E-NEWSLETTER

June 2022 issue

THE SOCIETY OF ACOUSTICS SINGAPORE

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Year of Registration: 1989

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ACOUSTICS NEWS

I.CONFERENCE NEWS

. The 28^{7h} International Congress on Sound and Vibration(ICSV28) will be held in Singapore from 24 to 28 July 2022 and will be a hybrid conference.

Woon Siong Gan will be organising three structured sessions on:

1. Nonlinear acoustics and vibration
2. Acoustic metamaterials & phononic crystals: fundamentals and applications

3. Sound propagation in curvilinear spacetime Please visit www.icsv28.org for more informations.

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II.ANNONCEMENTS

The Society of Acoustics(Singapore) will be sending out invoices to members with outstanding membership subscriptions. Members are encouraged to make payment in support of the Society.

The E-Newsletters will be made available to industrial contacts in an effort to promote the activities of the Society.

The Society is also exploring the possibility of organising zoom seminars/workshops and other professional events in collaboration with acoustic societies of the ASEAN countries.

Membership Certificates will soon be made available to all members who had made full payments of membership dues

The Society aims to increase membership by inviting all persons, including those from the institution of higher learning and other related societies such as the Institute of Architects, Singapore and the members of the mechanical engineering division of the Institution of Engineers, Singapore who are qualified in the various field of Acoustics to join our Society.

We are especially keen to invite students to join our society and we are establishing the Youth Chapter soon.

III.INTERNATIONAL ACOUSTICS NEWS

Please find below the ICA March 2022 Newsletter

NEWSLETTER

MARCH 2022

Message from the President

Dear Colleagues,

As 2021 came to an end there were signs that the severity of the pandemic was gradually on the decline, resulting in a resurgence of in-person scientific conferences and exchanges that have been moving us toward an eventual return to normality. Then in February 2022 began another catastrophic situation that impacts global interaction among scientists, a consequence of the Russian military invading Ukraine. Standing in solidarity with other organizations in the international community of scientists, at the beginning of March the ICA issued a statement of its own in response to this crisis, which is posted on the ICA website and repeated here:

ICA Statement on the Russian-Ukrainian Crisis

The ICA wishes to express its deep concern over the crisis in Russian-

Ukrainian relations and the subsequent military operations.

We believe in the solidarity of the people and their cooperation as the only

means of achieving global prosperity, which will enable the human communities to face their problems and chart a better future. Every issue that arises between communities must be resolved peacefully through mutual understanding and by resolving any differences that lead to it. The use of weapons that disrupt world peace and result in the loss of lives is beyond logic. Scientists are at the forefront of the struggle for global cooperation and the advancement of science for the benefit of society. Science and scientists have no borders. The joint effort to produce solutions to the problems that arise, with the recent example of the fight against Covid-19, requires all scientific forces to work together without exclusions and conflicts. Scientific bodies have a duty to uphold in every direction the principle that the freedom of research relies on the peaceful coexistence of nations and their scientists. In this context, we express our support for the people who are being tested and the scientists involved in this conflict, calling for an immediate peaceful solution. We want to hope that the rulers will wish to, even at the last minute, obey the voice of logic and bring to an immediate end the nightmare of war.

International News in Acoustics

Most notable among ICA initiatives over the past year was the International Year of Sound 2020-2021, originally scheduled for 2020 but extended for a second year due to the pandemic. IYS concluded at the end of 2021. Despite the challenges posed by the pandemic, Michael Taroudakis and Marion Burgess, co-organizers of IYS, note below that nearly 200 events related to IYS were held in over 30 countries, with widespread coverage via articles, interviews, and podcasts. Particularly noteworthy was the student competition called My World of Sounds,

involving over 700 contributions from primary, middle, and secondary school students around the world. The competition was

coordinated by Sergio Luzzi and described in his piece below, which includes the listing of awards and special mentions in the categories of drawings and stanzas.

The 2022 International Congress on Acoustics will be held in Gyeongju, Korea during October 24-28. Final preparations for this event are discussed below by the General Chair, Jeong-Guon Ih. Six plenary lecturers are listed on the Congress website, one of whom is Julien Bonnel at Woods Hole Oceanographic Institution.

The purpose of the ICA is to promote international development and collaboration in all fields of acoustics including research,development, education, and standardisation.

President

Mark Hamilton

Vice President

Jeong-Guon Ih

Past President

Michael Taroudakis

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Affiliated Organization of

This newsletter is available on the ICA website

under the menu item “Letter from the President”

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Institution (USA), recipient of the 2022 ICA Early Career Award.

