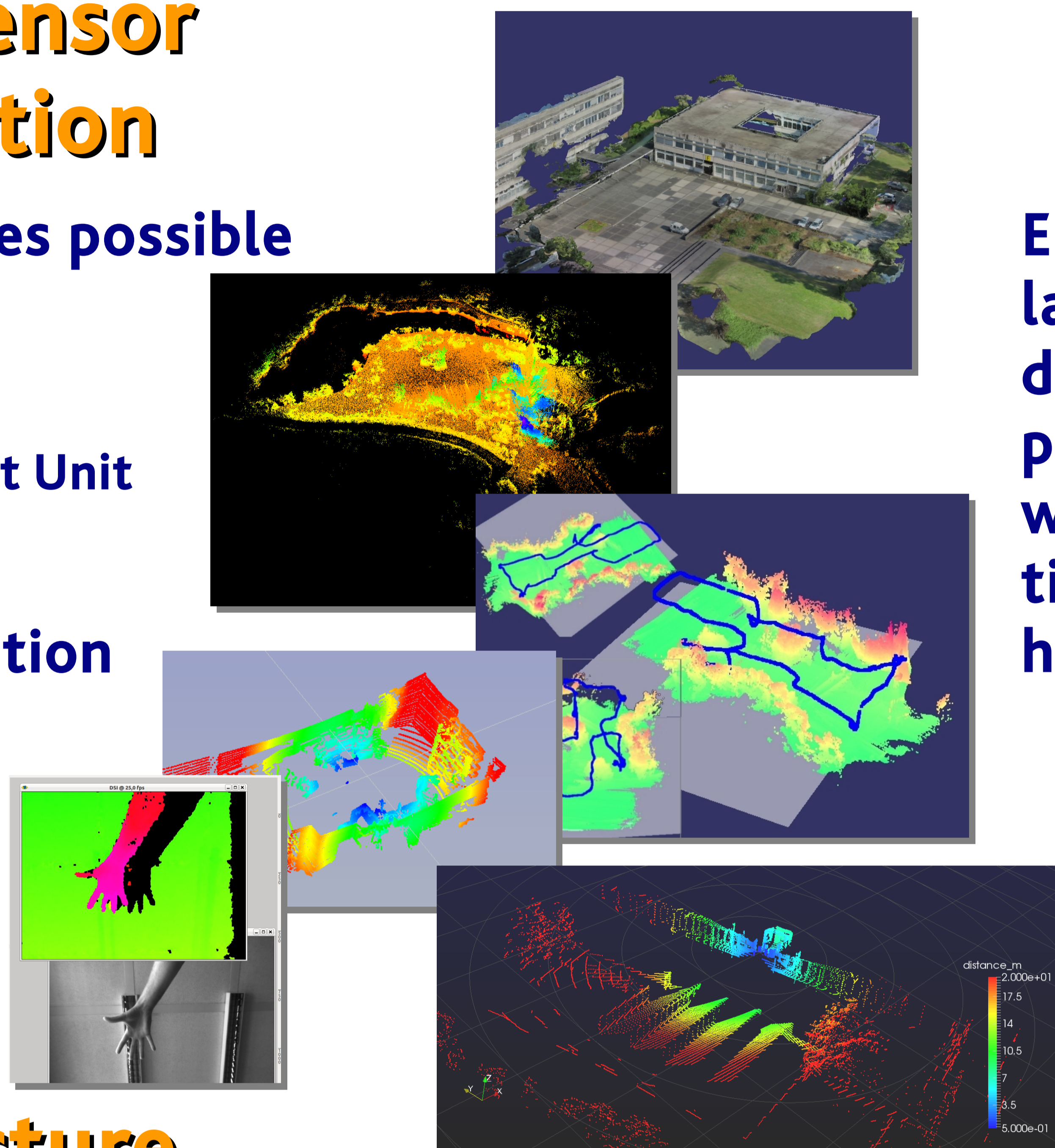
Modular Sensor Configuration

Different sensor types possible

- (Stereo-) Cameras
- Lidar
- (Fiber-Optic) Gyros
- Inertial Measurement Unit
- Space-qualified GPS
- ...

