IPIN competition 2016 - Track 2

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ETRI Electronics and Telecommunications Research Institute

KICS The Korean Institute of Communications and Information Sciences

International Conference on Indoor Positioning and Indoor Navigation

Track 2 Pedestrian Dead Reckoning

Chairs: Soyeon Lee, Jaehyun Lim

Track 2: Pedestrian Dead Reckoning Positioning (on-site)

- Competition Goals
  - Evaluate the performance of state-of-the-art PDR solutions based on the inertial, compass, pressure sensors, and etc.
  - Conduct quantitative comparisons for those PDR approaches.

- General Goals
  - Identify the topmost approach in this area.
  - Provide an opportunity for common interest group to share their ideas.

Path of Track 2

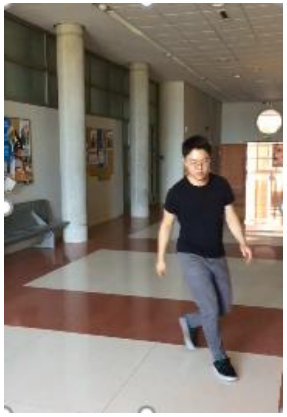
- Official scenario
  - **57 key points** for evaluations (same as Track 1)
  - Throughout four floors (F0 ~ F3)
  - About 10 ~ 12 min of walk
  - Walking in **normal pace**
  - Including stairs (do not use elevators)

Path of Track 2

- Irregular motion scenario, unofficial
  - 45 key points for evaluations
  - About 10 ~ 12 min scenario
  - Throughout three floors (F0 ~ F2)
  - Consisting of walking, zig-zag, squat, jumping, running
  - Including stairs

