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Control technology for off-road unmanned ground vehicle (UGV)

Technology allows to transform a ground vehicle into mobile robotic platform for off-road driving (for example, for the purposes of agriculture, emergency response, exploration of territories, etc.). This technology complies for wide number of vehicles, like ATV, UTV, tractors.

Vehicle control technology integrates into the single system the following control subsystems (fig.1):

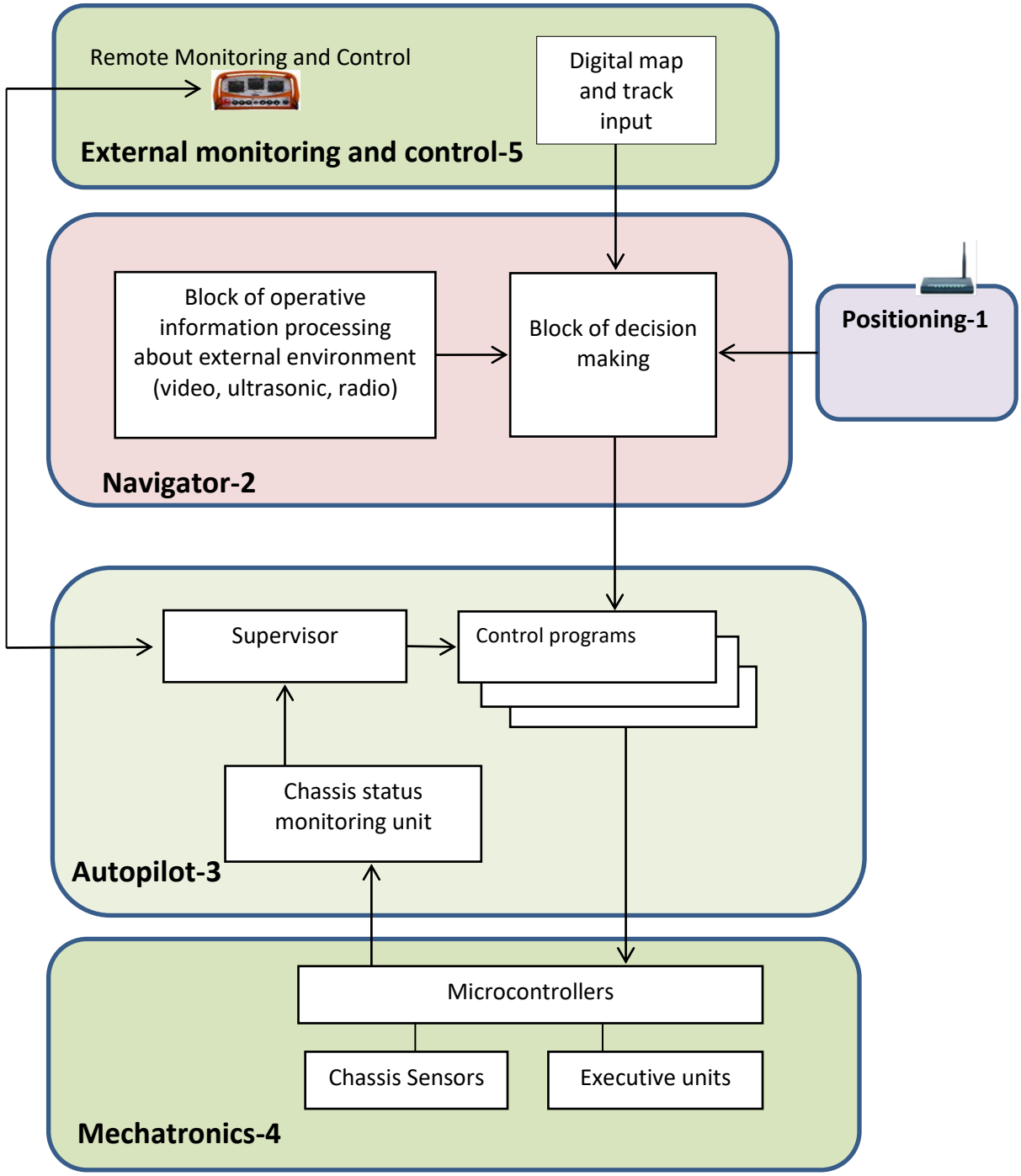
- Positioning subsystem (1),
- Navigation subsystem (2),
- Autopilot subsystem (3),
- Mechatronics subsystem (4),
- External monitoring and control subsystem (5),
- Safety subsystem (6),
- Technical services subsystem (7),
- Communication subsystem (8).

Fig.1. shows the functional diagram of the control system of an off-road UGV prototype built using this technology with 5, 2, 3, 4 subsystems marked.

Developed vehicle control technology includes the following components:

- Software for subsystems 2,3,5 (6,7-optional)
- General software that integrates all subsystems into a single system. all subsystems in common system. It is assumed that the software of subsystems 1,4,8 will be purchased and integrated as completed components.
- Additional mechanical parts of the vehicle chassis for the installation of sensors and actuators.

Figure 1 – General Diagram of UGV Control system



UGV with technology applied is able to operate in the following modes:

1. Direct driver control mode.
2. Remote monitoring and operator control mode via wireless communication channel.
3. Autonomous control on given (loaded) programs, which includes:
   - initial data load (digital map of the area, routes, etc.);
   - choice of route and driving program;
   - automatic movement along the route;
   - adequate response to emergency situations.