We have high hopes for a strong representation by in-person attendees at the 2022 ICA. International specialty symposia in acoustics to be held in 2022 that were approved for financial support from ICA are listed below by Antonino Di Bella.

Other international news covered in the remainder of this newsletter includes ICA's initiative to become a Full Member of the International Science Council (ICA is currently an Affiliated Member), events in 2022 celebrated by the International Union of Pure and Applied Physics (IUPAP, of which ICA is an Affiliated Commission), and World Hearing Day sponsored by the World Health Organization (WHO).

ICA Board Meeting

The ICA Board meets once per year and conducts business between meetings via email and online meetings. For the second year in a row, due to the pandemic, both the Board Meeting and the General Assembly of the ICA were held online. A screenshot of the participants in the two days of online meeting, held in July 2021, is shown on the left. The key decisions made during the Board.

Meeting were reported to the members of the General Assembly via an online consultation. The 2022 Board Meeting and General Assembly are scheduled in attendance at the 2022 Congress in Gyeongju, Korea. Naturally, both the evolution of the pandemic situation and the international crises are kept under observation and all opinions have been evaluated in order to allow everyone the wides participation. The meetings this year are particularly important as the voting forthe renewal of the Board will take place. Solutions are being studied to allow

elections with hybrid voting methods, if necessary.According to the 2019 revised Statutes, the 2021 ICA General Assembly was held by email in

December for the management of ordinary administrativeprocedures and current business. The current financial balance of the ICA was approved by the General Assembly. All other business will be carried out by the ICA Board as it has in the past, with email communication to the Member Societies when appropriate. The minutes of both the ICA Board Meeting and the ICA General Assembly can be found on the ICA website under the menu item “Governance”.

Mark Hamilton

ICA President

International Year of Sound 2020-2021

The International Year of Sound 2020-2021 has come to its end and it is now time to review and consolidate what has been achieved over this two year period. The activities and resources that have been compiled on the website truly reflect the support and enthusiasm from the member societies and other organisations to embrace the concept and in their own way endeavor to promote the importance of sound in our world. The achievements of the IYS will be summarized during special sessions at the International Congress on Acoustics to be held in South Korea, October 24-28, 2022 (ica2022korea.org).

The new IYS2020+ logo.

A screenshot of the 2021 ICA Board Meeting, held online in July.

It is our hope that this will be the last Board Meeting online, and that the next "group photo"will be, in attendance, in Gyeongju.

The website has been pivotal to the success of the IYS. The number of visits to the site reached a high of 8,880 for March 2020 and has continued between 4,000 and 6,000 visits per month for both 2020 and 2021. The central actions by the ICA involved the opening at the Sorbonne University in January 2020, the production of the film which is available in short and long version and the international student competition. This student competition received over 650 entries for the primary school level and approaching 100 stanzas and videos for the high school level. There will be various closing events around the world with the final closing during the ICA congress in Korea. The structure of the IYS relied on the local societies to organize activities. Themajority of those were planned to occur soon after the opening in February 2020and unfortunately had to be cancelled or postponed while developing alternative ways to hold the event. As the year unfolded and we all began to realize that we could continue to promote the message using modern technology, andmany novel and innovate activities were added to the program. Close to 200 events have been held in 31 countries.In the resources category there are almost 100 on-line and special projects that have been made available via the website. Also, the topic has been featured in many publications both within the scientific community (e.g. Acoustics Today) and the general media (i.e. newspapers and magazines).The co-organizershave also participated in a number of media interviews and podcasts. While it has led to challenges, the pandemic of 2020-21 has provided a unique experience for everyone around the world to become personally aware of the importance of sound, in both the desired form and also in the undesired form ofnoise, in so many aspects of our life. After the closing of the International Year, the continue actions by the acoustic community will aim to ensure the achievements of the IYS in promoting the importance of sound in our world is not forgotten.

Marion Burgess, Michael Taroudakis,

Co-convenors IYS 2020-2021

Student Competition "My World of Sounds"

The IYS Steering Committee has processed the votes received from both the Expert Jury and the Popular (Web) Jury and we are happy to announce that awards and special mentions have been assigned to the winners of the International Year of Sound 2020-2021 Student Competition! We received contributions from 16 nations all around the world. More than 650 items had been sent to national representatives for the first category of the competition (drawings - primary school) and more than 50 items for the second category (stanzas - middle and secondary schools).39 drawings and 33 stanzas were selected as finalists. Moreover, 23 additional contributions, in terms of video and audio tracks, were submitted. For the final assessment in the competition, entries for both categories were received from 16 countries: Argentina, Chile Croatia, Egypt, Greece, Hong Kong, Hungary, Italy, Portugal, Russia, Serbia, Slovenia, Spain, Thailand,Turkey and USA. There has been wide participation from the popular jury as well (4833 likes forcategory I and 517 likes for category II).