Walking

Zig-zag



Squat

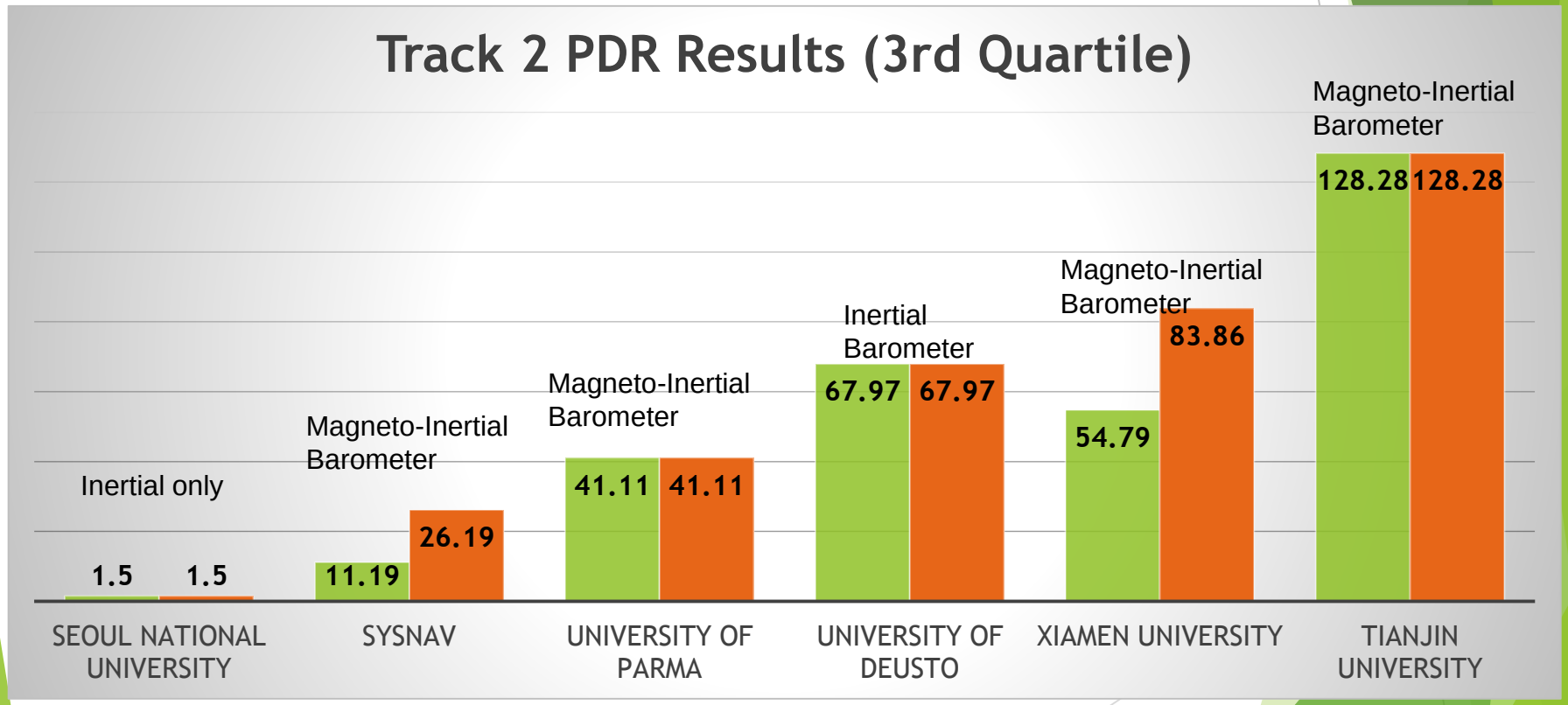
Running

Jumping

Competitors of Track 2

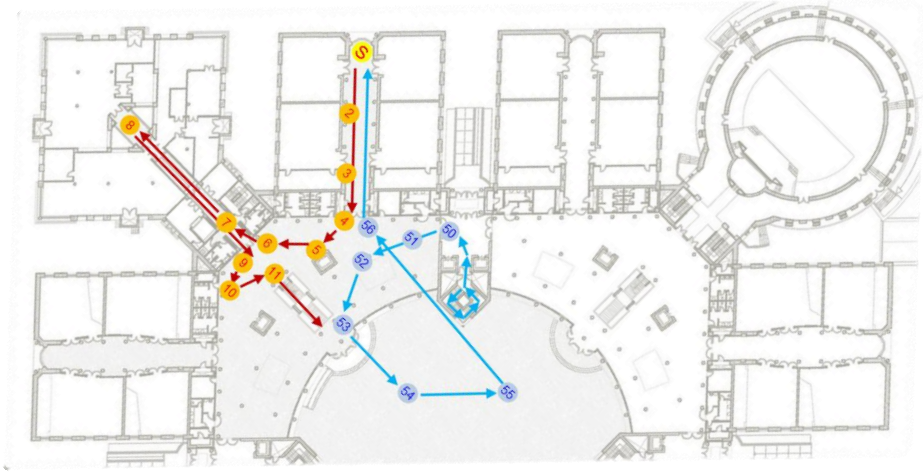
No	Organization	Name
1	Sysnav (FR)	Charles-Ivan Chesneau, Mathieu Hillion and Christophe Prieur
2	Seoul National Univ.(KR)	Hojin Ju, So Young Park and Chan Gook Park
3	Xiamen Univ.(CN)	Ao Peng, Lingxiang Zheng, Wencheng Zhou, Chaohui Yan, Yizhen Wang, XiaoYang Ruan, Biyu Tang, Haibin Shi, Hai Lu, and Huiru Zheng
4	Univ. of Deusto (ES)	Luis Enrique Díez and Alfonso Bahillo
5	Univ. of Parma (IT)	Nicolò Strozzi, Federico Parisi and Gianluigi Ferrari
6	Tianjin Univ.(CN)	Yu Liu, Shenglong Li, Kai Guo

