Project 9 – Aeronautical Communications (2)

Consider a communication system between aircrafts (A/Cs) and a control tower (CT). A/Cs generate one packet of fixed size every *k* seconds, where the latter is a random variable to be described later.
The connection between A/Cs and the CT is provided by ground base stations (BS), which are placed on the ground according to a grid deployment, at a distance **M** between neighbors. Each A/C can select only one serving BS at a time. The service time *s* of each transmission is a function of the distance *d* between A/C and BS and is defined as $s = T * d^2$, where T is a constant value. Each A/C can transmit only one packet at a time.
A/Cs move randomly at a constant speed and can execute periodically a handover operation, i.e. change their serving BS, every *t* seconds.

The handover operation works as follows:

- The A/C enqueues a handover packet for transmission toward the CT;
- As soon as the handover packet is received, the A/C is associated to the closest BS.

Model the system described above and study the end-to-end delay and the queue length for various values of *k* and *t.*
More in detail, at least the following scenarios must be evaluated:

- Constant interarrival times.
- Exponential distribution of the service time, with the same means as the previous case.

In all cases, it is up to the team to calibrate the scenarios so that meaningful results are obtained.

Project deliverables:

a) Documentation (according to the standards set during the lectures)
b) Simulator code
c) Presentation (up to 10 slides maximum)