My World of Sounds.

The excellent standard and creativity of the entries made the final selection very challenging for the jury. A video to showcase many of the entries will be soon available and this will be an ongoing record of the outstanding innovative and creative ideas from students around the

world on "My World of Sounds".We congratulate all the winners for the achieved result!

WINNERS

Category I - DRAWINGS (Primary Schools)

Turkey (Istanbul) Neslÿ Ergün - School: Çekmeköy Final Middle School

Chile (Melipilla) - Laura Isabel Paredes Catalan - School: Colegio Melipilla

Hong Kong (Tung Chung) - Cheung Han Ching - School: Ching Chung

Hau Po Woom

Category II - STANZAS (Middle and Secondary Schools)

Italy (Florence) - class 3°E - School: IC “Puccini” Spain (Besalù) - Roger Cortés, Laia Cuesta, and Coral Coll - School: Institut Escola Salvador Vilarrasa Spain (Valladolid) - Leader Alba Sánchez Domínguez - Class 3rd

D/E.S.O. - School: I.E.S. La Merced

SPECIAL MENTIONS

Category I - DRAWINGS (Primary Schools)

Croatia - Lotrščak Primary School

Category II - STANZAS (Middle and Secondary Schools)

Egypt - School: EBIS (Egypt British International School)

Greece - School: 5° Senior High School - 1° Technical School of Corfù Italy - School: IC Puccini Italy - School: Istituto Salesiano dell’Immacolata

Portugal - School: Manteigas Russia - School: School 46

Serbia - School: British International School Spain - School: Cisneros

Thailand - School: The demonstration school of Ramkhamhaeng University - DS.RU. Acapella Thailand - School: Bangkok Christian College - The 1852 Thailand - School: Horwang School - SupawitUSA - School: home school

More information on the outcome of the competition, the drawings and the complete texts of the winners' stanzas are available on the web page:

https://sound2020.org/society/student-competition/

This Student Competition is being sponsored by the HEAD-Genuit Foundation.

Sergio Luzzi

IYS 2020-2021 Students competition coordinator

1st Place

Turkey (Istanbul): Neslÿ Ergün

School: Çekmeköy Final Middle School

2nd Place

Chile (Melipilla): Laura Isabel Paredes Catalan

School: Colegio Melipilla

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3rd Place

Hong Kong (Tung Chung): Cheung Han Ching School: Ching Chung Hau Po Woom

Symposium Sponsorship

The ICA allocates up to EUR 5,000 annually for sponsorship of specialty

symposia in acoustics. In conjunction with the Acoustical Society of America (ASA), the ICA accepts applications for allocation of up to USD 2,000 for specialty symposia that comply with the conditions for the special ASA support. There were four application for 2022 funding from the ICA/ASA Specialty Symposia sponsorship program. For this year, none of the applications met the requirements of the ASA Committee on International Research and Education (CIRE), so all symposia will be financially supported by the ICA This application was evaluated by a committee composed of the ICA Executive Committee and the funding allocations were approved by the ICA Board.

The symposia receiving funding are:

• 4 th Vienna Talk on Music Acoustics (Austria)

• 2nd International Symposium on Fluid Acoustics (Poland)

• New Sounds 2022 - 10th International Conference on Second

Language Speech (Spain)

• ICUA2022 International Conference on Underwater Acoustics (UK)

Antonino Di Bella

ICA Secretary General

ICA Early Career Award in 2022

On Feb. 15, 2022, Dr. Julien Bonnel at the Woods Hole Oceanographic Institution, USA, is the recipient of the Early Career Award in 2022. There were ten nominations this year, and seven committee members participated in the evaluation. The ICA presents the ICA Early Caree Award triennially in pace with the ICA Congress, held in Korea this year. It is given to an individual who is relatively early in his/her professional career (about 10-15 years of active career), who has contributed substantially, through published papers, to the advancement of theoretical or applied acoustics or both and who has been active in the affairs of Acoustics through his/her National Society, other National Society(ies), Regional or International organizations. In the evaluation, the conflict of interest rule was practiced for fairness, so an evaluator having a close relationship with a nominee could not give any mark to that nominee.

