1. What is the main claim of the paper? Why is this an important contribution to the autonomous agents and multi-agent systems literature?

During disaster situations in hostile scenarios, unmanned aerial vehicles (UAVs) can be employed to distribute humanitarian aid, blood products, survey damage, map survivors, and streamline service delivery. One challenge in these situations is the need for dynamic route planning, as threats can be discovered during the mission. However, the problem of dynamically increasing stealthiness of autonomous UAVs in such scenarios has not been much addressed in the literature. By increasing UAV stealthiness, the chance of successfully delivering resources to Ground Forces (GFs) also increases. Considering this, the contribution of our work is a model which adopts the premise that the best way to avoid threats is to prioritize regions where other UAVs have already safely flown. In addition, closer GFs should have visitation priority, as the longer a UAV flies, the greater is its chance of being threatened. The proposed model encompasses path planning, route planning and a communication approach between UAVs and a Ground Control Station to increase the stealthiness of UAVs under such premises.

Regarding the scope of Multi-Agent Systems, this work is strong related to several interest topics, as follows:

- Multi-agent planning and planning for multi-agent systems, and coordination of multi-agent plans and activities.
- Multi-agent learning, co-learning, and evolutionary approaches in multi-agent systems.
- Learning agents, including: computational architectures for learning agents; evolution, adaptation; multi-agent learning.
- Cooperation and teamwork, including organizational structuring and design for multi-agent systems, self-organization, emergent functionality and swarm intelligence.

2. What is the evidence you provide to support your claim? Be precise.

The model was validated with extensive simulations. We compare our model with 2 other models: Shortest Path without a stealth policy and Shortest Path with a threat avoidance stealth policy

Results: For high hostility scenarios, our model tends to visit more GFs than flying through minimum paths (traditional approach), as it can increase in more than 40% the number of visited GFs. Our model is less sensitive to the variation in the number of threats. By prioritizing safe paths over unknown areas, UAVs are less exposed to threats, thus reducing the number of deactivated UAVs (can reduce up to 90% the number of deactivated UAVs). By adopting our model, UAVs fly longer paths. This is a point of attention due to battery consumption. For low threat environments, our model is not the best option. By being extremely conservative on the flight path due to prioritizing safe areas, UAVs end up taking longer, unnecessary paths. The results show that the combination of safe path prioritization with a traditional minimum path approach can bring benefits regarding both the number of GFs visited and the number of UAVs kept unharmed in CSS scenarios

3. What papers by other authors make the most closely related contributions, and how is your paper related to them? Provide journal references whenever possible. Don't rely only on conference proceedings.

A research area that has been extensively explored in recent years is the delivery of medical items with UAVs for assistance in emergency situations. This area is strongly related to this work, since we are proposing an approach to increase the chance of success of these deliveries, but in situations with the possible presence of threats. Some examples of these works are:

- Lammers, D.T., Williams, J.M., Conner, J.R., Baird, E., Rokayak, O., McClellan, J.M., Bingham, J.R., Betzold, R., Eckert, M.J.: Airborne uav delivery of blood products and medical logistics for combat zones. Transfusion (2023)
- Sham, R., Siau, C.S., Tan, S., Kiu, D.C., Sabhi, H., Thew, H.Z., Selvachandran, G., Quek, S.G., Ahmad, N., Ramli, M.H.M.: Drone usage for medicine and vaccine delivery during the covid-19 pandemic: attitude of health care workers in rural medical centres. Drones 6(5), 109 (2022
- Homier, V., Brouard, D., Nolan, M., Roy, M.-A., Pelletier, P., McDonald, M., Champlain, F., Khalil, E., Grou-Boileau, F., Fleet, R.: Drone versus ground delivery of simulated blood products to an urban trauma center: The montreal medi-drone pilot study. The journal of trauma and acute care surgery 90(3), 515 (2021)

Military applications for UAVs are scarcely cited in the research literature, compared to civilian counterparts. As a matter of fact, the problem considered herein has been little studied in the military domain, but some variations on it have been extensively studied in the civil sphere:

Cooperative path planning optimization with multiple UAVs: Bai, H., Fan, T., Niu, Y., Cui, Z.: Multi-uav cooperative trajectory planning based on many-objective evolutionary algorithm. Complex System Modeling and Simulation 2(2), 130–141 (2022) https://ieeexplore.ieee.org/document/9841533/

Multi-depot vehicle routing problem, with risk mitigation and plan adaptation considering the challenges of its execution in hazardous environments: Soeanu, A., Ray, S., Berger, J., Boukhtouta, A., Debbabi, M.: Multi-depot vehicle routing problem with risk mitigation: Model and solution algorithm. Expert Systems with Applications 145, 113099 (2020)

Multi-depot multi-trip vehicle routing problems with time windows and release dates, which optimizes trips and customer assignment and the sequence for vehicles visiting customers: Zhen, L., Ma, C., Wang, K., Xiao, L., Zhang, W.: Multi-depot multi-trip vehicle routing problem with time windows and release dates. Transportation Research Part E: Logistics and Transportation Review 135, 101866 (2020)

Multi-depot drone routing problem, with battery constraint optimization: Dorling, K., Heinrichs, J., Messier, G.G., Magierowski, S.: Vehicle routing problems for drone delivery. IEEE Transactions on Systems, Man, and Cybernetics: Systems 47(1), 70–85 (2016)

4. Have you published parts of your paper before, for instance in a conference? If so, give details of your previous paper(s) and a precise statement detailing how your paper provides a significant contribution beyond the previous paper(s).

The area of stealth methods for UAVs has been the subject of study by the authors.

- Borges, N.P., Ghedini, C.G., Ribeiro, C.H.C.: Sun - stealth uav networks: A cooperative local model to mitigate uavs exposure to threats. In: 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC), pp. 4316–4323 (2019). https://doi.org/10.1109/SMC.2019.8914502. https://ieeexplore.ieee.org/document/8914502
- Borges, N.P., Ghedini, C.G., Ribeiro, C.H.C.: Evaluating trail formation in collaborative uav networks with lethal threats. In: Developments and Advances in Defense and Security, pp. 97–107. Springer (2020)

The work being submitted differs from those in several aspects, the main ones being:

The problem addressed is different. The focus of this work is to visit multiple agents, while the other papers focus on UAV flight formation. This work addresses route planning, which is not considered in the other works. There is no local communication between UAVs or flight formation in this work. This work considers multiple targets to be visited instead of a single one.