

# Society of Allied Weight Engineers

Aerospace • Marine • Offshore • Land Vehicle • Allied Industries

## 83<sup>rd</sup> International Conference

on

## Mass Properties Engineering



May 20-22, 2024

Virtual



## Program & Instruction Guide

Rev 5/20/2024



# RAPTOR SCIENTIFIC®

## GLOBAL PROVIDER OF TEST & MEASUREMENT SOLUTIONS

- Mass Properties Measurement Instruments & Services
  - Weight & Center of Gravity (CG)
  - Moment of Inertia (MOI)
  - Product of Inertia (POI)
  - Dynamic Balancing
  - Gimbal Balancing
  - Moment Weight Scales
  - Fixtures and Accessories
  - Gas Bearings
  - Space Simulators
- Igniter Circuit Testers
- Radar Cross Section Measurement Products
- Avionics Systems - Air Data Test Equipment



(860) 829 0001  
sales@raptor-scientific.com  
raptor-scientific.com



[Click Here](#) to connect with us on Tuesday May 21, 2024 @ 6:00-7:00AM PDT,  
or [Click Here](#) for Wednesday May 22, 2024 @ 11:10AM-12:10PM PDT



Looking for help with tough technical challenges?  
Maybe you need some career advice?

Try becoming a Mentee!

Check out our new Mentoring Program at  
<https://www.sawe.org/mentoring>



### Contents

President's Message .....	5
Keynote Speaker .....	6
Technical Sessions .....	8
Standards & Practices Day.....	9
Technical Forum .....	10
Day 1 Schedule .....	12
Day 2 Schedule .....	13
Day 3 Schedule .....	14
List of Papers and Presentations.....	16
List of Sponsors .....	17
Webinar Instructions .....	18
Training Courses .....	19





ENSURING THOSE WE  
SERVE ALWAYS STAY  
**AHEAD**  
OF  
**READY**

LOCKHEED MARTIN 

### WHO WE ARE

As a global defense tech company, we are driving innovation and advancing scientific discovery. Our all-domain mission solutions and 21st Century Security vision accelerate the delivery of transformative technologies to ensure those we serve always stay ahead of ready.

122K

Employees worldwide

65K

Engineers, scientists or  
technologists

20%

Employees who are  
veterans

345+

Facilities worldwide

Connect with us on Tuesday May 21, 2024 @ 6:00-7:00AM PDT: [Click Here to Join our Meeting](#)

### Join us for our SAWE Virtual Awards Ceremony!

Wednesday May 22, 2024 @ 10:40AM PDT

Honoring outstanding achievements in Mass Properties  
and Student Scholarship recipients.

<https://www.sawe.org/members/honors-awards/>





### SAWE President's Message



**Robert Hundl**

**SAWE International President**  
**Fluor Corporation**

On behalf of the Society of Allied Weight Engineers I want to welcome you to our 83<sup>rd</sup> Annual International Conference being held virtually for the 3<sup>rd</sup> time. Our conference planning committee has put together a great line up of topics and papers to help you:

- Learn about today's latest technologies, techniques, and programs
  - Participate in development and updates of mass properties industry standards
  - Experience problem solving in forum discussions
  - Meet vendor representatives and get acquainted with products essential to our jobs
- Talk informally with customers, competitors, and suppliers
  - Foster further development of the Certified Mass Properties Engineer program
  - Learn first-hand about the latest SAWE activities and programs

SAWE's technical sessions, standards and practices workshops, and forum discussions address the many needs of our community across the military aircraft, commercial aircraft, airline, space, marine, offshore, land vehicles, and allied industries represented by our society. The virtual conference is designed to enhance your knowledge and capabilities in a technical, comfortable, and fun atmosphere. Attendance at our conference will reward you with a valuable experience, renewing your understanding of mass properties and improving your abilities to generate top performance products in a safe, efficient manner. Holding this conference virtually allows us to reduce your costs (lower registration, no travel expenses, less time away from the office) allowing for greater participation from our mass properties communities from around the globe.

