

Annex 1 - Test procedures details for competitors

**Evaluating AAL Systems through
Competitive Benchmarking**

EvAAL technical committee

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1. Phase 1

In this phase each team must locate a person inside an Area of Interest (Aoi). The Aoi in a typically AAL scenario could be inside a specific room (bathroom, bedroom, etc), in front of a kitchen etc. **The Aoi will be disclosed to the competitors before the competition.**

Each system is requested to identify 5 Areas of Interest. The actor will move along random paths and will stop in each Aoi for 30 seconds.

1.2 Areas of Interest (Aoi)

Important note: Please, pay attention about the areas of interest orientation (X and Y axis). Compare each Aoi figure with its final location inside CIAMI Living Lab (figure 6) before to extract some conclusions.

Aoi 1

- Use case: Elderly man is taking a shower (bathroom).

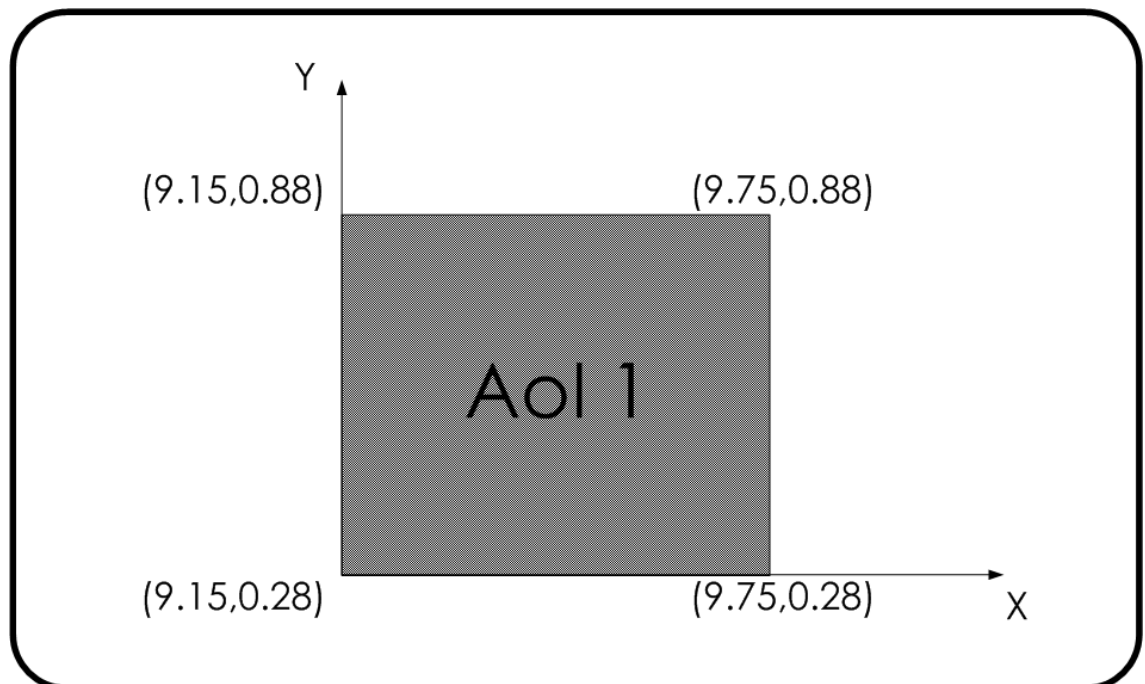


Figure 1 - Aoi 1 coordinates

Aol 2

- Use case: Elderly man is cooking (kitchen).