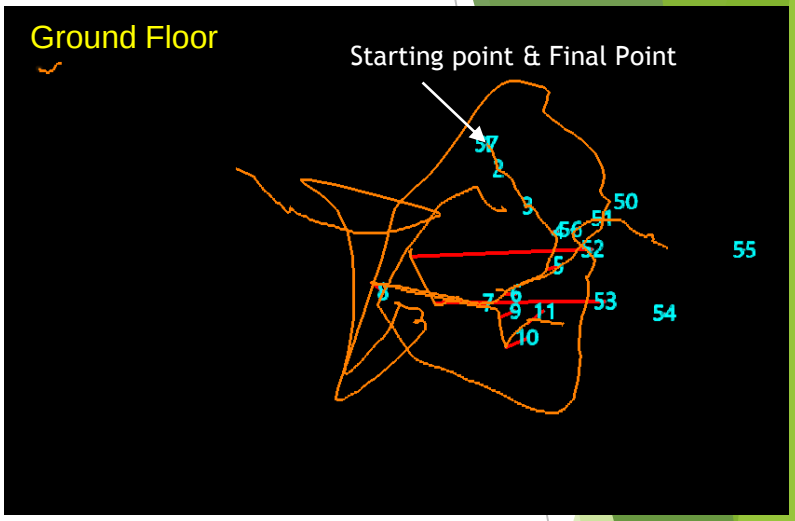
Results of Track 2

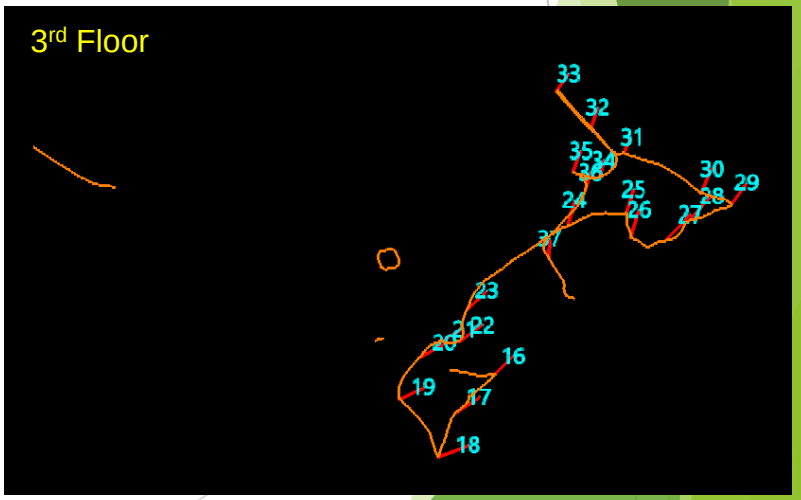


Trajectory – 2nd Rank

Orange : estimated trajectory
Red : key point error
Skyblue : key points

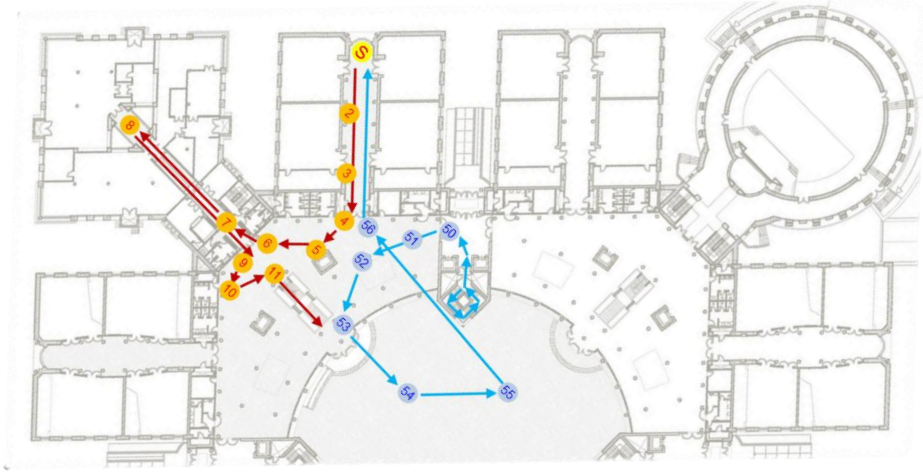


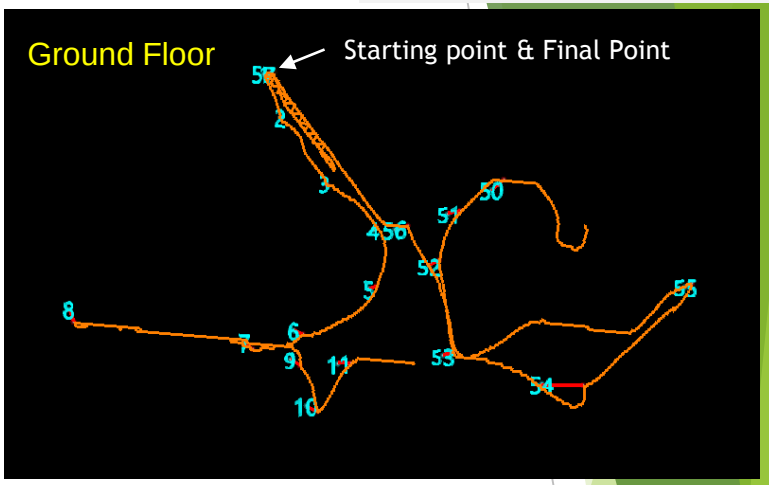


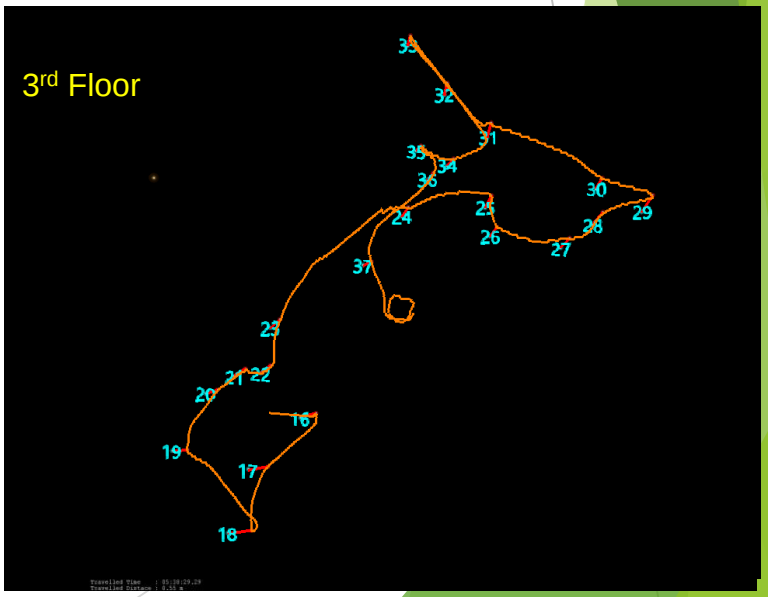


Trajectory - Winner SNU NESL

Orange : estimated trajectory
Red : key point error
Skyblue : key points

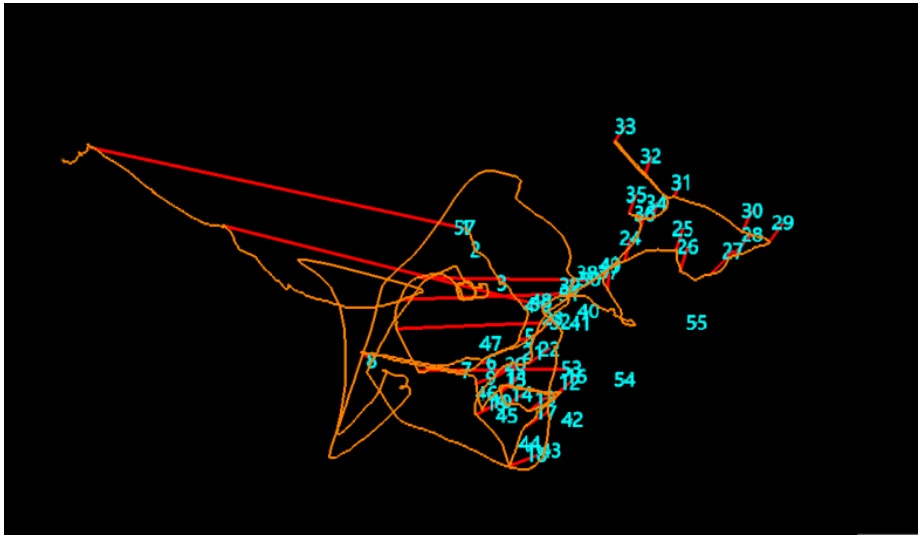






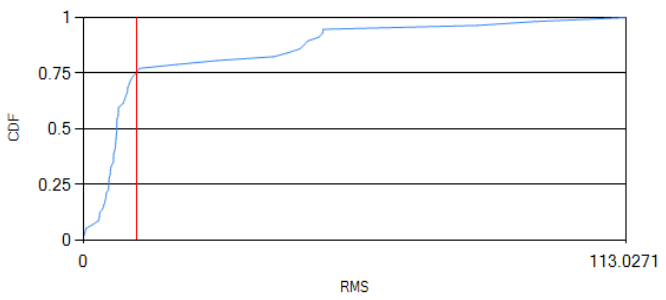
(1) Sysnav (Charles-Ivan Chesneau)

- 3rd Quartile : 11.19 m, 26.19m (with floor penalty)
- Mean : 17.20 m
