

Tactical trajectories generation using UAVs for the terrestrial displacement of mobile robots

Bruno Coelho, Vitor Coelho

Mechatronic Engineering



Topics

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 - IEAv
 - Research Collaboration



Ouro Preto - UNESCO World Heritage



Ouro Preto

Video



UFSJ

Federal University of São João del-Rei



- Mechatronic Engineering
- 50 students / semester
- 18 laboratories
 - Mechanical Systems
 - Electronics
 - Computational Mechanics
 - Embedded Systems
 - Telecommunications
 - Robotics
 - ...



Objectives

Trajectories generation using UAVs for the terrestrial displacement of mobile robots

The main objective of our research is to promote the **collaboration of aerial and ground robots**, as well as their integration with robotic manipulators, aiming at the accomplishment of industrial tasks.

Specifically, in this project, the objective is the generation of trajectories for terrestrial robots, using mapping data acquired by a UAV.



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Trajectories generation using UAVs for the terrestrial displacement of mobile robots

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Research & Development

Postdoctoral research in Robotic Systems and UAVs - Call CAPES/ITV

- Applied Computing
- **Control and Robotics**
- Mining
- Tribology
- Environmental Technology
- ...

ITV - Positioning

Vale Institute of Technology is positioned between the **scientific researches** carried out in **universities**, and the **technological development** produced in **companies**.



Professional Master's Degree

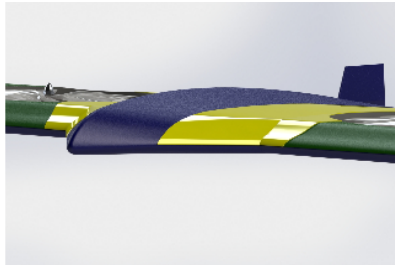
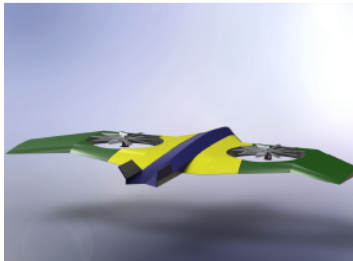
UFOP/ITV - Instrumentation, Control and Automation of Mining Processes



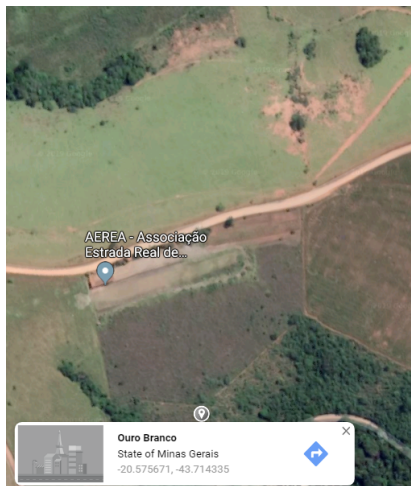
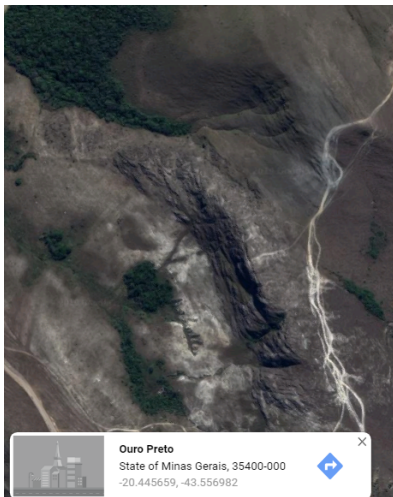
INSTITUTO TECNOLÓGICO VALE

CNPq Call 2018

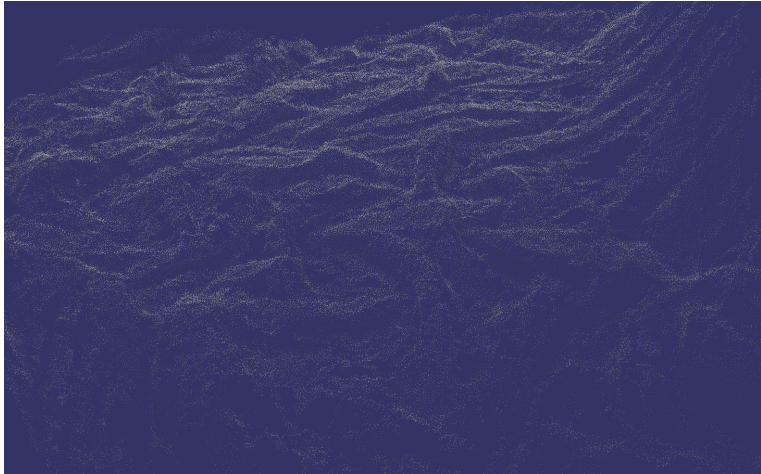
Study and development of UAVs for industrial applications - 2019-2021



Experimental Flight Areas



Point Cloud



ROS

Robot Operating System



ROS

Robot Operating System



Algorithms

Algorithms



Algorithms

- Dijkstra's algorithm
- A* algorithm
- Greedy Best-first search
- Depth-first search

Algorithms results

Video



Applications

Trajectories generation for mobile robots

- Robot autonomy
- Better results in SLAM
- Search and rescue
- Localization in complex environments

Acknowledgment

Research collaborators and Government agencies of Brazil



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Research collaboration

Other possibilities for research collaboration



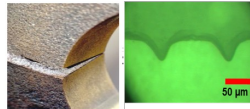


Laser Materials Processing

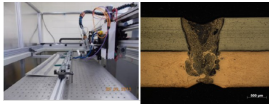
Laser Subdivision (EFO-L)



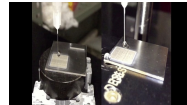
Additive manufacturing/coatings/surface modifications



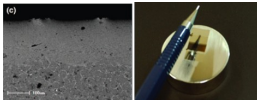
Micro-machining



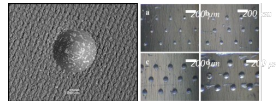
Welding of low-weight high strength materials



Changing surface properties



Polishing/roughening



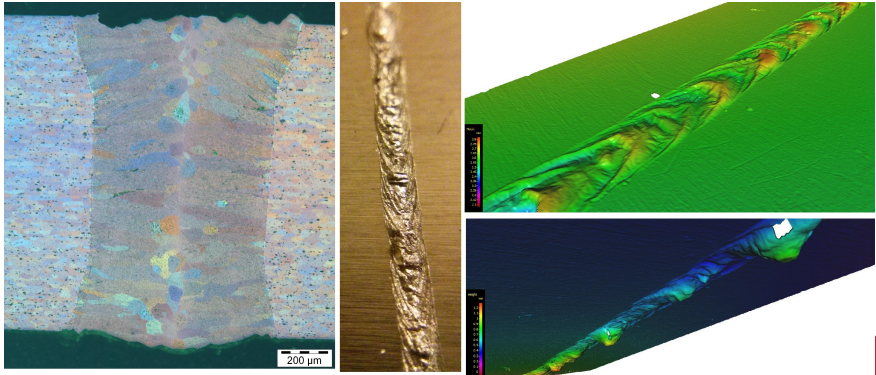
Structuring/Texturing

Further information: milton@ieav.cta.br



IEAv - São José dos Campos / SP

Results of PhD Research Collaboration



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