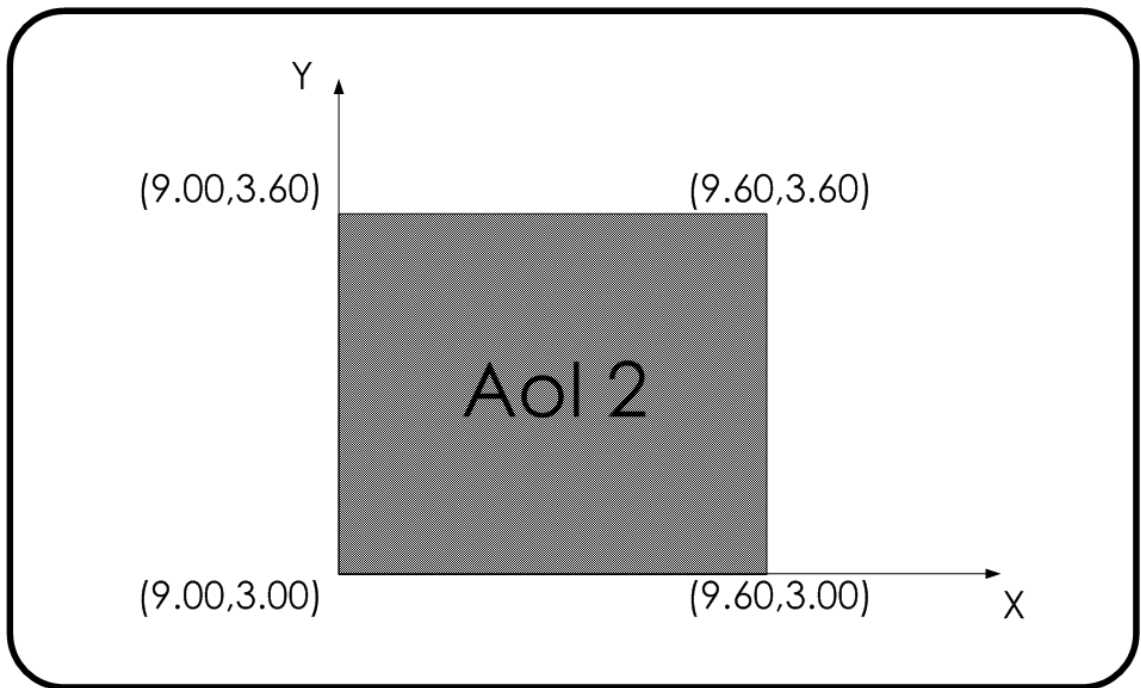


Figure 2 - Aol 2 coordinates

Aol 3

- Use case: Elderly man is opening the fridge (kitchen).

