Servosila Robotic Heads

www.servosila.com

TABLE OF CONTENTS

Servosila Robotic Heads

The robotic heads are highly integrated, sensor rich, passively cooled, watertight yet powerful computers designed to serve as centralized control nodes of mobile robots. The robotic heads feature an internal DC-to-DC power regulator that enables them to draw power from onboard batteries or power generators.

The robotic heads are optimized for the following control applications:

- Outdoor Mobile Robots
- Service Robots
- Robotic Arms for Mobile Robots

Since the robotic heads combine a high-performance computer and a set of sensors in the same package, the amount of cabling is significantly reduced, installation simplified and maintenance streamlined. The robotic heads can be also taken off the robots and used as desktop testbed computers by developers of onboard software; an HDMI monitor port and a keyboard port are provided to simplify desktop-style use.

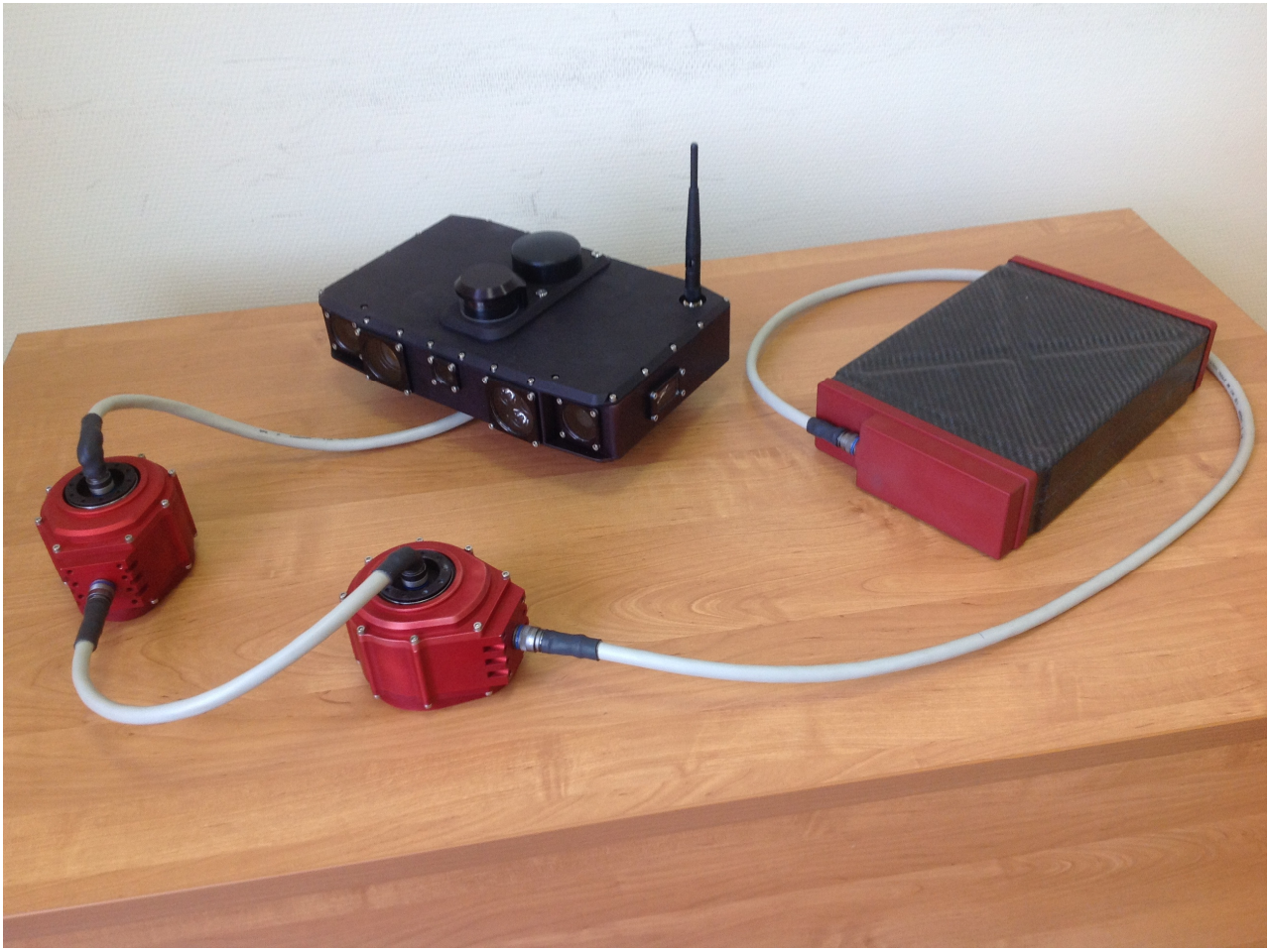
The robotic heads come with watertight sockets for connecting external payloads such as Servosila Servo Drives or a Thermal Vision Camera. The external payloads are controlled via CAN, Ethernet or USB onboard buses, and powered by a payload power supply line, - via the same watertight socket.

