



TOTALSIM^{US}

ICF Dublin

Intelligent Infrastructure

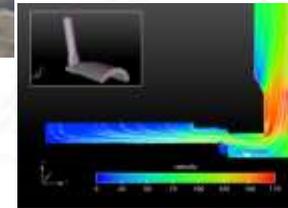
Raymond Leto

21 October 2015



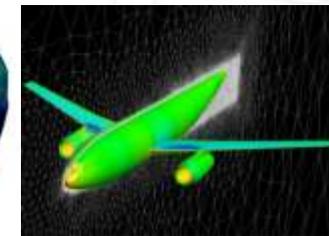
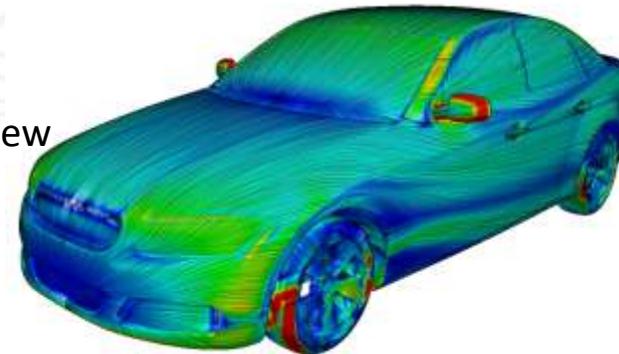
Industries:

- OE Automotive - Several OEM's
- Motorsports
- Heavy Equipment
- Truck and Trailer OE and Add-on
- Consumer goods
- Tier 1 Suppliers
- Aerospace



Software Support and Development:

- OpenFOAM®
 - All tools around TS-Foam, support development, new utilities, solvers and add-ons
- Vertical Apps
 - Dept. of Energy SBIR Award to develop CFD Apps
 - AweSim
 - GENI



TOTALSIM^{US} History

TOTALSIM UK – Brackley, Northants, UK

CFD and aerodynamic consultancy
Primarily motorsport and automotive
Started March 2007

Most employees previously at
Advantage CFD (1998-2006)

Largely Employee Owned
14 engineers

~1500 cores compute power

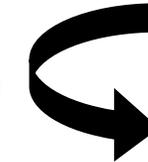
Independent sister offices in USA (2009)
Share business model / procedures / methods



1998 *reynard*



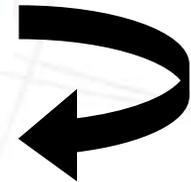
2005



F1
Honda Racing Team



2007



2009



TOTALSIM^{US} Aerodynamic and Computational Fluid Dynamics Experts

- **TOTALSIM US – Dublin, Ohio**

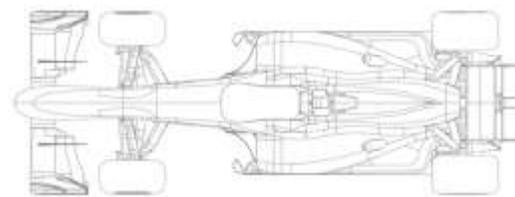
- Started Operations June 09
- Sister Company to TotalSim Ltd.
 - Share Business model, IP, procedures
- 13 Engineers – 5 MSc Aero
- 576 cores in-house
- Secure 10GB fiber connection to +15k cores at OSC

- **Ray Leto - President**

- 20+ years Race Engineering, Aerodynamics, Simulation, and Management in Indy & Champ Car
- 10k+ hrs of wind tunnel and 20yrs track testing experience
- Focus on sim integration w/ physical testing and design

- **Naethan Eagles – Technical Director**

- 5 years Aerospace, 3 years AdvantageCFD / BAR F1
- 10 years Williams F1. Started CFD Dept.
- Extensive background in management, and correlation.
- Design in a continuous development environment
- Focus on making tools work



TOTALSIM^{US} US Base of Operations

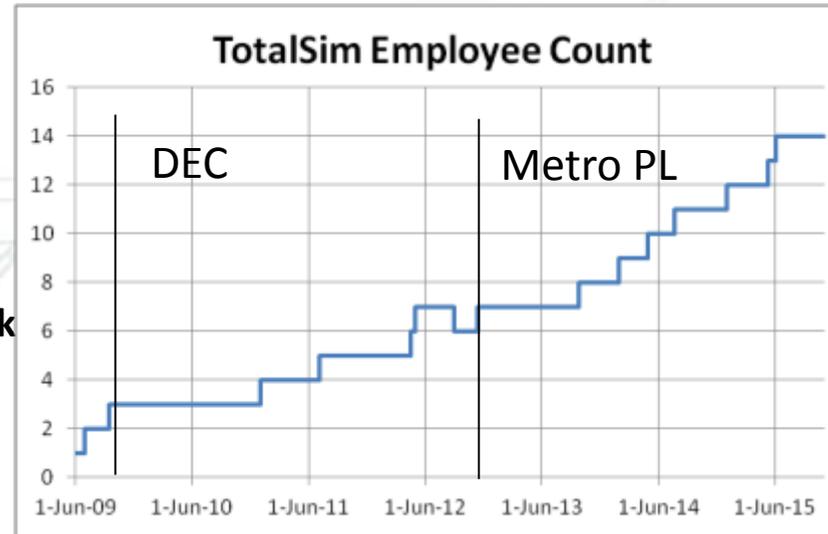
Location?