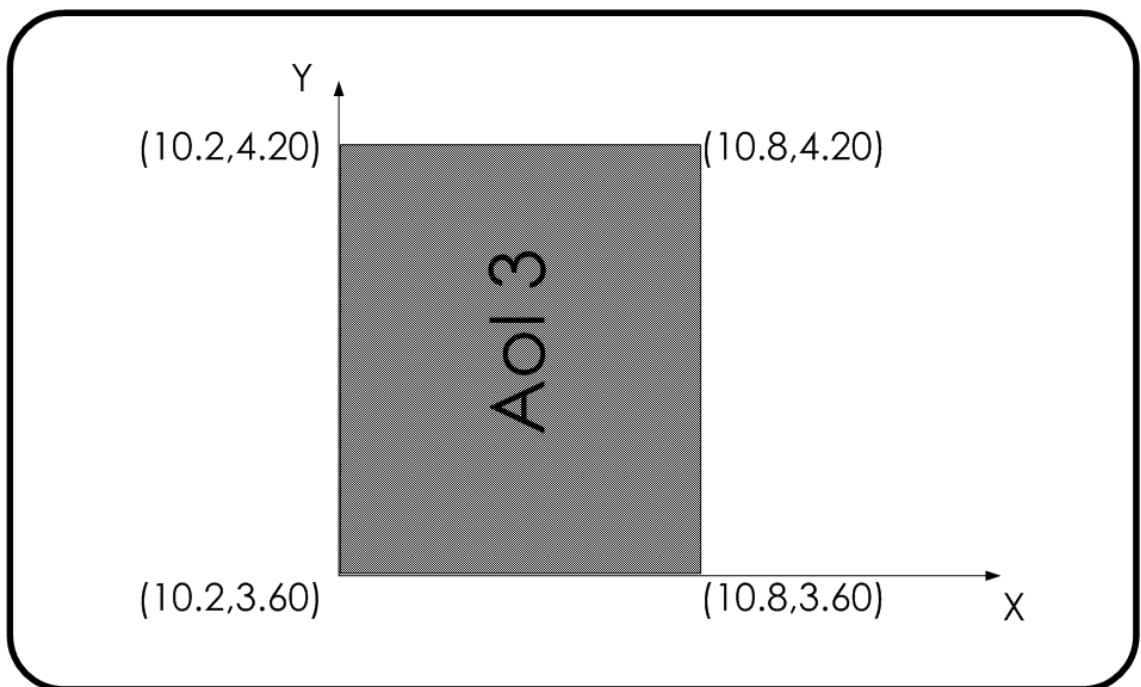


Figure 3 - Aol 3 coordinates

Aol 4

- Use case: Elderly man is taking a book from the bookcase (guest room).

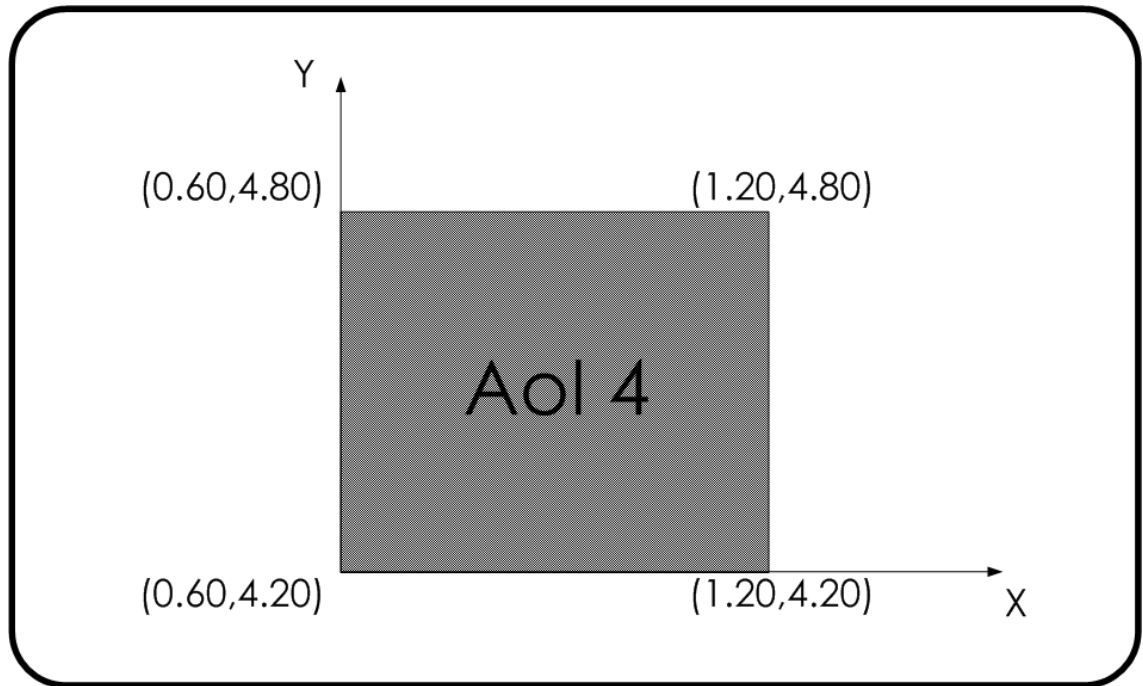


Figure 4 - Aol 4 coordinates

Aol 5

- Use case: Elderly man is watching television (living room).

