Self reconfigurable intelligent swarm fixtures

From 2008-10-01 to 2012-01-31, closed project | SWARMITFIX Website

Objective

A step beyond flexible/reconfigurable fixtures for higher continuous adaptation of production resources respect to production objectives and technical conditions in the knowledge-based factory is achievable today by synergic convergence of the NMP themes of flexible fixtures, parallel robots and new/smart materials with the ICT themes of robot swarms with networked embedded control. Today’s smartest adaptable fixtures have limited adjustment capability, are mostly operated manually, are usually setup off-line with help of external measuring equipment, e.g. laser. Significant increase in effectiveness and decrease in cost may come from on-line fully actuated configuration/reconfiguration, large adaptability to different shapes and the capability to dynamically concentrate the support in the region where manufacturing is actually performed, doing that on-line and without moving/removing the part from the fixture. We propose the new concept of self adaptable swarm fixtures composed of mobile agents that can freely move on a bench and reposition below the supported part behaving as a swarm, all without moving/removing the part from the fixture. Each fixture agent is composed of: *A mobile platform, *a parallel robot fixed to the mobile platform, *an adaptable head with phase-change fluid and an adhesion arrangement, to sustain/clamp the supported part perfectly adapting to the part local geometry. A hybrid control system is adopted and each robot is treated as an autonomous agent exhibiting its own behaviours. Behaviour based translocation of the robots to destination positions is adopted to reduce planner complexity, with *no need to plan exact trajectories and *no significant increase in complexity when extra units are removed/added. The area of manufacturing of thin metal sheets is considered (aircrafts and automotive bodies). The project objective is to develop a swarm fixture for a large range of sheet shapes to fully replace the specialized fixtures today used.

Related information

Result In Brief
Swarm manufacturing is shaping up

Report Summaries
Final Report Summary - SWARMITFIX (Self reconfigurable intelligent swarm fixtures)
Coordinator

UNIVERSITA DEGLI STUDI DI GENOVA
VIA BALBI 5
16126 GENOVA
Italy
EU contribution: EUR 749 560
See on map

Activity type: Higher or Secondary Education Establishments

Administrative contact: Ettore Ginestra
Tel.: +39 010 353 2842
Fax: +39 010 353 2298
Contact the organisation

Participants

Exechon AB
ORRVAGEN 26 A1
19255 SOLLENTUNA
Sweden
EU contribution: EUR 474 683

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

Administrative contact: Karl-Erik Neumann
Tel.: +46705680099
Fax: +468352240
Contact the organisation

PIAGGIO AERO INDUSTRIES SPA
VIALE CASTRO PRETORIO 116
00185 ROMA
Italy
EU contribution: EUR 199 987

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

Administrative contact: Alessandro Morando
Tel.: +39 010 6481 304
Fax: +39 010 6481 366
Contact the organisation
POLITECHNIKA WARSZAWSKA
POLAND
EU contribution: EUR 609 720
PLAC POLITECHNIKI 1
00 661 WARSZAWA
Activity type: Higher or Secondary Education Establishments
Administrative contact: Jadwiga Osowska
Tel.: +48 22 234 71 22
Fax: +48 22 825 37 19
Contact the organisation

ZTS VYSKUMNO-VYVOJOVY USTAV KOSICE AS
SLOVAKIA
EU contribution: EUR 419 302
JUZNA TRIEDA 95
041 24 KOSICE
Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)
Administrative contact: Juraj Spakovsky
Tel.: +421556834122
Fax: +421556834217
Contact the organisation

CENTRO RICERCHE FIAT SCPA
ITALY
EU contribution: EUR 195 793
STRADA TORINO 50
10043 ORBASSANO
Activity type: Research Organisations
Administrative contact: Massimo Casali
Tel.: +39 011 908 3492
Fax: +39 011 908 3786
Contact the organisation

Subjects
Industrial Manufacture

Last updated on 2019-07-16
Retrieved on 2019-08-08

© European Union, 2019