Dr. Julien Bonnel received a Ph.D. degree in signal processing from Grenoble Institut National Polytechnique, Grenoble, France, in 2010. From 2010 to 2017, he was an Assistant/Associate Professor with Laboratoire des Sciences et technologies de l'Information, de la Communication et de la Connaissance (Lab-STICC, UMR CNRS 6285), Ecole Nationale Superieure de Techniques Avancees de Bretagne, ENSTA Bretagne, Brest, France. Since September 2017, he has been an Associate Scientist with Woods Hole Oceanographic Institution, Woods Hole, MA,

USA, where he became tenured in September 2020. His research interests in signal processing and ocean acoustics include time-frequency analysis, source detection/localization, geoacoustic inversion, acoustical tomography, passive acoustic monitoring, bioacoustics and theimpact of noise pollution on marine life. Dr. Bonnel is a Fellow of the Acoustical Society of America (ASA) and an Associate Editor for the Journal of the

Acoustical Society of America. He received the 2019 A.B. Wood Medal from the Institute of Acoustics (UK) and the 2020 R. Bruce Lindsay Award from the ASA(USA).

Jeong-Guon Ih

ICA Vice President

ICA 2022 Gyeongju, Korea

The 24th International Congress Acoustics, ICA 2022 (www.ica2022korea.org), will be held in Gyeongju from October 24 to 28, 2022. Gyeongjuis a city located in the southeastern part of the Korean Peninsula,which had been the capital of the Silla Dynasty for a thousand years during AD 1-9c. For more info see http://www.gyeongju.go.kr/open_content/eng/index.do.

The venue of ICA2022, Gyeongju Hwabaek Convention Center (HICO,

http://www.crowncity.kr/hico/en/main/main.do) was built specifically for

international meetings and conventions. During ICA 2022, all participants will have exclusive use of all HICO facilities to themselves.

The Acoustical Society of Korea (ASK, http://en.ask.or.kr/) is ready and eager to host ICA 2022, which will be the first ICA congress in Korea. Over

the years,ASK has contributed to the development of acoustic education and research,and the economy in Korea, by emphasizing the importance of sound in various industrial fields. It also has participated actively in the ICA, and has hosted international conferences like Inter-Noise 2003 and ICSLP 2004. ASK will be honoured to help promote the global advancement of acoustics by hosting a successful ICA 2022.

The participant will be able to enjoy a unique Korean culture as well as ICA2022. Koreans have a well-known love of music, from K-pop to Western classical music to reinterpretations of traditional Korean music. It follows then that Koreans are highly sensitive to the quality of sound, not only in musical instruments but also in everyday products and environment. As the cradle of the country's religion, philosophy, arts and of course, music, Gyeongju can offer visitors an insight into the development of acoustics in Korea. Furthermore, the entire city is an open-air museum full of ancient constructions and relics, including four UNESCO World Heritage Sites: Bulguksa Temple, Seokguram Grotto, Yangdong Traditional Village, and the Gyeongju Historic Areas. In short, the unique and authentic glimpse of Gyeongju City into Korean culture makes it the ideal backdrop for ICA 2022. For the preparation of ICA2022, the organizing committee is now active: Prof. Jeong-Guon Ih (Mechanical Eng.) is the General Chair, Profs. Chan-Hoon Hann (Architectural Eng.) and Han-Seok Ko (Communication Eng.) are the Co-Technical Chairs, and Prof. Sung-Hwan Shin (Automotive Eng.) is the Secretary General.

Jeong-Guon Ih

General Chair of ICA 2022

New ICA website

The new web portal of the International Commission for Acoustics website has been online since 1st March. The new version of the ICA website retains most of the information previously published but adds new content and improves the management of the calendar of meetings, congresses and international events. The new web portal has been designed to be the reference and coordination point for all ICA members and a primary information point for all those interested in the various aspects of acoustics. Numerous functions and activities will be integrated into the new portal, which will be the main link for all the National Societies and International Affiliates thatmake up ICA.Further content will be added in the coming months and our intent is to make these pages a "living document" in which to also host contributions from National Societies which may be of interest to all ICA members.

Antonino Di Bella

ICA Secretary General

ICA-ISC relationship

The International Science Council (ISC) (https://council.science/) was created in 2018 as the result of a merger between the International Council for Science(ICSU) and the International Social Science Council (ISSC). The headquarters became automatically Affiliated Member of the new ISC. The ISC is a non-governmental organization with a unique global membership that brings together 40 international scientific Unions and Associations and over140 national and regional scientific organizations including Academies and Research Councils. It is the only international

non-governmental organization bringing together the natural and social sciences and the largest global science organization of its type. Following the creation of the ISC, some internal discussions started among the ICA Executive Board members on the feasibility of the ICA to become Full

Members of the ISC.

