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| <b>SUBJECT:</b>          | <b>SIMULACIÓ (M1.205)</b>  |                          |                     |
| <b>PAC Num.:</b>         | <b>Pràctica</b>  |                          |                     |
| <b>Date of proposal:</b> | <b>22/04/2018</b>  | <b>Date of delivery:</b> | <b>≤ 27/05/2018</b> |
| <b>Observations:</b>     | <ul style="list-style-type: none"> <li>The answers will be on this document, keep the original text and take care on the final <b>presentation</b>.</li> <li>It is needed to <b>justify</b> all the answers.</li> <li>The name of the file must be <b>Surname1_Surname2_Name.RTF</b> (o .DOCX o .PDF)</li> </ul> |                          |                     |

## EXERCICES

In this practical you can use all the different techniques learned during the course. Define the goals of the model, the hypotheses to be used and the conceptual model. Finally implement the model with SIMIO and discuss the results.

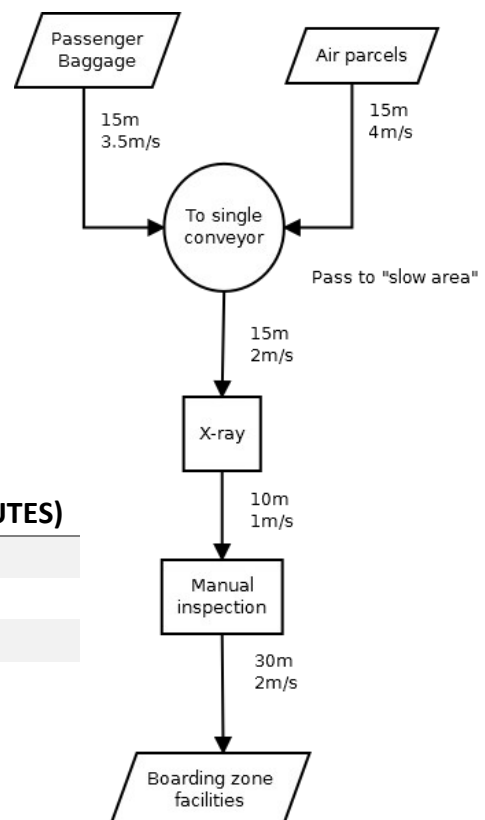
### System to model

A conveyor system is implemented in an airport for managing the transfer of the passengers baggage and air packages from their origins to the boarding area, where packages will be collected and boarded. The model is concerned with the capacity of the security checks that are needed to be carried out between package collection and the deployment at the boarding buffer.

The speed of conveyors is already set by the manufacturer.

Both x-ray and manual inspection servers have limited space, and only allow **up to** four parallel processes (for each one). Nonetheless, improving those facilities is expensive and the airport's authorities want to achieve good throughput values at minimum cost (minimum number of those parallel facilities). Sources for passport baggage and air parcels are different, and packages are driven by conveyors until a common conveyor is used to feed the security facilities. The times of the system elements are represented on the next table.

| FACILITY                  | DISTRIBUTION (TIME IN MINUTES) |
|---------------------------|--------------------------------|
| <b>PASSENGERS BAGGAGE</b> | Exponential(2.5)               |
| <b>AIR PARCEL SOURCE</b>  | Exponential(4)                 |
| <b>X-RAY INSPECTION</b>   | Triangular(1.5, 3 , 5)         |
| <b>MANUAL INSPECTION</b>  | Erlang(5, 3)                   |



On the figure (right) is shown the systematic representation of the part of the system that is needed to be modeled.

What is the final number of facilities that must be used on the airport? What validation techniques can be applied to assure that the conclusions are correct?