- Median : 7.03 m
- Std : 23.65 m
- RPE : 122.24 m
- Travelled distance : 1344.98 m



PDR Results : (1-1) 201610041207-chesneau-track2-first-run

Error Distribution



Detailed Data

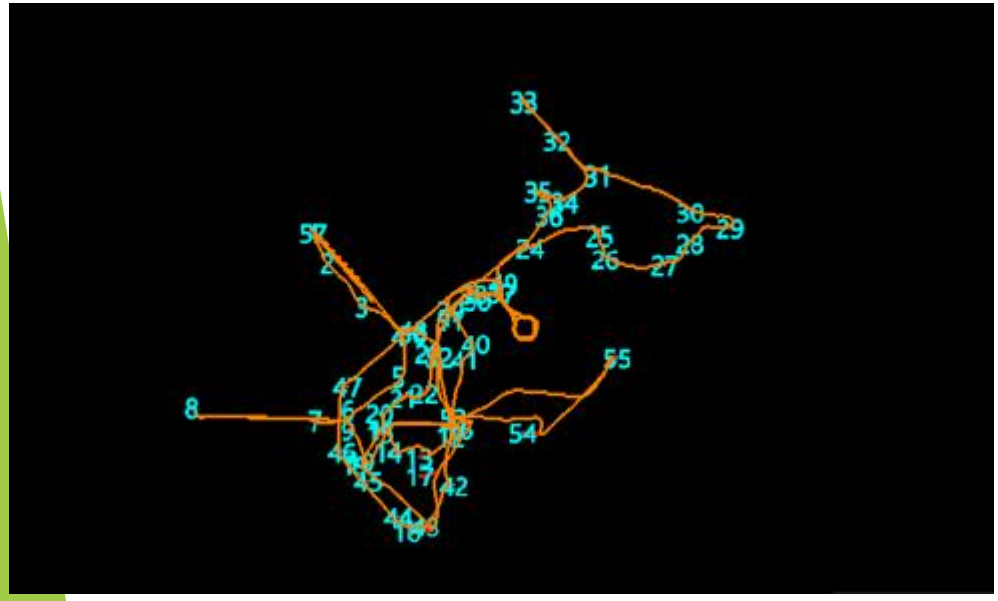
RMS	Index	True Point X	True Point Y	True Point Z	E F
0.147923587965172	1	-3.35022146714405	40.5134449457565	0	-3
0.380964598262952	2	-3.35019293744115	40.5133991161274	0	-3
0.581043427109877	3	-3.35012252370636	40.5133320409748	0	-3
1.99500591103983	4	-3.35004786086687	40.5132856043308	0	-3
3.18602396067971	6	-3.3501496876256	40.5131701197355	0	-3
3.4086155091102	7	-3.35021828031553	40.5131531233168	0	-3