Category 1 (Full Member) of ISC is defined as: Scientific unions, associations and similar bodies, being international scientific organizations devoted to the practice and promotion of specific scientific disciplines or areas. For the purposes of the ISC Statutes, an international scientific organization is an institution that draws membership from several countries within a region or from countries across at least two regions, and whose members are held together by a formal agreement, constitution or similar instrument. It is obvious that ICA is fully eligible to become full member of the ISC. As a result of further extensive discussions among the Executive Board members as well as between ISC officers and ICA President Mark Hamilton, Past President Michael Taroudakis and Secretary General Antonino Di Bella, a proposal for the ICA to become Full member of the ISC was presented during the meeting of the ICA Board that was held through zoom on July 2021, in accordance with the procedure described in Article 12 of the ICA Internal Regulations. The reasoning for becoming Full Member of the ISC can be summarized in the following two arguments:

1) Being a full member, we will automatically promote Acoustics as an important area of science which may have an interdisciplinary character, but it is a stand-alone discipline which has a prominent role in science for several reasons, including of course the importance of sound (our primary subject of research) for the quality of our environment and the health of the people, but also for the culture and education of the society.

2) Being full members, we will have the right to vote on all matters related to the ISC and to support nominations of acousticians for the various administrative positions of the ISC. This way we will follow closely all the activities of the ISC. Note that as Affiliated Member, we still have the right to appoint candidates for the various positions in the ISC administrative structure, but we cannot support them by voting. The ICA Board unanimously approved the proposal. We are now at the stage of preparing all the necessary documents to present our application to the ISC board. If our application is approved, the ICA will be the first International Commission to become full member of the ISC.

Mark Hamilton

ICA President

Michael Taroudakis

ICA Past President

Antonino Di Bella

ICA Secretary General

News from IUPAP

ICA is an affiliated commission of the International Union of Pure an Applied Physics (IUPAP). The relationship between ICA and IUPAP is kept at a very good level and there is a continuous interaction between the two organizations. IUPAP is now a based in Switzerland (moved from Singapore) and is registered as a non-profit organization under the Swiss law. Headquarters are in Genève and there is a good level of support from CERN. IUPAP activities foreseen for 2022 are focused on two important celebrations:

The International Year of Basic Sciences for Sustainable Development

(IYBSSD) and the Centenary of the IUPAP. 2022 will mark the beginning of the celebration of the IYBSSD, which was approved last December by the General Assembly of the United Nations (UN) as an official International Year supported by UN and UNESCO. The opening will be held at UNESCO on July 2022 and the closing will be held in Genève in 2023. Thus, the IYBSSD will be a two years celebration following our model for the IYS 2020+. ICA has offered to transfer experience from the organization of the IYS and Marion Burgess and Michael Taroudakis are already in contact with Luc Allemand who represents the IYBSSD organizing committee, discussing various aspects of the organization.

The Centenary celebrations will include a symposium to be held in Trieste

13 July 2022. If the situation permits it, the symposium will be held with face-to-face participation and will be associated with the IUPAP administrative meetings and the IUPAP General Assembly. Much effort has been applied to the organization of this symposium and its satellite events the main aim of which will be to illustrate the importance of Physics in modern life. The IUPAP Commissions and Affiliated Commissions will be invited to contribute to thecelebration. President Mark Hamilton and Past President Michael Taroudakis participate

regularly in all administrative meetings of the IUPAP. In addition, ICA presents an annual report on our activities which is included in the annual report of the IUPAP. This way we have the opportunity to promote ICA through the wide community of Physicists. An important aspect of IUPAP-ICA relationship is the possibility of financial support by IUPAP of Congresses organized by ICA or our International Affiliates. Following the support of the ICA Congress held in Aachen, IUPAP has approved our proposal to support the ICA 2022 Congress in Korea so it will become an

official sponsor of the Conference. It should be noted that IUPAP approved the proposal to support the ASA-AAD-WESPAC Conference

originally scheduled for 6-10 December 2021. This Conference was however rescheduled for 2023 due to Covid-19, which means that a new proposal for its support will be submitted to IUPAP.

Mark Hamilton

ICA President

Michael Taroudakis

ICA Past President

World Hearing Day 2022

On World Hearing Day 2022, WHO focused on the importance of safe listening as a means of maintaining good hearing across the life course. In 2021, WHO launched the World report on hearing that highlighted the increasing number of people living with and at risk of hearing loss. It highlighted noise control as one of the seven key H.E.A.R.I.N.G. interventions and stressed the importance of mitigating exposure to loud sounds.The theme of the World Hearing Day 2022 was

To hear for life, listen with care!

