



Information Technology and Software

Self Sacrificing Components

Insuring Mission Success by Sacrificing a Component
after Resource Donation

In a system with cooperative components and a limited amount of power, what happens when one component fails? In this autonomic system, a failing component that is likely to jeopardize the primary mission sacrifices itself and donates any resources (such as power) to the other components before self-destruction. Inspired by insect colonies, this invention has applications not just for space exploration, but also for deep sea exploration vehicles, unmanned aerial vehicles, a constellation of satellites, smart grids, or any system with multiple cooperative elements with a chance of failure and a need to conserve resources.

BENEFITS

- Preserves the continued operation of the swarm
- Swarm elements can donate their power source to the swarm
- Insures mission completion in spite of component failure

technology solution



THE TECHNOLOGY

If it begins to fail and either risks neighboring components or the mission, a vehicle, craft, device, or other component of an autonomic system will donate its power source to ensure the continued operation of the system as a whole. In the context of swarms of spacecraft, swarms of underwater craft, or UAVs, the donating component, the receiving component, or both, will be able to rendezvous with the other component and transfer the power source. Additionally or alternately, the failing component can delegate its task to another capable component of the system, insuring that the mission is still fulfilled. After either transferring its power source or delegating the task, the component can either self-destruct, or if possible, change its function to one it is capable of carrying out, such as a messaging function or a shielding function.

APPLICATIONS

The technology has several potential applications:

- Unmanned Aerial Vehicles, Satellites or Underwater Crafts operating in unison
- Robotic swarms used for search and rescue missions
- Smart grids, sensor technology, internet of things

PUBLICATIONS

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