Statistics

Mean	: 17.20	Std	: 23.65
Median	: 7.03	3rd Quartile	: 11.19

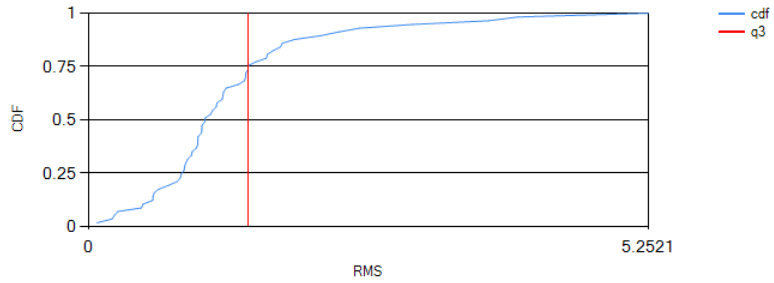
(2) NESL (Hojin Ju et al)

- 3rd Quartile : 1.50 m
- Mean : 1.35 m
- Median : 1.10 m
- Std : 0.91 m
- RPE : 1.42 m
- Travelled distance : 1023.6m



PDR Results : (2-4) Hojin Ju_second

Error Distribution



Detailed Data

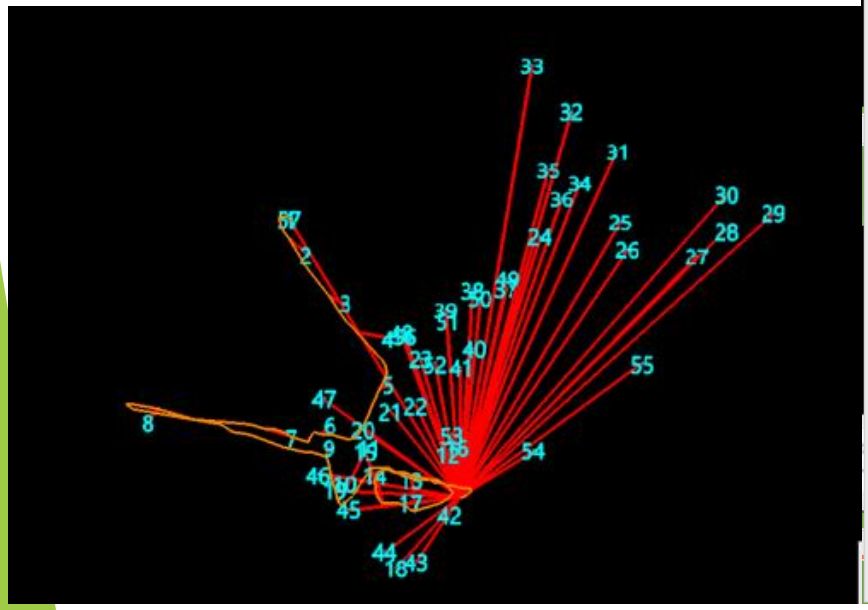
	RMS	Index	True Point X	True Point Y	True Point Z	E F
▸	0.081937176800939	2	-3.35019293744115	40.5133991161274	0	-3
	0.222189012664362	1	-3.35022146714405	40.5134449457565	0	-3
	0.24569813202534	3	-3.35012252370636	40.5133320409748	0	-3
	0.276802995404807	39	-3.34993662537632	40.5133213423362	3	-3
	0.500241279803249	37	-3.3498352538788	40.5133498720391	2	-3
	0.513024327774343	51	-3.34994390955582	40.5133095814214	0	-3

Statistics

Mean	: 1.35	Std	: 0.91
Median	: 1.10	3rd Quartile	: 1.50

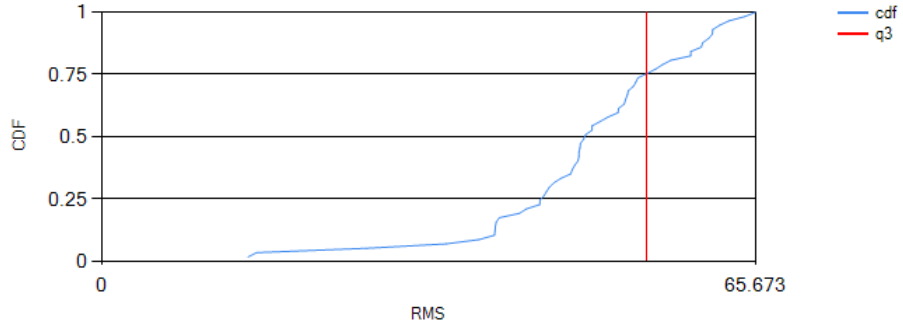
(3) Xiamen Univ. (Ao Peng)

- All key points are recorded, but floor identification was not done for floors 2 ~ 4.
- 3rd Quartile : 54.79m, 83.36m(with floor penalty)
- Mean : 48.79m
- Median : 48.6m
- Std : 10.2 m
- RPE : 61.01 m
- Travelled distance : 532.27 m