• It is possible to have good hearing throughout the course of life via ear

and hearing care.Many common causes of hearing loss can be prevented, including hearing loss caused by exposure to loud sounds.

• ‘Safe listening’ can mitigate the risk of hearing loss associated with

recreational sound exposure. WHO calls upon governments, industry partners and civil society to raise awareness for and implement evidence-based standards that promote safe listening.

World Hearing Day 2022 was held on March 3rd

More information on the registered events is available on the web page:

https://www.who.int/campaigns/world-hearing-day/2022.

In the same webpage, it is possible to download the “Media brief on

#safelistening”, a document that provides clearly communicated key details on hearing loss, unsafe listening practices, and how to listen safely. It also contains useful information for communicating about safe listening and the work of WHO, including digital media tools and story ideas for journalists.

International Noise Awareness Day

International Noise Awareness Day is a global campaign, founded in 1996 by the Center for Hearing and Communication (CHC), aiming to raise awareness of the effects of noise on the welfare and health of people. Noise affects people in many ways, but only deafness and annoyance receive actual interest from the general public. Worldwide, people are called upon to take part via various actions on this occasion: open days on hearing from acousticians, lectures in public health departments,universities and schools, panels of experts, noise level measuring actions, and readings.The 27th Annual International Noise Awareness Day will take place on April 27th, 2022.

More information on this initiative is available on the INAD website:

https://noiseawareness.org/.

ICA Membership

The following list comprises the national acoustical societies that are full Members of the ICA.

Argentina Hong Kong (HKSAR) Poland

Australia Hungary Portugal

Austria Iceland Russia

Belgium India Serbia

Brazil Indonesia Singapore

Canada Iran Slovakia

Chile Israel Slovenia

China (PRC) Italy Spain

Croatia Japan Sweden

Czech Republic Korea (South) Switzerland

Denmark Lithuania Taiwan

Egypt Mexico Turkey

Finland Netherlands USA (ASA)

France New Zealand USA (INCE)

Germany Norway United Kingdom

Greece Peru

Observers: Belarus, Latvia, Morocco, Nigeria, South Africa.

Observer

Member

IV.MEMBERSHIP SUBSCRIPTION

Fellow	S$70
Member	S$50
Associate	S$30
Student	S$15
Corporate	S$200

FEE BASED ON ANNUAL RATE

FOR MORE INFORMATION PLEASE CONTACT: Dr. Woon Siong Gan at email: wsgan5@gmail.com

Membership application forms can be downloaded from the society website: www.acousticssingapore.com. Please complete and email to wsgan5@gmail.com

V.ARTICLES

The following article is a condensed form of the paper to be presented at the ICSV29 in Prague in July 2023.

Phase Transition is Transport Phenomenon-Lee Yang Theory is a Subset of Transport Theory

Woon Siong Gan

Section One Key Components of Transport Phenomenon

Transport phenomena are ubiquitous in the engineering discipline. Transport phenomenon is a broad topic. It includes heat transport, electron transport,magneto-transport, thermogalvanic transport,magneto-thermo-galvano transport, classical transport, transport transport. Transport in metals

will have thermal conductivity, electrical conductivity,electronic-thermal conductivity,magnetoresistance and resistivity.It covers both classical transport and quantum transport.Examples of quantum transport are Onsager's reciprocal relations, quantum Hall effect,and Anderson localization. Hence it has the key component convering electron-phonon interaction, electron-electron interaction, phonon-phonon interaction, Dirac interaction, impurity scattering,phonon scattering scattering mechanism etc.

Another key component of transport phenomenon is the singularity behaviour of the transport properties during phase transition. Examples are The infinity conductivity of superconducting material,zero magnetic susceptibility of ferromagnetic material,zero viscosity for superfluidity and infinite specific heat during phase transition etc.

Section Two Key Components of Phase Transition

There are also two key components of phase transition. These are interaction and singularity characteristics. For instance for superconductivity, a second order phase transition, there is electron-phonon interaction. In magnetization there is the spin-spin interaction described by the Ising model and the particles interaction in superfluidity.

There are also the singularity characteristics in phase transition. These are

i.Singularity in the transport properties during phase transition such as the conductivity is infinity for superconductivity materials, magnetic susceptibility is zero for ferromagnetic materials, and the specific heat is infinity during

phase transition in metals.

ii.The singularity at the derivatives of the free energy which exhibits discontinuity in the first derivative of the free energy with respect to some thermodynamic variable for first order phase transition and for the second phase transition there is discontinuity in the second derivative of the free energy.

iii. The singularity behaviour of the partition function which was investigated in details and rigorously by the Lee Yang theory.

iv.The Joseph E Mayer's definition of singularity during phase transition which implied that the condensation point is marked by a singularity of the thermodynamic potential.