Automatic configuration

- Sensor Detection
- Calibration
- Multi-Sensor Fusion

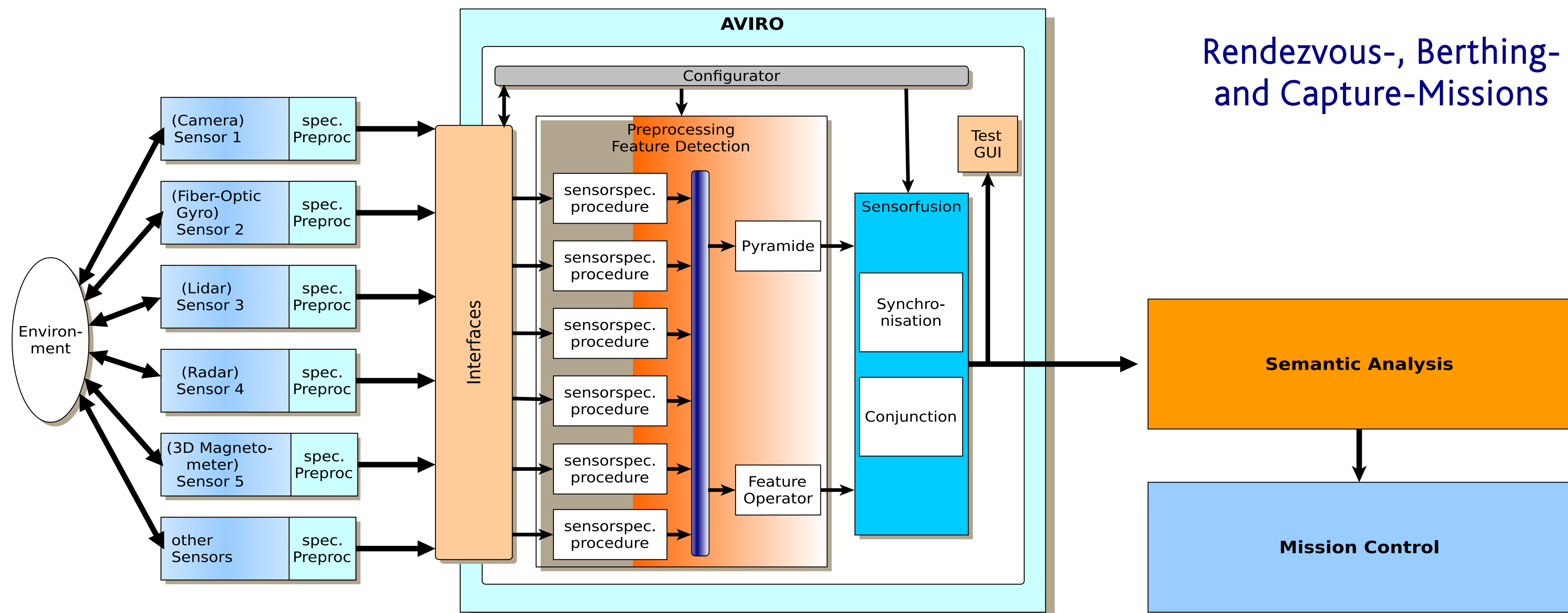


FPGA Hardware

Environment sensors generate large quantities of sensing data. To allow the real-time processing of these information we implement computation-intensive tasks in hardware:

- Interfaces
- Specific Preprocessings
- Pyramid Operator
- Feature Detection

Basic Architecture



3D-Environment-Model And GNC-Values

AVIRO generates advantageous information for the control of space robotics by the fusion of multiple different sensor systems. Three-dimensional environment models describe the surrounding. GNC-Values (guidance, navigation and control) the robot state.

3D-Environment-Model

- Pointcloud
- Annotated Pointcloud (Color, Texture)
- Triangle-Mesh

Robot State

- Pose (Position + Attitude)
- Speed
- Velocity

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