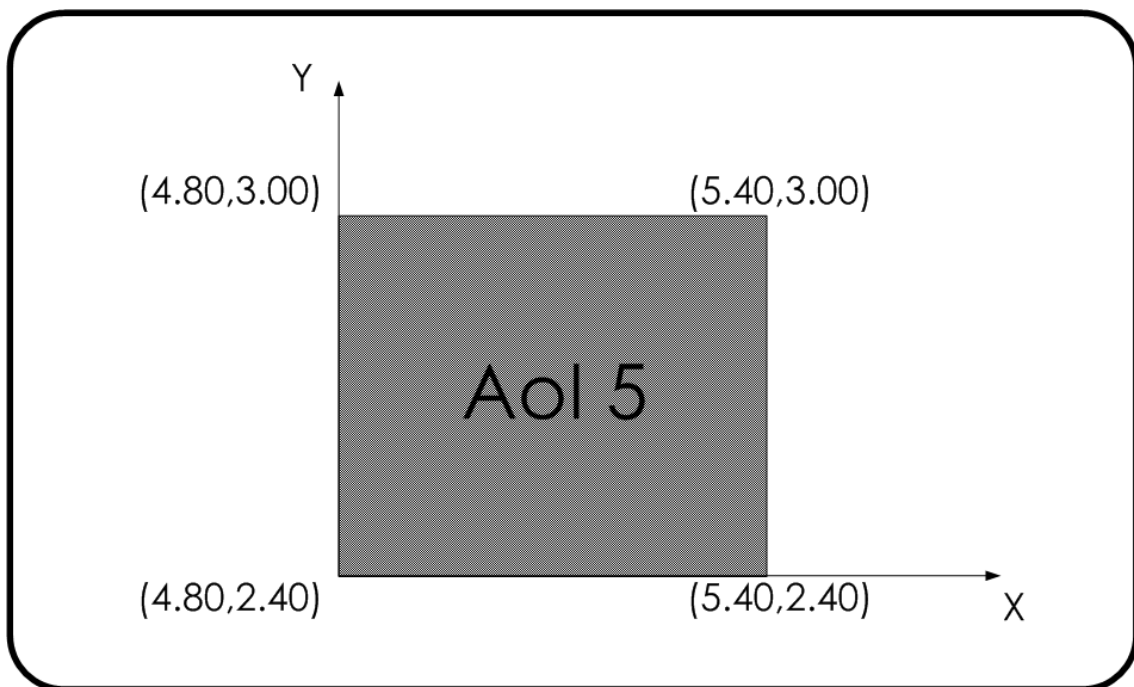


Figure 5 - Aol 5 coordinates

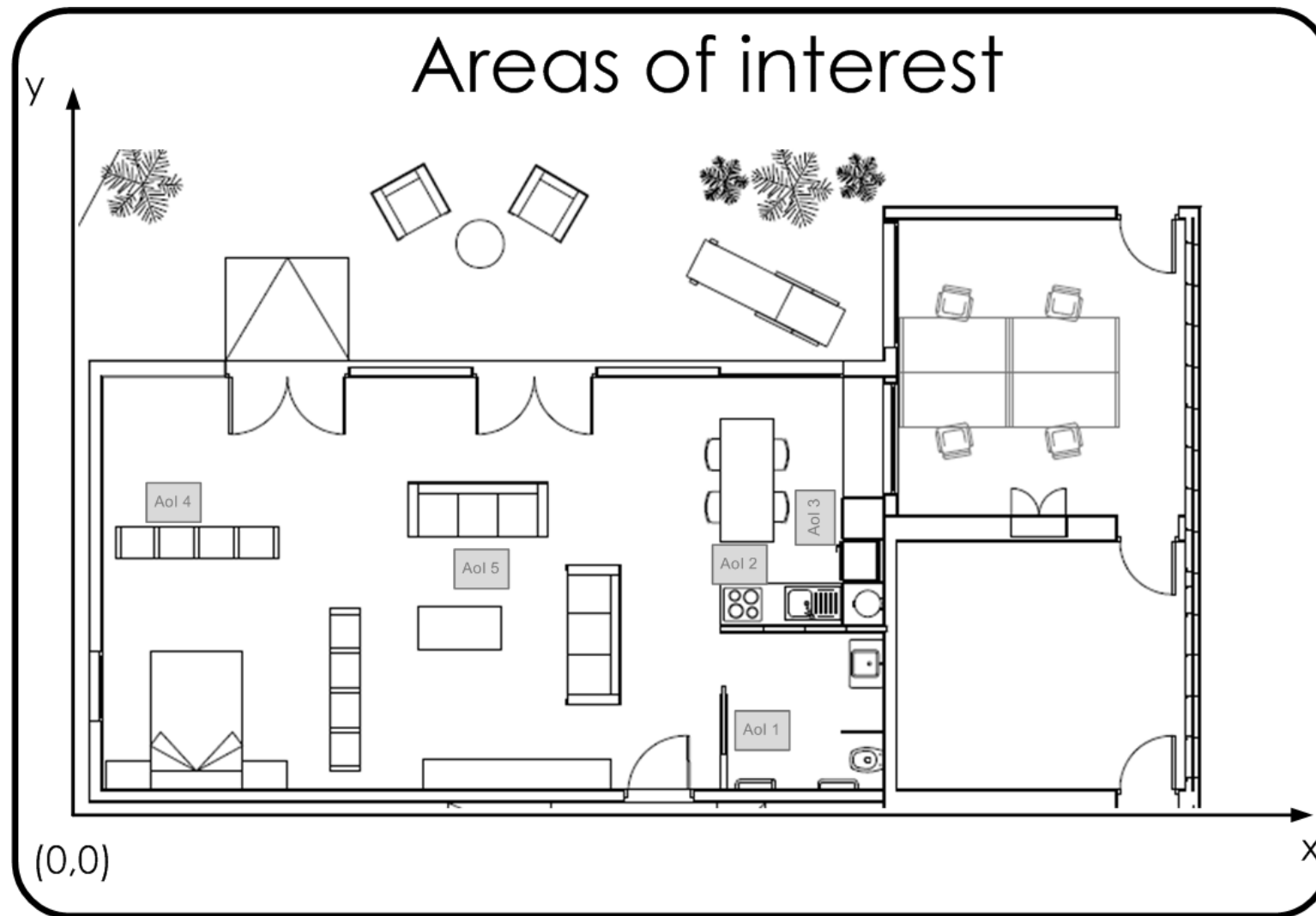


Figure 6 - Areas of interest location inside CIAMI Living Lab (plant view)

2. Phase 2

In this phase a person that moves inside the Living Lab must be located and tracked (we plan only 2D localization and tracking here). During this phase only the person to be localized will be inside the Living Lab.

In this phase each localization system should produce localization data with a frequency of 1 new item of data every half a second (this will be also used to evaluate availability). **The path followed by the person will be the same for each test, and it will not be disclosed to competitors before the application of the benchmarks.**

Each system is requested to track the actor along three different paths (the paths are the same for all competitors). The evaluation criteria Accuracy and Availability will be computed on the three paths aggregated. Each path will last up to a couple of minutes. To help the competitors we give a sample path (that will not be used during the competition).

2.1 AAL sample path

- Use case: Aaron is an elderly man (he is 75 years old) who lives with his wife, Sharon, in a very comfortable apartment near to the Valencia's downtown. Since he was a teenager he has worked as farmer in his father's lands (they had a lot of lands with Orange fruits and Clementine –a sweet variety of mandarins- cultivated on it). He yearns for those days and for this reason first thing in the morning every day is getting a watering can from his bedroom's bookcase and going to the garden to water some plants.
- Benchmark:
 - EvAAL technician (he) waits in the starting point prior the simulation is launched.
 - Sample path is going to the bedroom from the outdoor garden through the guest room.
 - The start point is in the bedroom (between bed and a bookcase).
 - The stop point is in the garden (outside CIAMl Living Lab).
 - EvAAL technician (he) must wait for 6 seconds (6 timer beeps) in the same position (R0 and L0 control points) to

simulate the time needed to take a watering can from a bookcase.