From sections one and two,it showed that both transport phenomenon and pahse transition have the same characteristics of singularity behaviour and interaction of microscopic particles. Hence it showed that phase transition is a transport phenomenon.

Section Three Lee Yang Theory's Treatment of the Partition Function

Lee Yang theory 's main purpose is to describe the region surrounding the critical point of phase transition of magnetization. Landau's theory of second order phase transition only describes the critical point and not the surrounding condition leading to the critical point. It does not dewscribe the interaction between the microparticles which is an essential component of phase transition.

Section 4 Lee Yang Theory if a Subset of Transport Theory

The complete theory of phase transition should include both the

interaction of microparticles and the singularity characteristics. Transport theory[1] includes both aspects. Lee Yang theory on the other hand,only describes the singularity behaviour of the partition function Hence it can be considered as a subset of transport theory.

Section 5. Turbulence as an Illustration

Turbulence is a phase transition and can be considered as transport phenomenon.[2] The application of transport theory to turbulence will present phase transition as a complete theory which includes both the molecules-molecules interaction aspect and the singularity behaviour of the transport property of viscosity which tends to zero at the critical point of turbulence.

References

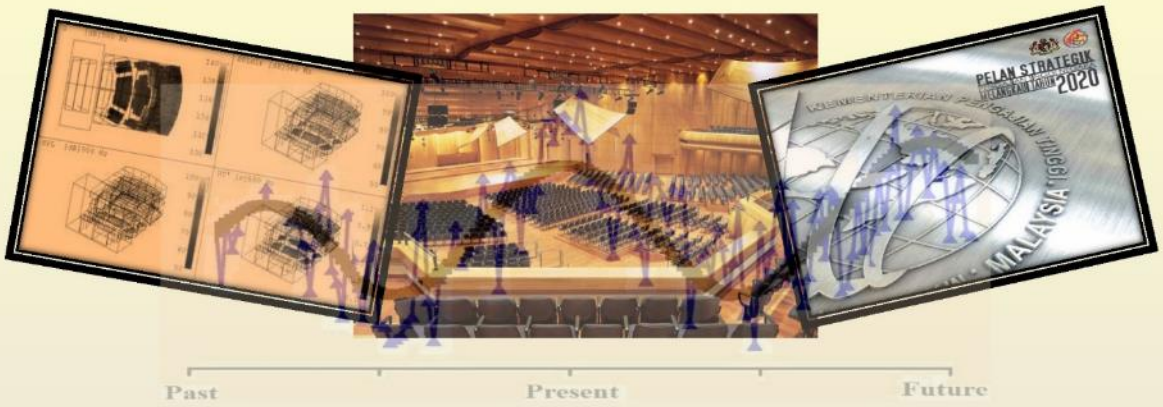
1.Woon Siong Gan,Transport theory in magneroacoustics, PhD thesis, Imperial College London,1969.

2.Woon Siong Gan, Transport Theory Approach to Phase Transition, Proceedings of the ICSV28,Singapore, 24-28 July 2022.

The following are the powerpoint slides given by

Associate Prof Nazli Che Din of University of Malaya at the joint SVAM-SAS zoom seminar on 27 April 2022,International Noise Awareness Day.

ACOUSTICS IN MALAYSIA: THE PAST, THE PRESENT, AND THE FUTURE



Nazli Che Din

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Table of Content

HISTORY OVERVIEW

The word "acoustic" is derived from the Greek word ακουστικός (akoustikos), meaning "of or for hearing, ready to hear" and that from ἀκουστός (akoustos), "heard, audible", which in turn derives from the verb ἀκούω (akouo), "I hear"

Charlton Inao, 2014

INTRODUCTION

HISTORY OVERVIEW

- **Acoustics – branch of physics**
- **Multidisciplinary - Interdisciplinary – Transdisciplinary of science**

Physical acoustics	Biological acoustics	Acoustical engineering
• Acoustic theory • Aeroacoustics • General linear acoustics • Nonlinear acoustics • Structural acoustics and vibration • Underwater sound	• Bioacoustics • Musical acoustics • Physiological acoustics • Psychoacoustics • Speech communication (production; perception; processing and communication systems)	• Acoustic measurements and instrumentation • Acoustic signal processing • Architectural acoustics • Environmental acoustics • Transduction • Ultrasonics • Room acoustics