PDR Results : (2-6) track2_Peng_Ao_1st_xmu

Error Distribution



Detailed Data

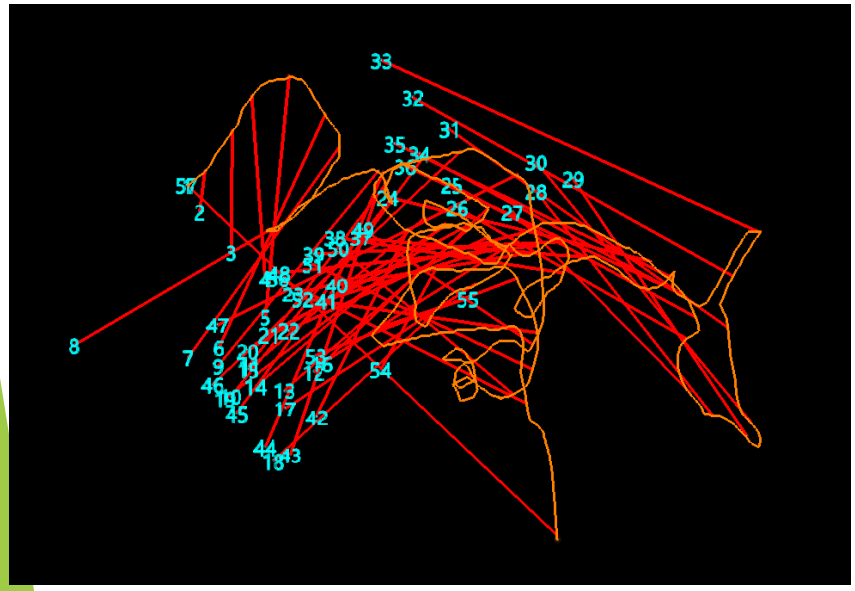
	RMS	Index	True Point X	True Point Y	True Point Z	Es X
▸	14.7224092572061	1	-3.35022146714405	40.5134449457565	0	-3.
	15.5597083826613	2	-3.35019293744115	40.5133991161274	0	-3.
	26.6574039441067	3	-3.35012252370636	40.5133320409748	0	-3.
	34.5865044554199	4	-3.35004786086687	40.5132856043308	0	-3.
	37.9024370137635	34	-3.34970853950689	40.5134887267101	2	-3.
	39.4545393473391	33	-3.3497910935408	40.5136423014938	2	-3.

Statistics

Mean	: 48.79	Std	: 10.20
Median	: 48.60	3rd Quartile	: 54.79

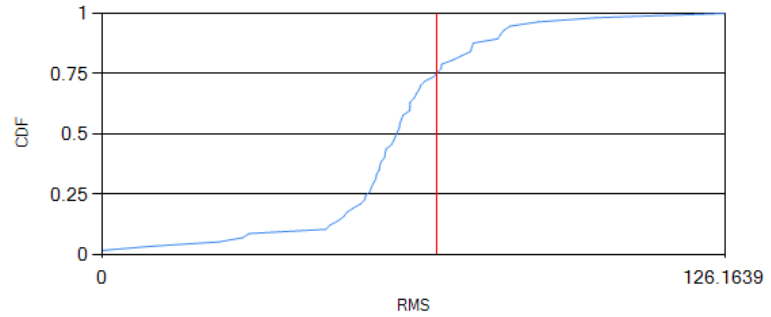
(4) Univ. of Deusto (Luis Enrique Diez)

- 3rd Quartile : 67.97 m
- Mean : 60.13 m
- Median : 59.88 m
- Std : 18.93 m
- RPE : 126.78 m
- Travelled distance : 962.33 m



PDR Results : (2-3) 20161004_132459_log_IPIN16_Competition_LuisEnriqueDiez_copy

Error Distribution



Detailed Data

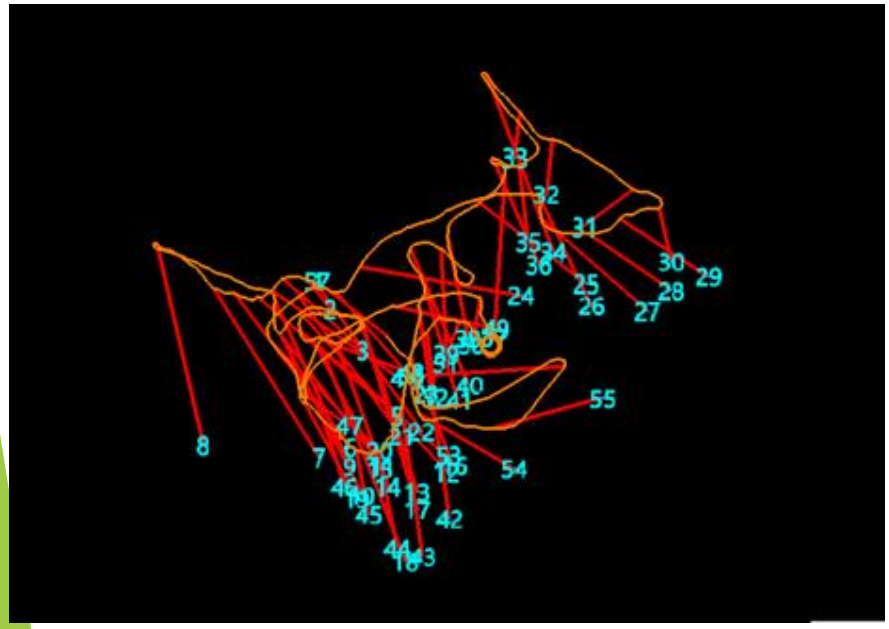
	RMS	Index	True Point X	True Point Y	True Point Z	E P
▸	0.147923587965172	1	-3.35022146714405	40.5134449457565	0	-3
	10.3409773182209	2	-3.35019293744115	40.5133991161274	0	-3
	23.6968793188048	55	-3.3495979869083	40.5132516494316	0	-3
	28.5394158931414	54	-3.34979041064906	40.5131344196685	0	-3
	29.8605239609834	3	-3.35012252370636	40.5133320409748	0	-3
	45.3769861512063	4	-3.35004786086687	40.5132856043308	0	-3