If you need guidance for discussing conference attendance with your sponsoring management, download [Tips to Help You Justify SAWE Attendance](#).



### Keynote Speaker

#### Innovation in High-Risk Environments: Lessons Learned from Leading Moon-shot Projects

*"It's human nature to stretch, to go, to see, to understand. Exploration is not a choice really, it's an imperative."*

- Michael Collins (Apollo 11 astronaut)

Meet John Saiz, the former Chief Technologist at NASA's Johnson Space Center, and learn about the challenges and uncertainty of "moon-shot" projects. Or, as many call these types of projects today - disruptive innovation, quantum leap, or radical innovation.

John's 25+ years at NASA spanned the Space Shuttle, International Space Station, and Orion Programs. As an Industrial Associate with the University of Cambridge Institute for Manufacturing, and a Principal and Innovation

Management Black Belt™ with the Innovation 360 Group, John collaborates with organizations to improve their innovation capabilities.

In this keynote address, John will share his insights and lessons learned dealing with the challenges of managing innovation in complex technological programs while also managing risk and uncertainty.



**John Saiz**

**Industrial Fellow**

**IfM Engage University of Cambridge**

[Click Here](#) to connect with John on Monday May 20, 2024 @ 11:20AM–12:20PM PDT to discuss:

*Assessing the Innovative Capabilities of your Organization / How Culture Affects Innovation in an Organization*





**Society of Allied Weight Engineers**

Aerospace • Marine • Offshore • Land Vehicle • Allied Industries

**83<sup>rd</sup> International Conference**



**HII**

**DELIVERING  
THE ADVANTAGE**



[Click Here](#) to Connect with us on Monday May 20, 2024 @ 11:20AM–12:20PM PDT.

Or, [Click Here](#) to Join us on Tuesday May 21, 2024 @ 6:00-7:00AM PDT.

INGALLS SHIPBUILDING | MISSION TECHNOLOGIES | NEWPORT NEWS SHIPBUILDING

## Mass Properties Textbooks Available!

**In-depth reference books for Aircraft Weight Engineering, Marine Vehicle Weight Engineering, Moments of Inertia and Products of Inertia of a Rigid Body, and our SAWE Weight Engineer's Handbook.**

For more info visit store at

<https://www.sawe.org/product-category/publications/textbooks>





### Technical Program Sessions



**Robert Zimmerman**  
**VP – Technical Director**  
**Society of Allied Weight Engineers**



**Amanda Cutright**  
**Deputy VP - Technical**  
**NASA**

The Society of Allied Weight Engineers has been promoting the exchange of technical information about Mass Properties Engineering since 1939. As we enter our 83rd year of holding International Conferences, the SAWE welcomes those engineers who have created new technical information to exchange, and those who will be learning about these technical advances. The SAWE brings mass properties professionals together from all around the world to partake in a meaningful interchange of ideas through two days of Technical Tracks on various aspects of mass properties.

This year's conference, which will be held virtually, is an opportunity for mass properties professionals to interact and share information that is vital to ensuring excellence in mass properties prediction, control and verification. Plan on attending the technical sessions with the attendant paper presentations and meet your colleagues from literally around the world.

The 2024 Conference technical sessions will include topics across the full spectrum of Mass Properties Engineering in two days of papers and presentations, plus our annual Technical Forum. This year's Forum will feature our audience participation investigation of **"Mass Properties Engineering in a Collaborative Environment."**

Plan to join us this year online!





### Standards and Practices Sessions



***Jorge Bes***  
***VP – Standards and Practices***  
***Airbus***

Welcome to this year's International Conference! We are happy you are joining us. We have made great progress over the past year and are excited about continuing our momentum.

During this year's Standards and Practices Day we will once again break into working groups associated with the following industries:

- Civil Aircraft
- Military Aircraft
- Marine
- Offshore
- Missiles and Space
- Land Vehicles

Take advantage of the opportunity to join one of these Industry Committee sessions. During the sessions, each team will review the activities performed during the last year, and will plan the ones for the next year, considering the industry's needs, and the team's proposals. No previous participation in the committees is required, so feel free to join us and contribute to make your industry better. You can make a difference by proposing new Standards & Recommended Practices in your industry or improving the existing ones!



