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Integral spatial intelligence for advanced terrestrial and celestial missions

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The 21st century is believed to have an increasing activity in exploration of both Earth and beyond, also growing demands to local and global security, which will require advanced ground, air, and space operations. Many will need to be distributed, cooperative, flexible, self-recovering, global goal-oriented, automated up to fully automatic, etc., with massive use of unmanned components. A novel ideology and related distributed control technology will be revealed that effectively cover these demands, being based on integral, holistic, gestalt-like comprehension of distributed worlds rather than traditional multi-agent and interoperability principles treating systems as communicating parts. It allows us to catch top semantics of advanced ground, air, and space missions in a high-level Spatial Grasp Language (SGL) which is cooperatively interpreted in distributed systems in parallel, self-spreading, virus-like mode, spatially matching them. This shifts most of traditional system routines, including partitioning, infrastructures creation, overall management and command and control, to automatic language interpretation. Details of SGL and is distributed interpretation mechanisms will be revealed along with exemplary tasks programmed within different researched applications. The latter include formalized command and control simplifying engagement of multinational forces and gradual transition to distributed robotized systems; multiple mobile sensors scattered over large territories and behaving altogether as a spatial supercomputer operating under local and restricted communications, also without central control; integrated air & missile defense individually tracing multiple moving objects (e.g., cruise missiles) with overall runtime defense resources optimization. On an agreement, the technology can be quickly ported on any platform needed.

Biography

Peter Simon Sapaty is a Chief Research Scientist at Ukrainian Academy of Sciences, and is networking for 45 years. He has worked in Germany, UK, Canada and Japan as Alexander von Humboldt Awardee, Project Leader, and Special Invited Professor, created and chaired SIG on mobile technologies within DIS project in the US. He has invented high-level distributed control technology tested in different countries and resulted in European Patent and two John Wiley books, with third one in progress. He has published more than 170 scientific papers on distributed system organizations. He has served as Keynote Speaker, Tutorial, Workshop, or Conference Leader; currently engaged in different international journals.

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