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CASE STUDY TASKS

CASE STUDY

Solutions to protect drones from GPS jamming/spoofing and take over control attacks

There has been an incident in the airport facility where an engineering firm worker had a GPS jammer, so his bosses don't know where he is all the time. However, his route takes him closed to the airport perimeter to fix the damaged fence. At the same time there is an UAV on its regular patrolling mission. The jammer affects the UAV's satellite-based navigation system causing its crash with injuring multiple people. Imagine that in the similar approach attacker can take over the control of the UAV and/or tries to deceive and spoof a UAV's GPS receiver by broadcasting fake GPS signals, which resemble normal signals, or by broadcasting genuine signals captured elsewhere or at a different time.

You have **5 hours** to propose a solution, that will prevent UAV's from GPS Jamming, spoofing and take over attacks.

UAV navigation system: Typical UAV navigation system compromises a GPS receiver which is used as the primary navigation aiding source of the GPS/INS navigation unit.

TASKS

1. Find out if there is any publicly available statistic of jamming/spoofing attacks or at least records in a form of articles or news.
2. Propose at least 2 different anti-jamming/spoofing solutions for small (takeoff weight < 5 kg) and mid-size UAVs (takeoff weight < 25 kg) with respect to their size, weight and power constrains. Your proposed solutions can work as an extension of the UAV typical navigation systems (GPS+GPS/INS inertial navigation unit) or it can be completely new solution.
3. Find out what are the current ways how to take over the control of the drone.
4. Find out if there is any publicly available statistic of the drone control take-over attacks or at least records in a form of articles or news.
5. Propose at least 2 solutions how to prevent these control take-over attacks.

General note:

Focus on the concept level solution. The implementation details may be included but are not critical.

OUTCOME

The participants will be evaluated by a committee against the following:

1. Quality of input data research (20%)
2. Feasibility of the proposed solution (25%)
3. Solution complexity vs. performance ratio (30%)
4. Team organization, work split (10%)
5. Presentation skills and impressions (15%)

Acronyms used

Terms	Definition
GPS	Global Positioning System
UAV	Unmanned Aerial Vehicle
INS	Inertial Navigation System