### Technical Forum

### Collaboration and Mass Properties Engineering



**Jeffrey Cerro**  
**Moderator**  
**NASA (Retired)**



**Amanda Cutright**  
**Panelist**  
**NASA**



**Fred Brown**  
**Panelist**  
**HII**



**Melissa Cooley**  
**Panelist**  
**HII**



**Mark Beyer**  
**Panelist**  
**Beyer Flight  
Sciences**

The SAWE is proud to present our 13th Virtual Forum, a panel and audience participation venue to inform and debate important issues in mass properties engineering. This forum's topic is "Collaboration and Mass Properties Engineering".

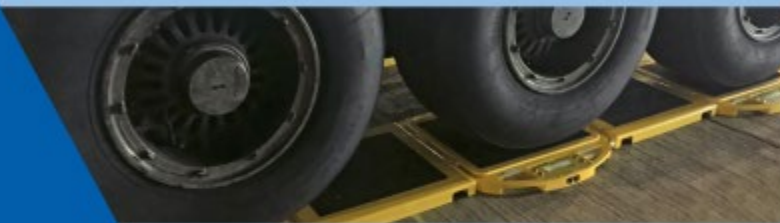
The SAWE began discussions on the impacts of collaboration tools and processes at the 2017 International Conference in Montreal. Since that time, the general aspects of engineering collaboration have evolved extensively and seen implementation. We seek to determine how far Mass Properties Engineers have come in this venture and explore where we see that emphasis needs to be placed in future activities. Collaboration historically implies person to person, group to group interchange. In our ever-encompassing digital world we now must focus on the needs for machine based interacting standards and procedures. What can we gain and what might we lose as this advancement unfolds? PDM/PLM/MBx/SysML/Digital Twins/Digital Thread/... are some of the numerous acronyms and words we must understand to work in this environment. What training, standards, and processes do SAWE members need to define and utilize in the general activities of collaborative engineering?

Join our esteemed panel for what promises to be a lively and informative forum!



# AIRCRAFT WEIGHING SYSTEMS

PLATFORM SCALES | JACK WEIGH KITS | MASS PROPERTIES TRAINING SERVICES



## ACCURATE. REPEATABLE. CERTIFIED.

Manufactured to the highest industry standards, our precision-built scales are certified intrinsically safe and offer unmatched stability and repeatability, giving you the ultimate confidence in your results *every time*.



intercompcompany.com  
+1 763-476-2531 Worldwide



[Click Here](#) to meet with us on Wednesday May 22 @ 11:10AM – 12:10PM PDT



## Become a Certified Mass Properties Engineer!

Sign up today to take the exam.

For more info visit us at

<https://www.sawe.org/certification>





### Day 1 Schedule Monday May 20, 2024 Technical Program

Time	Main Room	Track 2 Room
7:00 AM	Opening Session and Keynote	
8:10 AM	3807 - Why Measure? - Robert Cipolli - Raptor Scientific	3809 - Practical Limitations of Precision - Douglas Fisher - Collins Aerospace
8:40 AM	Presentation - Altair	Presentation - Intercomp
8:50 AM	3805 - Measuring Reaction Points during Aircraft Weighing using an Inexpensive Laser - Damian Yañez - Gulfstream Aerospace	3813 - PILGRIMAGE IN SHIP WEIGHING UNCERTAINTY How Air Can Bias the Deadweight of a Ship - Manuela Bucci - Tymor Marine
9:20 AM	Break	Break
9:30 AM	Presentation - Challenges of Mass Estimation in Hydrogen Aircraft Conceptual Design - Fabian Peter - Bauhaus Luftfahrt	Presentation - Combined approach to the application of topological optimization for design and weight reduction - Yuri Mirshavka - TGM Lightweight Solutions
10:00 AM	Presentation – B&A Software	Presentation – Raptor Scientific
10:10 AM	3808 - Implementing Effective Weight Management Strategies in Shipyards: A Practical Approach - Runar Assen - B&A Software	Presentation - The SAWE Career Initiative Updates - Dirk Petersen, Robert Zimmerman, Darren Gamble - SAWE
10:40 AM	Presentation – Lockheed Martin	Presentation – HII
10:50 AM	3812 - Empirical Model for Initial Weight Estimation of UAVs - Serder Avsar - Turkish Aerospace Industries	3796 - Why Belong to a Professional Society like SAWE? - William Boze - SAWE
11:20 AM	<a href="#">Click Here to Meet with HII</a>	<a href="#">Click Here to Meet with John Saiz</a>

