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Interactive, Constraint-Network Prognostics & Diagnostics to Control Errors and Conflicts (IPDN)

An interactive, constraint-network system automatically detects and globally resolves operational conflicts in multi-unit environments to maximize efficiency and throughput.

Airport surface operations must ensure safety while increasing efficiency and throughput. Conflict detection and resolution (CD&R) detects and resolves trajectory conflicts between aircraft and ground transportation vehicles; however, current CD&R systems face various challenges. For example, manual CD&R prevents conflicts through separation assurance but underutilizes available resources. Computer-integrated CD&R notifies controllers of impending conflicts, but ultimately provides limited predictability. An improved method of conflict and error prediction and detection (CEPD) is needed to maximize efficiency of airport ground activities.

Researchers at Purdue University have developed a system based on interactive, constraint-network prognostics and diagnostics to control errors and conflicts (IPDN). IPDN is designed for systems with multiple cooperative units each configured to collaborate with other cooperative units in an environment where resources are shared. This CEPD system enables automated detection of conflicts using the relationships among cooperative units. Furthermore, IPDN enables automated, global resolution of conflicts through network analysis.

Advantages:

-Automated detection of conflicts

-Uses network analysis to resolve conflicts

Potential Applications:

-Airport surface operations

Technology ID

65241

Category

Aerospace & Defense/Autonomous Systems (UAVs & AVs)
Robotics & Automation/Automation & Control
Buildings, Infrastructure, & Construction/Infrastructure Modeling & Digital Twins

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View online

-Other types of networks

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Intellectual Property:

Provisional-Patent, 2009-06-29, United States | Provisional-Patent, 2010-06-30, United States | Utility Patent, 2011-06-30, United States | Provisional-Patent, 2011-07-28, United States | CIP-Patent, 2012-07-30, United States | CON-Patent, 2015-04-13, United States | CON-Patent, 2017-09-11, United States | CON-Patent, 2019-11-21, United States | CON-Patent, N/A, United States

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