Software-Defined Functions of the Robotic Heads

The hardware configuration of the robotic head is specifically designed for the following tasks (depending on installed software):

- Remote control of a mobile robot with onboard video compression and streaming
- Controlling multiple servo drives, differential drive motors and other actuators, health checks and monitoring of servo drives via a CAN bus
- Automatic obstacle detection and avoidance using a laser scanner or/and a stereo vision system
- Visual object recognition, visual localization, and visual object tracking using multiple video cameras

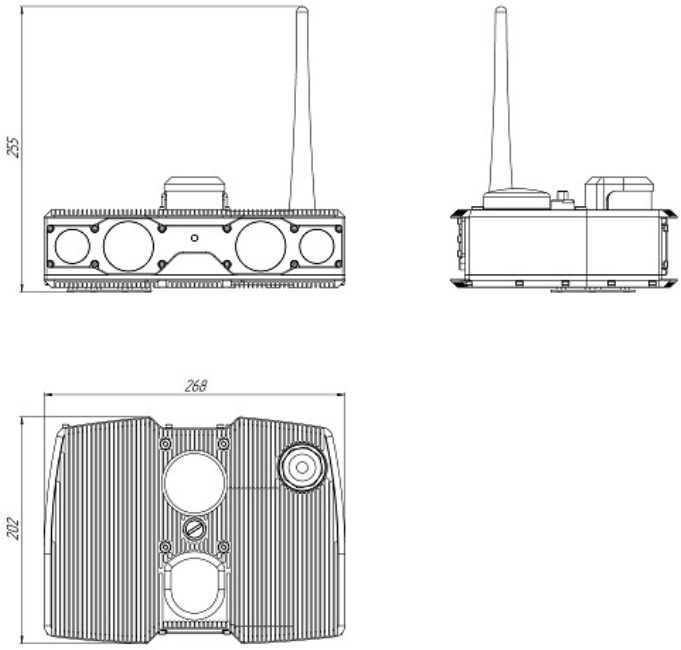
- Simultaneous Localization and Mapping (SLAM) via fusion and filtering of data coming from multiple sensors including a laser scanner, a stereo vision, a MEMS inertial measurement unit and a GPS/GLONASS receiver
- Path planning using a digital map created via a SLAM method
- Robotic arm control including inverse kinematics and 3D motion planning
- Automatic self-leveling of a mobile robot
- Self-Health Testing.



