Information Technology and Software

Self Sacrificing Spacecraft

Will self-sacrifice if they begin to fail and can donate their power source to the swarm

NASA Goddard Space Flight Center has developed a spacecraft with self-adapting behaviors including the ability to self-sacrifice and donate power to the swarm. When flying as part of formation flying or a swarm of crafts, spacecraft can sacrifice themselves (give up their functionality) for the greater good of the entire system, thus enabling the continued operation of the other spacecraft in the mission. Further, the craft can donate its power source (fuel, battery) to another element of the swarm.

BENEFITS

- Preserves the continued operation of the swarm
- Swarm elements can donate their power source to the swarm
THE TECHNOLOGY

Certain flight crafts (such as space probes) or swarm elements that operate in cooperative swarms must self-sacrifice if they begin to fail and risk damaging their neighbors in the swarm. With this technology, the craft will self-sacrifice when certain failure modes are sensed. Also, the swarm element may be able to "donate" its power source (fuel, battery charge) to another element of the swarm. Further, multiple elements of the swarm may be able to donate their power source to a key element of the swarm by attaching themselves (either directly or daisy chained) to the key element and attaching their fuel/power source to its power source.

APPLICATIONS

The technology has several potential applications:

- Robotic swarms used for search and rescue and other missions
- UAVs operating in unison
- Floating optics system for space research

PUBLICATIONS

Patent No: 9171266