- After this, he initiates the walk.
 - One step/second is the cadence selected to cover the path.
 - The simulation stops when the EvAAL technician arrives to the garden (R12 and L12 control points) and water one plant.
 - He must wait 10 seconds (10 timer beeps) in the same position (R12 and L12 control points) to simulate the time employed for an elderly people to water the plants.
 - After this the AAL sample scene ends.
- Right and left reference foots (each foot has his own X and Y real coordinates). Where:
 - R = right foot at different control points.
 - L = left foot at different control points

Action	Foot	X position (m)	Y position (m)
Start	R0	2.75	1.07
Start	L0	2.59	0.89
Wait	R0	2.75	1.07
Wait	L0	2.59	0.89
Wait	R0	2.75	1.07
Wait	L0	2.59	0.89
Wait	R0	2.75	1.07
Wait	L0	2.59	0.89
Walk	R1	2.84	1.33
Walk	L1	2.58	1.5
Walk	R2	2.85	1.8
Walk	L2	2.58	2.02
Walk	R3	2.86	2.31
Walk	L3	2.6	2.51
Walk	R4	2.9	2.8
Walk	L4	2.63	3.0
Walk	R5	2.94	3.34
Walk	L5	2.69	3.52

Action	Foot	X position (m)	Y position (m)
Walk	R6	3.0	3.84
Walk	L6	2.75	4.09
Walk	R7	3.05	4.39
Walk	L7	2.8	4.66
Walk	R8	3.1	4.92
Walk	L8	2.85	5.16
Walk	R9	3.2	5.4
Walk	L9	2.93	5.65
Walk	R10	3.26	5.94
Walk	L10	2.94	6.21
Walk	R11	3.23	6.45
Walk	L11	2.96	6.7
Walk	R12	3.26	7.02
Walk	L12	3.12	7.03
Wait	R12	3.26	7.02
Wait	L12	3.12	7.03
Wait	R12	3.26	7.02
Wait	L12	3.12	7.03
Wait	R12	3.26	7.02
Wait	L12	3.12	7.03
Wait	R12	3.26	7.02
Wait	L12	3.12	7.03
Wait	R12	3.26	7.02
Wait	L12	3.12	7.03
Wait	R12	3.26	7.02
Wait	L12	3.12	7.03
Stop	R12	3.26	7.02
Stop	L12	3.12	7.03

Table 1 – Sample path static coordinates

Important note: The sample path is composed by two wait control areas and to cover it is needed 25 steps (13 right and left feet). Please, pay attention that all routes don't have the same number of wait control areas neither distance.