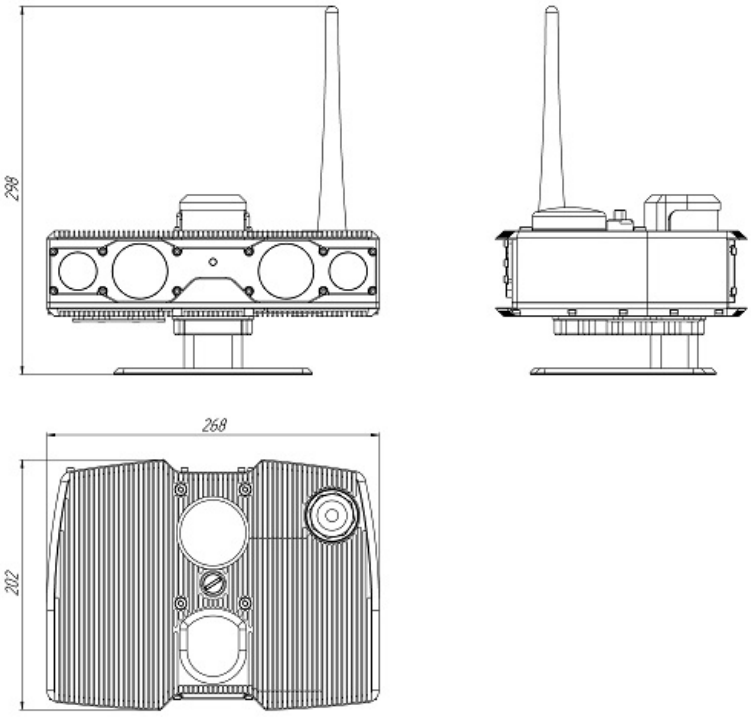
Specifications: Robotic Heads

Parameter	"Parallel" Computer	"Regular" Computer
CPU	Intel 4th Generation Core i5-4402E	Intel Atom N2600
Chipset	Intel QM87 Express	Intel NM10
RAM	4GB	
SSD Disk	32GB	
OpenCL Support	Yes	No
Supported Operating Systems	Linux (Ubuntu preinstalled by default), Windows	
Input voltage	18-36 VDC	
Nominal voltage	24 VDC	
Power Consumption	30-50W depending on the chosen configuration	
Weight	2.95-4.30 kg depending on the chosen configuration	
Protection rating	IP68 Dust-proof Watertight	
Environmental temperature range	-20C … +50C with additional limitations applied by specific payloads. optional: extended temperature range	
Range of remote control, - line of sight	several kilometers	
- indoors or in urban environments	within a few hundred meters	
Radio frequency	902-928 MHz or 2.4 GHz	
Laser scanner range	Up to 4.5 m	
Video cameras	an optical zoom camera (x24 zoom), a pair of forward looking cameras for stereo vision, a rear view camera	
Thermal Vision Camera	optional, external	
Sensors for Automatic Navigation and Mapping	Laser Scanner, GPS/GLONASS receiver, Stereo Vision, 6DOF IMU (MEMS)	
Headlight	High-intensity white headlight	
Number of hardpoints for external payloads	1	
Bus for connecting external payloads	CAN Ethernet USB	

Dimensions of Robotic Head



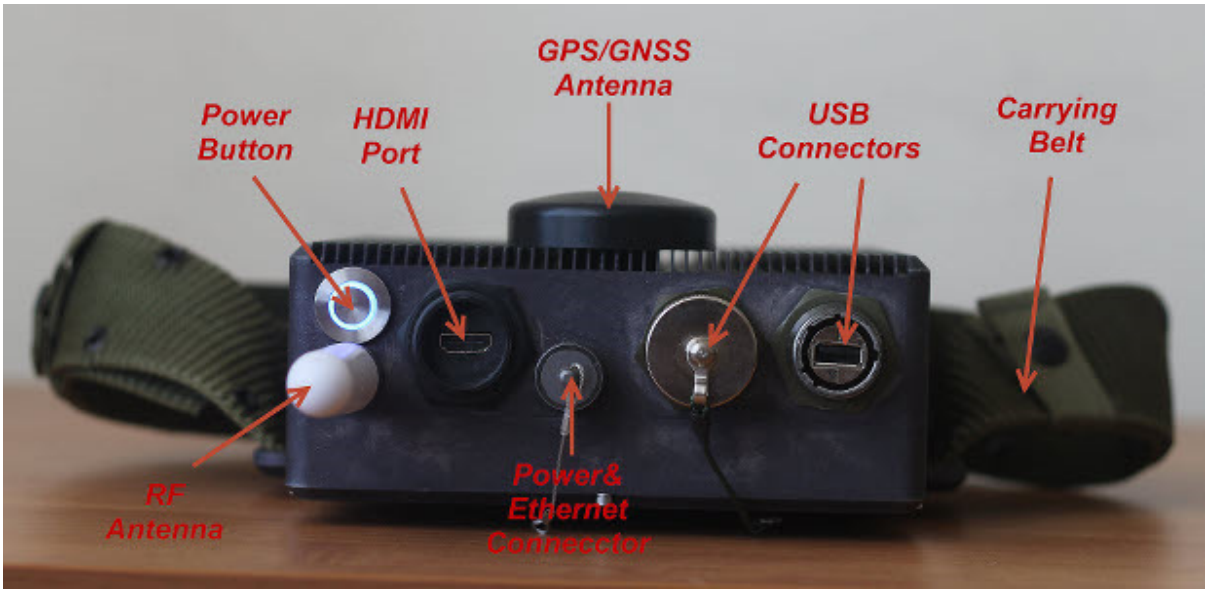
Dimensions of Desktop Robotic Head



Operator Control Unit (OCU)

A portable operator control unit, or OCU, complements Servosila Robotic Heads with a remote control functionality. The unit is a passively cooled computer with a radio modem and a battery included into a water-tight enclosure.

The unit comes with ports for a joystick and either a virtual reality goggles or a portable handheld display. Please note that in order to use the OCU, the robotic head must be equipped with a radio modem. The OCU also allows to control the robot via a cable.



Specifications: OCU

Parameter	Value
CPU	Intel Atom N2600
Chipset	Intel NM10
RAM	4GB
SSD Disk	32GB
OpenCL Support	No
Supported Operating Systems	Linux (Ubuntu preinstalled by default), Windows
Single charge operation	5-6hrs
Weight	4.9 kg with all accessories
Protection rating	IP68 Dust-proof Watertight
Environmental temperature range	-20C … +50C with additional limitations applied by specific payloads. optional: extended temperature range
Range of remote control, - line of sight	several kilometers
- indoors or in urban environments	within a few hundred meters
Radio frequency	902-928 MHz or 2.4 GHz
Sensors	GPS/GLONASS receiver (optional)
Bus for connecting external payloads	HDMI Ethernet USB

About Servosila

Servosila is a technology company that designs, produces and markets a range of mobile robots, servo drives, and robotic control systems as well as software that makes the mobile robots intelligent.

www.servosila.com

www.youtube.com/user/servosila/videos