Statistics

Mean	: 60.13	Std	: 18.93
Median	: 59.88	3rd Quartile	: 67.97

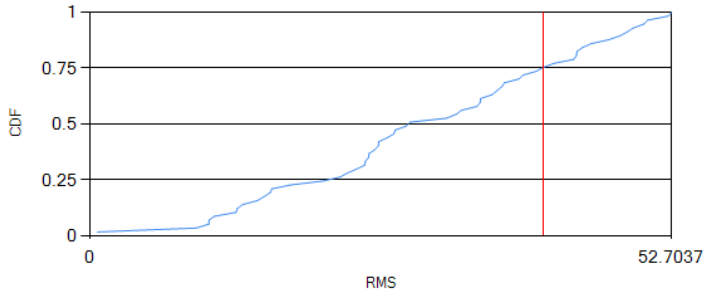
(5) Univ. of Parma (Nicolo Strozzi)

- 3rd Quartile : 41.11 m
- Mean : 30.73 m
- Median : 29.03 m
- Std : 12.92 m
- RPE : 20.78 m
- Travelled distance : 812.29 m



PDR Results : (2-2) strozzi5_1_r

Error Distribution



Detailed Data

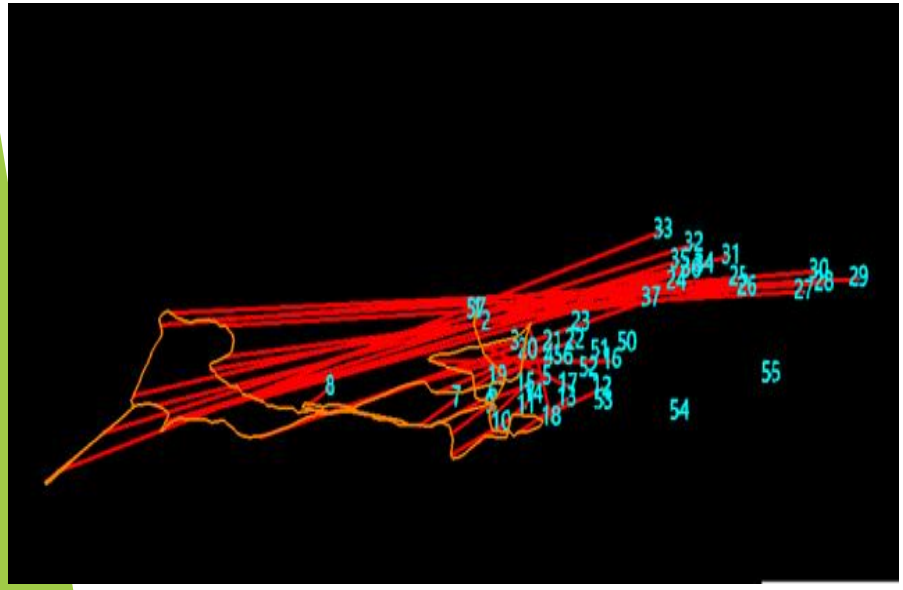
RMS	Index	True Point X	True Point Y	True Point Z	Es Pc
0.72660351276762	1	-3.35022146714405	40.5134449457565	0	-3.
9.67287561725486	2	-3.35019293744115	40.5133991161274	0	-3.
10.803905290053	33	-3.3497910935408	40.5136423014938	2	-3.
10.8193690635399	51	-3.34994390955582	40.5133095814214	0	-3.
11.3040991160916	50	-3.34988411858275	40.513339476908	0	-3.
13.2456968299434	30	-3.34945556602429	40.5134732478288	2	-3.

Statistics

Mean	: 30.73	Std	: 12.92
Median	: 29.03	3rd Quartile	: 41.11

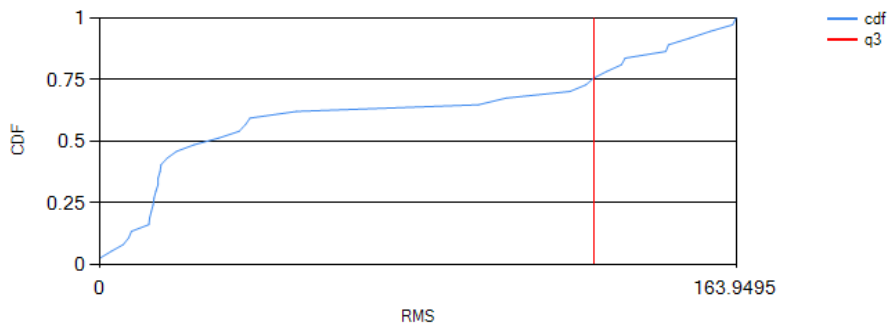
(6) Tianjin Univ. (YuLiu)