**Note: Start times in PDT**



### Day 2 Schedule

### Tuesday May 21, 2024

### Standards & Practices Day

Time	Main Room	Breakout Rooms
6:00 AM	<a href="#">Click Here to Meet with HII</a> <a href="#">Click Here to Meet with Raptor Scientific</a>	<a href="#">Click Here to Meet with Lockheed Martin</a> <a href="#">Click Here to Meet with B&amp;A Software</a>
7:00 AM	Opening Remarks	
7:10 AM	MPE Certification Exam Questions Generation Workshop	Room 2 – Materials & Manufacturing Room 3 – Manufacturing & Data Sources Room 4 – Data Sources & Data Check Room 5 – Data Check & Materials
8:10 AM	Standards & Practices Plenary Session	
8:30 AM	Break	Break
8:40 AM	Military Aircraft Industry Committee	Room 2 – Civil Aircraft Industry Committee Room 3 – Marine Industry Committee Room 4 – Offshore Industry Committee* Room 5 – Ground Vehicles Industry Committee Room 6 – Missiles & Space Industry Committee
9:50 AM	Break	Break
10:10 AM	Military Aircraft Industry Committee	Room 2 – Civil Aircraft Industry Committee Room 3 – Marine Industry Committee Room 4 – Offshore Industry Committee* Room 5 – Ground Vehicles Industry Committee Room 6 – Missiles & Space Industry Committee
11:20 AM	Closing Remarks	
11:30 AM	Networking Hour	

\*Click here for a [Special link for the Offshore Committee](#)

**Note: Start times in PDT**



### Day 3 Schedule

### Wednesday May 22, 2024

### Technical Program & Awards

Time	Main Room	Track 2 Room
7:00 AM	SAWE TECHNICAL FORUM Mass Properties Engineering in a Collaborative Environment - Jeff Cerro, Moderator – NASA Retired	
8:10 AM	3799 - A Quick Start Guide to Using Excel VBA - Robert Hundl - Fluor	3802 - Aircraft Mass Growth & Reduction Factors - Dieter Scholz -Hamburg University of Applied Science
8:40 AM	Presentation - Boeing	Break
8:50 AM	3806 - SAWE Handbook Section 2.2 Solid Properties Excel Formulae - Robert Zimmerman - Lockheed Martin Retired	3801 - Wing Design with regard to Mass and Drag - Dieter Scholz - Hamburg University of Applied Science
9:20 AM	3811 - Parametric Weight Substantiation and Uncertainty Quantification for Aircraft Design - Andrew Walker - Lockheed Martin Aeronautics	3803 - Mass Estimation of Folding Wings - Dieter Scholz - Hamburg University of Applied Science
9:50 AM	Presentation - Efficient weight management of modular rail vehicles through WDT software integration - Florian Gabel - TGM Lightweight Solutions	3804 - Methods for the Operating Mass Empty Estimation in the Aircraft Design - Dieter Scholz -Hamburg University of Applied Science
10:20 AM	Break	
10:30 AM	Presentation – Farside Development	
10:40 AM	SAWE Awards Ceremony	
11:10 AM	<a href="#">Click Here to Meet with Intercomp</a> <a href="#">Click Here to Meet with Raptor Scientific</a>	<a href="#">Click Here to Meet with B&amp;A Software</a>

**Note: Start times in PDT**





## **ALTAIR® WEIGHT ANALYTICS™**

### MASTERING WEIGHT & BALANCE ACROSS AIR, LAND, AND SEA

Discover the power of data-driven, streamlined W&B management from start-to-finish, on-demand analytics, and a centralized role-based system that fosters collaboration and innovation. Experience faster, more accurate decision-making and develop cost-effective products like never before.