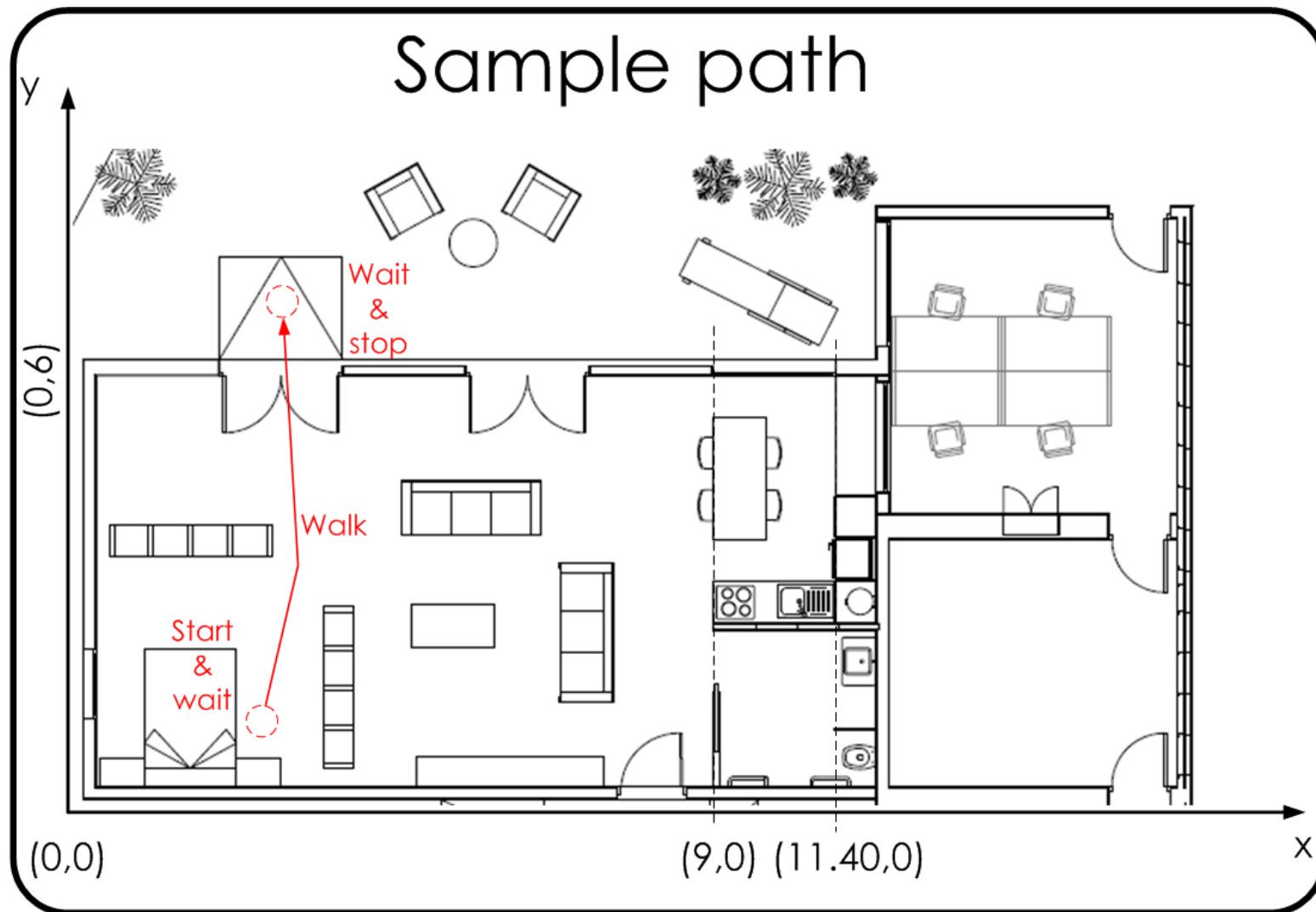


Figure 7 - Sample path with start, stop and wait control point

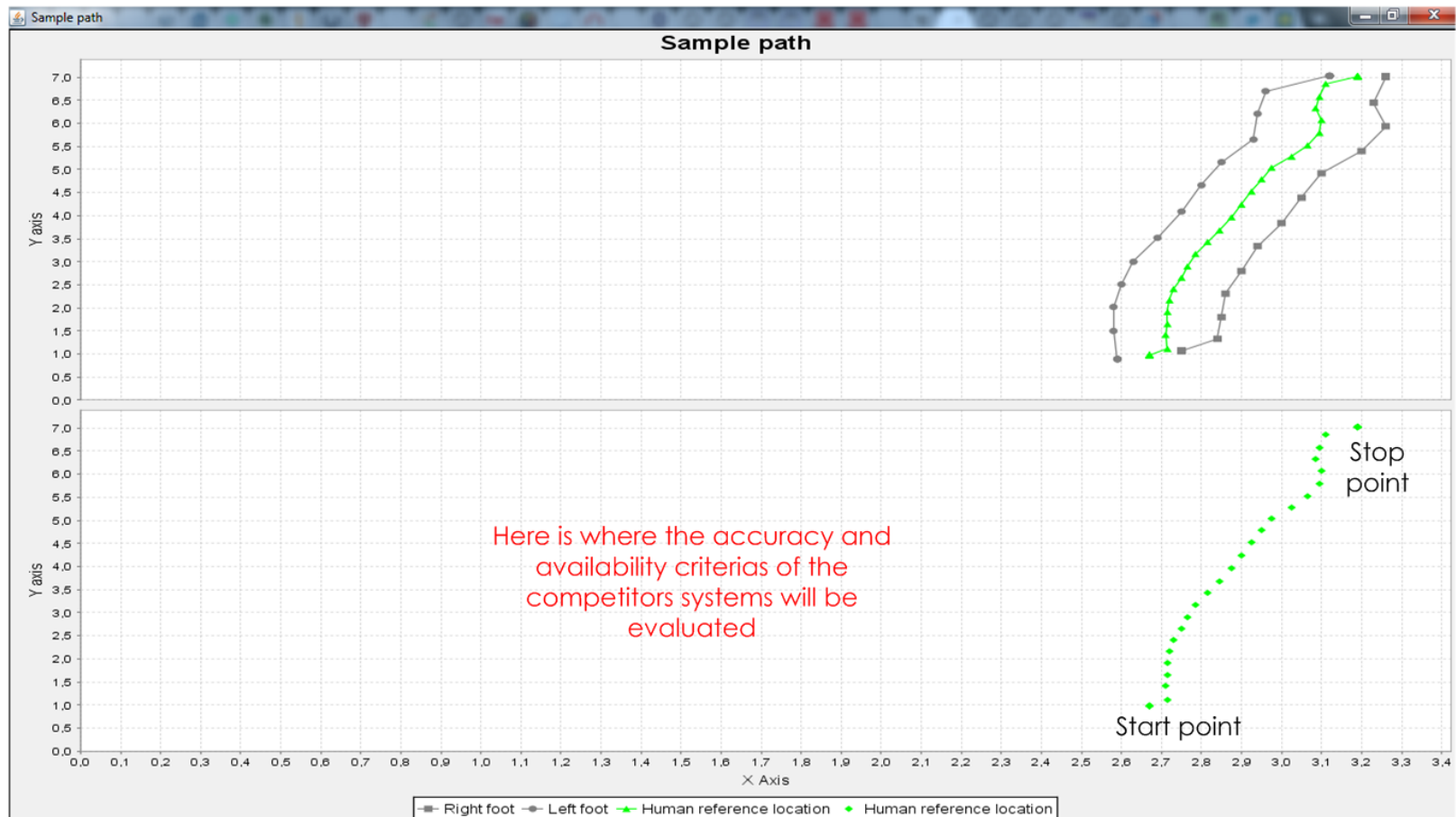


Figure 8 - Human reference location at AAL sample scene automatically computed and plotted by the EvAAL application

3. Appendix

Some biomechanics definitions connected with the EvAAL competition that could be helpful for competitors.

- Stride length. The stride length is the distance between two successive placements of the same foot, consisting of two step lengths. It depends on:
 - The length of the lower limbs.
 - The age of the population.
 - The human condition.