- This trial is incomplete, so the result will not be considered as an official record.
- 3rd Quartile : 127.28 m
- Mean : 62.98 m
- Median : 30.81 m
- Std : 59.09 m
- RPE : 71.63 m
- Travelled distance : 532.27 m



PDR Results : (1-4) MPRL_LIUYU_first

Error Distribution



Detailed Data

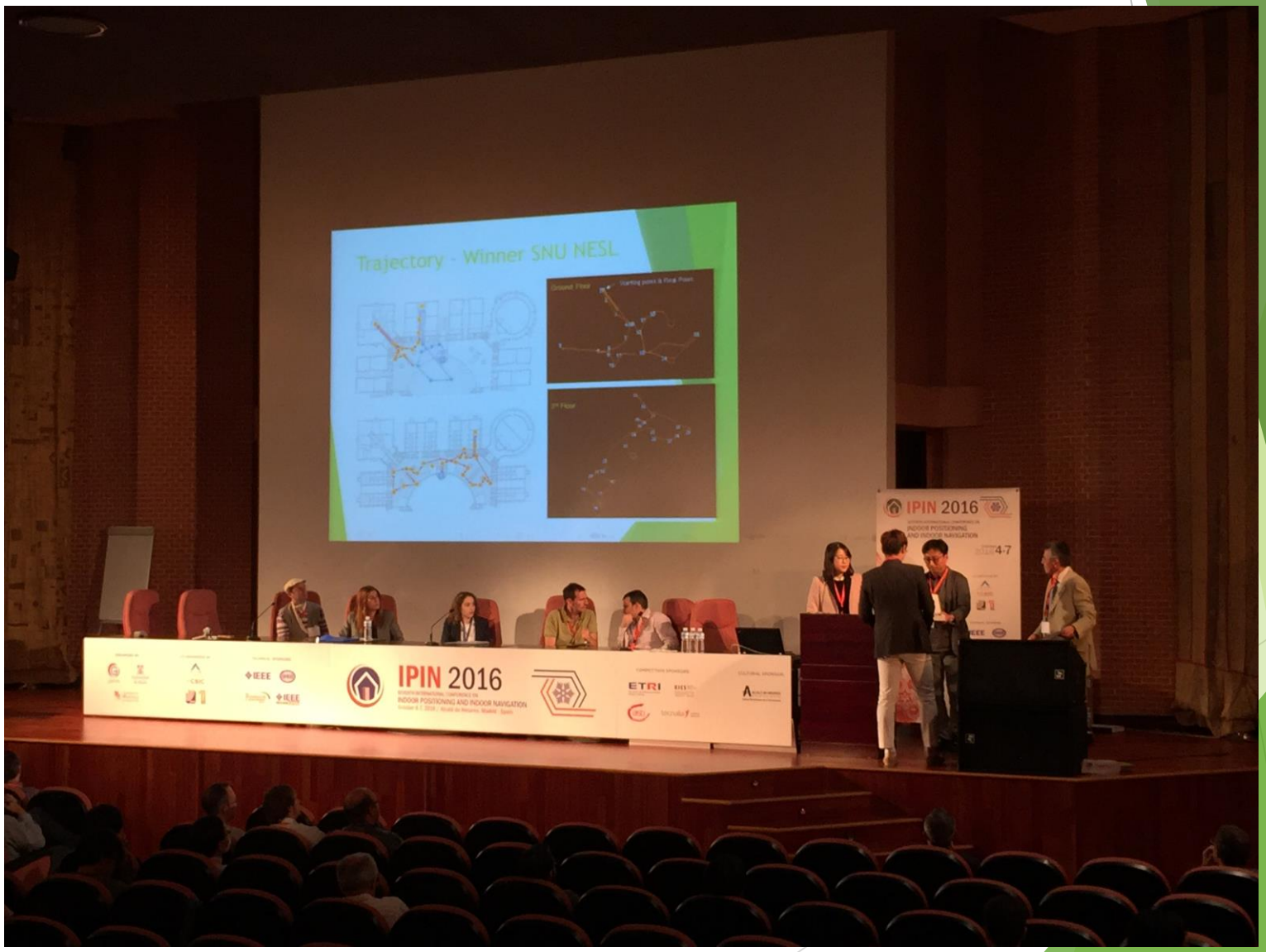
RMS	Index	True Point X	True Point Y	True Point Z	E F
0.289612723082967	1	-3.35022146714405	40.5134449457565	0	-3
3.13336118474836	2	-3.35019293744115	40.5133991161274	0	-3
6.18064300708392	19	-3.3501288973634	40.5130861240411	2	-3
7.57273997814206	8	-3.35047140555183	40.5131737618253	0	-3
8.27526650207632	3	-3.35012252370636	40.5133320409748	0	-3
12.7558595346719	7	-3.35021828031553	40.5131531233168	0	-3

Statistics

Mean	: 62.98	Std	: 59.09
Median	: 30.81	3rd Quartile	: 127.28

Award Ceremony

Award Ceremony



Award Ceremony

Track 2 Participants