- Near OE Automotive – Michigan / Ohio
- Motorsports – North Carolina / Indiana / California
- Heavy Equipment - Mid West
- Truck and Trailer OE and Add-on
- Consumer goods – Mid West
- Tier 1 Suppliers – Mid West
- Aerospace – California / Kansas / Mid Atlantic

Dublin OH!O

- Auto Supply Chain - Honda / Detroit
- Motorsports –Indy / Detroit / NC short flight
- DEC – Dublin Entrepreneurial Center
 - Key to affordable start - **Build the network**
- OARNet / OSC
 - City Of Dublin Fiber Investment
 - Metro Data Center

Dublin Entrepreneurial Center



HPC Systems

- **KEY** to our business – computation is what we do!
- TS builds own systems
- Internal systems require:
 - System Admin / Power / Cooling
 - Cash! ~\$300-500 per core
- Own for the Average – Rent for the Peaks
- Capacity for growth
- Using OSC our growth is nearly to unlimited



Network:

- **FAST** connection to HPC systems needed
- **LARGE** amounts of data
- Good connection to customers and researchers
- Dublin / OARnet / Metro Data Center





AweSim enhances competitiveness and efficiency for manufacturers by decreasing product development time, improving quality, and speeding up time to market. Rather than relying on costly and time-intensive physical testing, supercomputer-powered modeling and simulation applications enable manufacturers to pare down the initial phases of product testing by eliminating undesirable prototypes before the physical testing process begins.

Explore

Discover how innovative modeling and simulation tools are changing the way you manufacture products and provide value to your customers.

Browse & Discover

Evaluate

Take a free test drive of a modeling and simulation application and discover how similar apps could be developed for your business.

Free Test Drive

Simulate

I understand the competitive advantage of modeling and simulation and I want to start using the AweSim App Store.

Get Started

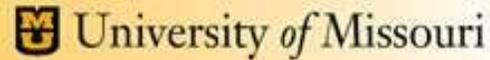
Learn

Contact us about our comprehensive training programs for all of the apps in our App Store or for developing and selling your app.

Get Smart



Multiple collaborations with OH-TECH / MU /MDC is using GENI and the AweSIM platform for PaaS and Cloud networking experiments better deliver our Apps to customers with *lower design time and cost/simulation*