- Step length. The step length is the distance between two successive placements of the alternates foots, consisting of a half of one stride lengths. It depends on:
 - The length of the lower limbs.
 - The age of the population.
 - The human condition.

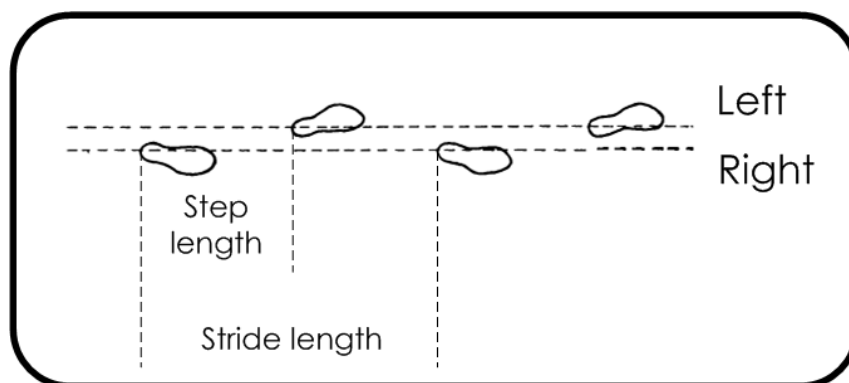


Figure 9 - Biomechanical definitions

- Cadence. The cadence is the beat or timing of a particular rhythmic activity. For us, the concrete rhythmic activity will be the human movement. This parameter will be measured in steps by minute (step/min) and it depends on:
 - The user's location (the cadence is lower at indoor environments than outdoors).
 - The user's habits.
 - The age of the population.
 - The human condition.
 - Male/female condition.