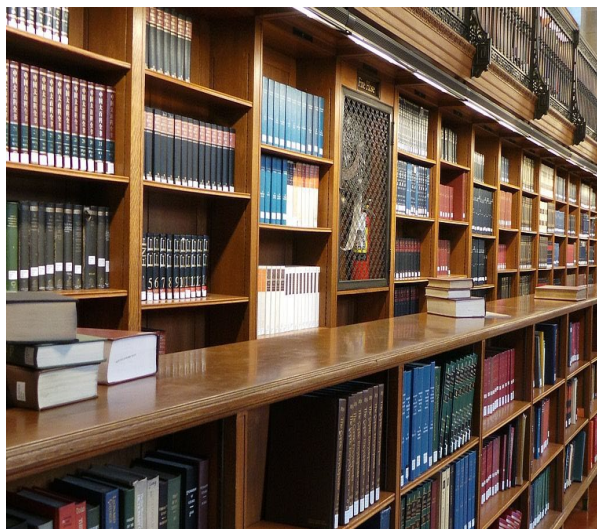


Need help meeting your product's W&B requirements?  
Learn more at [altair.com/altair-weight-analytics](https://altair.com/altair-weight-analytics)



© Altair Engineering Inc. All Rights Reserved. / [altair.com](https://altair.com) / Nasdaq: ALTR

   #ONLYFORWARD



**Looking to see if others have solved similar challenges to yours?**

Search our extensive Technical Library at  
<https://www.sawe.org/resources/library-resources/sawe-technical-papers/>

**Over 3500 papers available to search and purchase for download.**

**Members get a \$200 credit per year for purchases!**



### List of Papers and Presentations

Paper No.	Title	Author(s)	Day/Time
3796	Why Belong to a Professional Society like SAWE	William Boze	Mon 10:50 AM
3799	A Quick Start Guide to Using Excel VBA	Robert Hundl	Wed 8:10 AM
3801	Wing Design with regard to Mass and Drag	Dieter Scholz, Dr. Ing.	Wed 8:50 AM
3802	Aircraft Mass Growth & Reduction Factors	Dieter Scholz, Dr. Ing.	Wed 8:10 AM
3803	Mass Estimation of Folding Wings	Dieter Scholz, Dr. Ing.	Wed 9:20 AM
3804	Methods for Operating Empty Mass Estimation in the Aircraft Design	Dieter Scholz, Dr. Ing.	Wed 9:50 AM
3805	Measuring Reaction Points during Aircraft Weighing using an Inexpensive Laser	Damian Yañez	Mon 8:50 AM
3806	SAWE Handbook Section 2.2 Solid Properties Excel Formulae	Robert Zimmerman	Wed 8:50 AM
3807	Why Measure?	Robert Cipoli	Mon 8:10 AM
3808	Implementing Effective Weight Management Strategies in Shipyards: A Practical Approach	Runar Aasen	Mon 10:10 AM
3809	Practical Limits of Precision	Doug Fisher	Mon 8:10 AM
3811	Parametric Weight Substantiation and Uncertainty Quantification for Aircraft Design	Andrew Walker	Wed 9:20 AM
3812	Empirical Model for Initial Weight Estimation of UAVs	Serdar Avsar	Mon 10:50 AM
3813	PILGRIMAGE IN SHIP WEIGHING UNCERTAINTY How Air Can Bias the Deadweight of a Ship	Manuela Bucci	Mon 8:50 AM
Pres.	Challenges of Mass Estimation in Hydrogen Aircraft Conceptual Design	Fabian Peter	Mon 9:30 AM
Pres.	Combined approach to the application of topological optimization for design and weight reduction	Yuri Mirshavka	Mon 9:30 AM
Pres.	Efficient weight management of modular rail vehicles through WDT software integration	Florian Gabel	Wed 9:50 AM
Pres.	SAWE Career Initiative Update	Dirk Petersen, Robert Zimmerman, Dan Rowley	Mon 10:10 AM
Pres.	SAWE Certification Workshop	Dirk Petersen	Tue 7:10 AM