OARnet

An OH-TECH Consortium Member

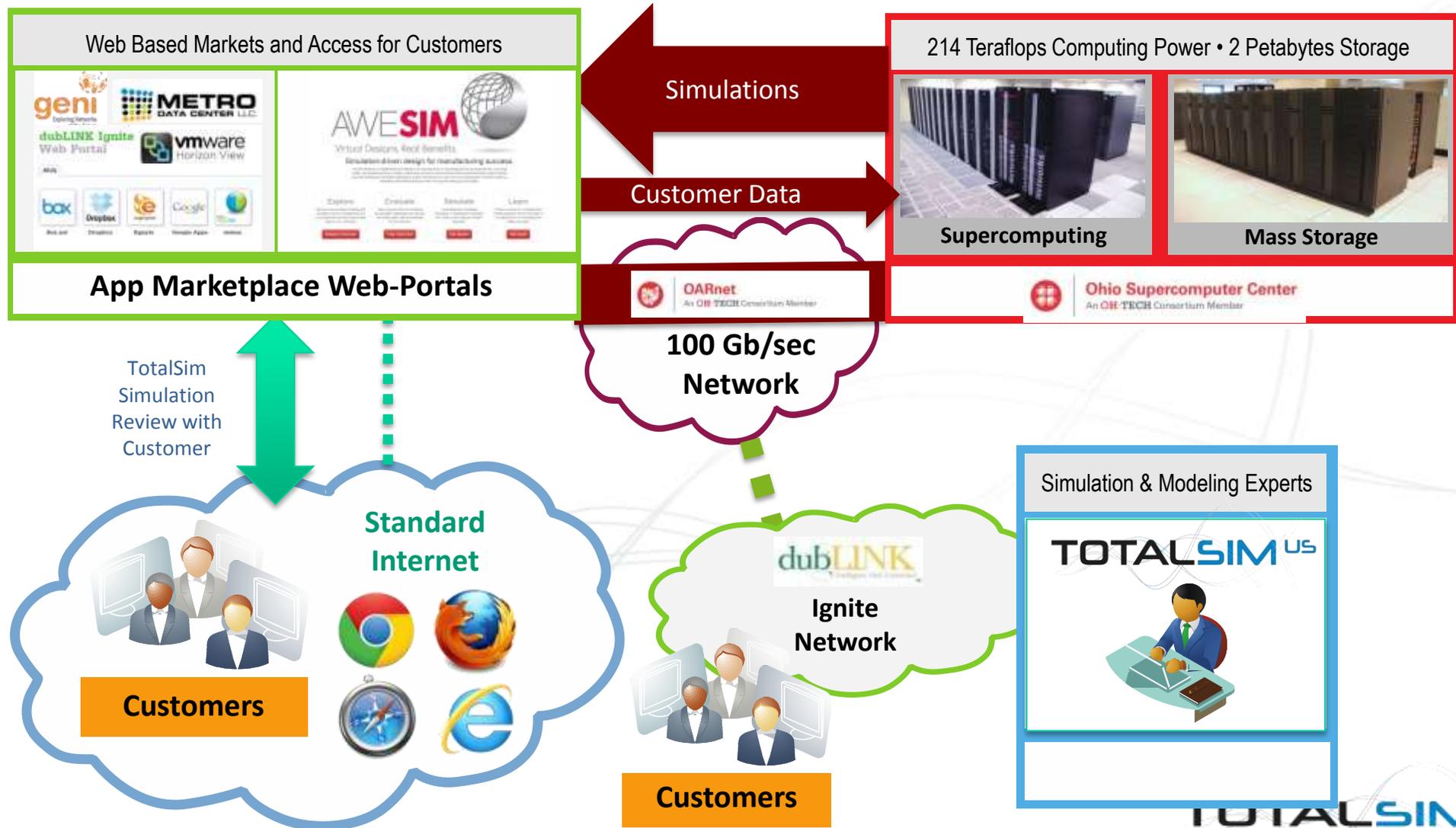


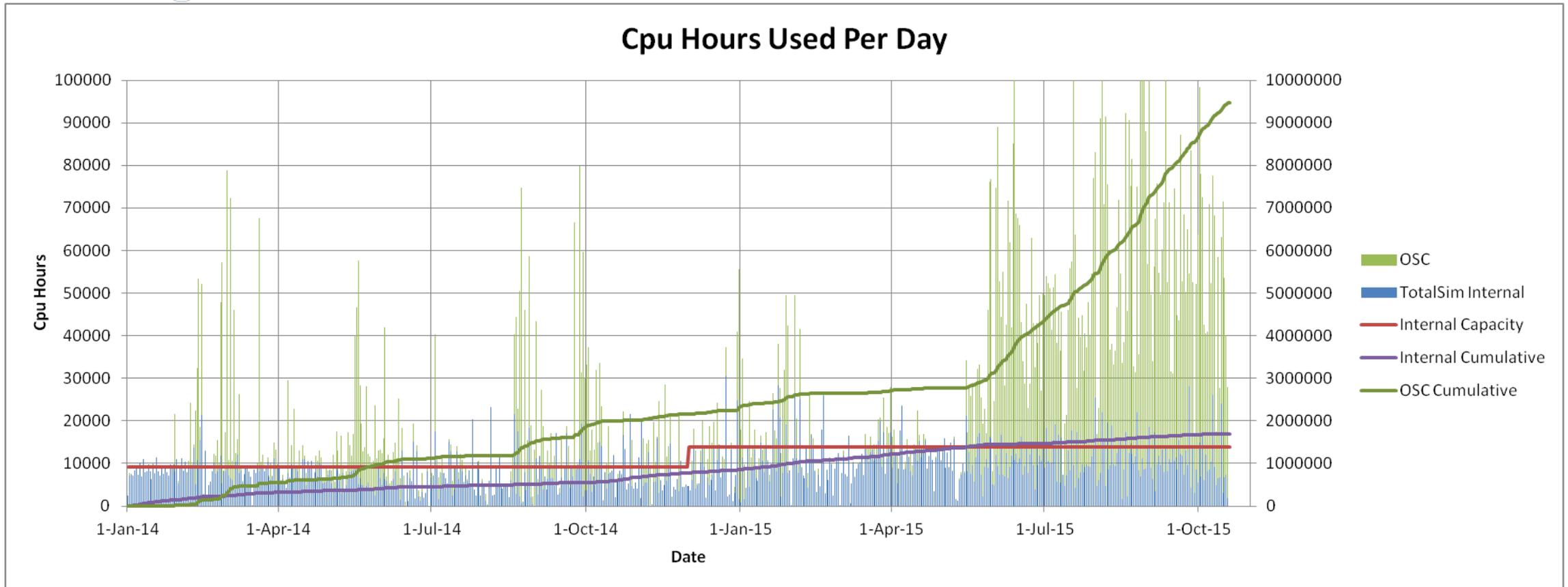
Ohio Supercomputer Center

An OH-TECH Consortium Member



TOTALSIM^{US} Typical Workflow





HPC Systems

- **1 CPU-HR = 1 “Core” used for 1 hour**
- 50,000 CPU-HRS /Day ~2000 cores active for 24hrs
- (typical lap to has 2 or 4 “cores”)

HPC Systems

- **TotalSim Internal = 576 cores**
- OSC Currenly ~15,000 cores will add 25,000 in 2016

- **Connections:**
 - **Physical:** network resources, etc.
 - **Human:** Business Network, Research, Bus Dev, Community
- **Scalability** of our business / Planning
- **Leading Edge**
- **Reliability**
- **Cost**

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