# 2014-01-0099

# PROFESSIONAL DRIVING SIMULATORS TO DESIGN FIRST-TIME RIGHT RACE CARS

Andrea Toso Alessandro Moroni Dallara Dallara





#### Professional Driving Simulator Constituents for High Immersion Realism



Sound Generator (Engine, Tyre, Wind)

Real Time Vehicle Model

#### Professional Driving Simulator Result: High Immersion Realism



## Which one is real ?



#### Professional Driving Simulator Hardware: Platform, Actuators, Projectors, Sound, Struts



#### Professional Driving Simulator Software: Vehicle Model – Operating System – Track Data



SAE INTERNATIONAL

#### Professional Driving Simulator Case Study: Nippon Super Formula - Traditional Approach



#### Professional Driving Simulator Case Study: Nippon Super Formula - Sim Approach



### Early Decision: Power Steering YES / NO ?

Mass	575 kg (dry)		
Engine	l4 turbo 2.0L		
Power	410 kW		
Tires	235/55-13 - 340/62-13		
Speed	325 km/h		





#### Driving Simulator Case Study Nippon Super Formula - Dev Time Saving



	10 <sup>th</sup> Jul 2013	and an
	A A	
05		
Q		

	Sim-way [weeks]	Old-way [weeks]
Initial Design	Same	Same
Wind Tunnel	3	6
Prototype Build	6	6
Poster Rig	1	2
Prototype Track Test	1	4
Design Review	1	6
Final Track Testing		2
Total Dev Time	<u>12</u>	<u>26</u>

Dev Time: 12 weeks vs 26 weeks !!

#### Professional Driving Simulator Conclusions

#### The Simulator digests all components and ..











#### ... the car is right off the box: no Magic!!

SAE INTERNATIONAL

## **Protagoras: "Man is the measure of all things"**





a.toso@dallara.it a.moroni@dallara.it Head of R&D Driving Simulator Manager

