

Future forecast UXV autonomous systems:

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In the future, more and more autonomy of UxV (autonomous systems in sea and land air) will be required to increase efficiency and reduce workload and danger to humans.

Today there is an interaction between man and machine, in which man maintains the main components of command and control.

The UxV performs the operations and commands based on automated routines that transmit and feedback stream of information, which is processed in GCS (ground control systems) and supports the processing and updating of commands.

The next step will be a system in which a person and a machine work together as a team. They work together to achieve a common goal, this goal is still determined by the person in the process.

Technology is gradually moving in the direction that man and machine share information and the UxV system will operate more independently while man maintains direction but does less supervision and control.

A big step for the future will be a system approach of systems, where humans and UxV work together as a group, to perform a common task.

The direction will remain with the person, but the role will be similar to a unit commander, where the commander gives the commands and the unit executes independently according to the commands given. The UxV system will be given a task and will be required to operate at a high level of autonomy in combination with highly complex communications. As an example, this could be a group of UCAVs fighting along with some manned aircraft that fly conventionally and are supported by (control systems) aerial or spacecraft ISRs. The operational future includes autonomous collaboration between different systems that share information required for situational and operational imaging. This phase implies a large number of issues, not all of which are technical in nature and will not be achieved in the near future.

The understanding of the potential for autonomous collaboration is still in its infancy.

Increasing the autonomy of UxVs requires increasing the computing capabilities of the platform for:

Situation Awareness

Quick decision making and response to dynamic situations and environments

Communication (speed, multi-channel, electronic countermeasures, etc.).

Technically, this means a requirement for greatly improved sensing and processing capabilities over the autonomous system itself and a larger bandwidth of data linking to handle multilateral communication. The system design will need to contain larger and heavier components and a significantly increased energy demand.

To solve the described need, leading companies in the manufacture of components will pay attention to the problem of weight and volume and will be forced to come down to resolutions that do not exist today.

The component development solution will create a very large movement towards innovative developments in the autonomous systems.

Advances toward human-machine teams or systems of systems raise additional issues of:

Common situational perception and assessment

Mutual understanding of behavior (human and machine)

The problems analyzed by simulations and analyzable of such scenarios are not completely solved today. However, there is a high chance that autonomous systems, completely independent of human control, will be implemented in the foreseeable future. To realize this vision the following conclusions can be drawn unmanned platforms are becoming increasingly important.

Currently, the systems include a high degree of automation that allows for semi-autonomous operation, with 'intelligence' and decision-making maintained by the human operator. The situation applies to unmanned systems in air, space, land and sea.

In the future:

Artificial intelligence must be transferred to the unmanned platform in order to increase autonomous capabilities.

A higher degree of autonomy must be promoted to make wise decisions.

Additional equipment needs to be invested in, data processing, communications and energy production

Energy storage is needed for this purpose, with the disadvantage of increasing the size and mass and complexity of the unmanned platform

The industry in collaboration with academia needs to get organized quickly and fill in the gaps so that we can move on to the next stage.