**Note: Start times in PDT**



## List of Sponsors

### Silver Corporate Partners



**ALTAIR**



### Platinum Conference Sponsors



**The SAWE appreciates the continued support of our Corporate Partners  
and Conference Sponsors. Thank You!**





### Webinar Instructions

Thank you for joining us! Here are some instructions to help you navigate the conference webinar. If you have any questions, feel free to reach out to our Senior Vice President, Chris Wandell at [seniorvp@sawe.org](mailto:seniorvp@sawe.org).

1. Use the link that you received in your follow-up email after registration to access the Microsoft Teams Webinar. A separate MS Team Webinar registration is required.
2. Ensure that your microphone is muted (this is the default).
3. Once you have joined the meeting, you will be placed in the Lobby until the webinar host allows you in.
4. We ask that you use the “Raise Hand” or Chat options if you have a question during any of the presentations.
5. Following each presentation the host will open the floor for you to use your microphone to ask questions.
6. On Days 1 and 2 for the Technical sessions, when in the Main Room you will see a “Join Room” button at the top of the screen. Use it to jump over to the Track 2 Room. A “Return” button will allow you to jump back to the Main Room. Feel free to go back and forth as you desire.
7. On Day 2 for the Standards and Practices industry break-out sessions, you will be assigned to a room based upon the preferences you selected when you registered. If you wish to change rooms, send an email to the address listed below, and we will accommodate the switch as soon as possible.

For some general tips on webinar presentations and attendance visit: <https://www.sawe.org/events/conferences/international2024/#virtual-presentation-guidelines>.

Papers and presentations may be downloaded here: [Conference Proceedings](#)

We hope you enjoy your time with us, and we look forward to seeing you online!

**For Conference Support email us at:** [conferencesupport@sawe.org](mailto:conferencesupport@sawe.org)



### Training Courses

Following our conference this year, SAWE is proud to once again offer the opportunity for individuals to further develop their skills and enroll in some of our most popular training courses. These courses are all developed and delivered by specialists in the field of Mass Properties. Like the International Conference itself the courses are also offered in a 'virtual' format.

Classes are in 4-hour sessions per day using Microsoft Teams.

Dates and further information can be found below.



### Virtual Training Events June & July 2024

Class Name	Instructor	Cost	Dates
Developing Basic Parametric Methods	Andy Walker	\$600	June 3-4, 2024 (Mon & Tue) 10:00am – 2:00pm EDT
Structural Weight Optimization for Mass Properties Engineers	Raj Bishnoi	\$650	June 10-11, 2024 (Mon & Tue) 10:00am – 2:00pm EDT
Advanced Mass Properties Measurement	Robert Cipolli	\$600	June 10-11, 2024 (Mon & Tue) 10:00am – 2:00pm EDT
Designing the Aircraft of the Future	Andy Walker	\$1200	June 12-15, 2024 (Wed thru Sat) 10:00am – 2:00pm EDT
Marine Vehicle Weight Estimating Methodology	Davey Hansch	\$600	June 14-15, 2024 (Fri & Sat) 10:00am – 2:00pm EDT
Vendor Weight Control	Whidy Kiskunas	\$600	July 8-9, 2024 (Mon & Tue) 10:00am – 2:00pm EDT

Further information on the courses above, including more detailed course descriptions and booking information can be found at :

<https://www.sawe.org/events/training-events/>

For more information, or if you have any other queries on any of the training classes, we offer please email [sawetraining@sawe.org](mailto:sawetraining@sawe.org)