INTRODUCTION

HISTORY OVERVIEW

UNIVERSITY OF MALAYA

History of acoustics

Early research in acoustic

n the 6th century BC, the ancient Greek philosopher Pythagoras wanted to know why some musical intervals seemed more beautiful than others, and he found answers in terms of numerical ratios representing the harmonic overtone series on a string. He is reputed to have observed that when the lengths of vibrating strings are expressible as ratios of integers (e.g. 2 to 3, 3 to 4), the tones produced will be harmonious. If, for example, a string sounds the note C when plucked, a string twice as long will sound the same note an octave lower. The tones in between are then given by 16:9 for D, 8:5 for E, 3:2 for F, 4:3 for G, 6:5 for A, and 16:15 for B, in ascending order.[7] Aristotle (384-322 BC) understood that sound consisted of contractions and expansions of the air "falling upon and striking the air which is next to it...", a very good expression of the nature of wave motion. In about 20 BC, the Roman architect and engineer Vitruvius wrote a treatise on the acoustic properties of theatres including discussion of interference, echoes, and reverberation—the beginnings of architectural acoustics.[8]

Charlton Inao, 2014

INTRODUCTION

HISTORY OVERVIEW

UNIVERSITY OF MALAYA

The physical understanding of acoustical processes advanced rapidly during and after the Scientific Revolution. Mainly Galileo Galilei (1564–1642) but also Marin Mersenne (1588–1648), independently, discovered the complete laws of vibrating strings (completing what Pythagoras and Pythagoreans had started 2000 years earlier). Galileo wrote "Waves are produced by the vibrations of a sonorous body, which spread through the air, bringing to the tympanum of the ear a stimulus which the mind interprets as sound", a remarkable statement that points to the beginnings of physiological and psychological acoustics. Experimental measurements of the speed of sound in air were carried out successfully between 1630 and 1680 by a number of investigators, prominently Mersenne. Meanwhile Newton (1642–1727) derived the relationship for wave velocity in solids, a cornerstone of physical acoustics (Principia, 1687).

Charlton Inao, 2014

INTRODUCTION

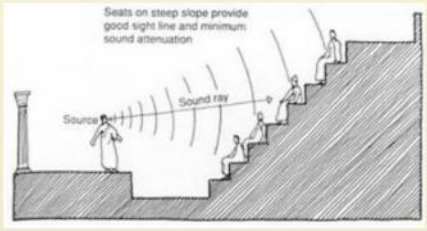
HISTORY

UNIVERSITY OF MALAYA

Marcus Vitruvius Pollio

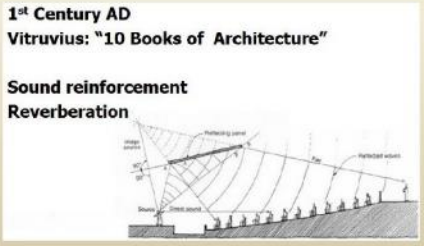
Grand Theatre

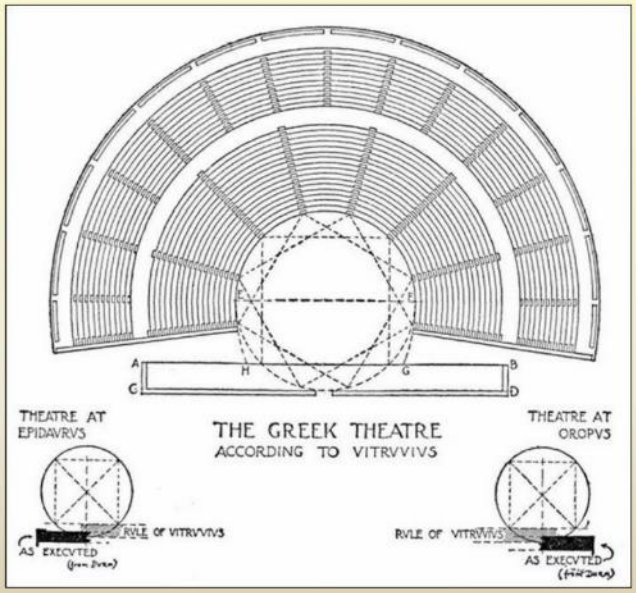
- Open air
- Direct sound path
- No sound reinforcement
- Minimal reverberation



1st Century AD
Vitruvius: "10 Books of Architecture"

Sound reinforcement
Reverberation





INTRODUCTION

HISTORY

UNIVERSITY OF MALAYA

Louis Sullivan's motto "form follows function"

'**Form**' does not strictly refer to the external image of an object, but to more structural characteristics of space. The in-between, the space between buildings, walls or other architectural elements also has a form. A courtyard has a form; any enclosed space has a form.

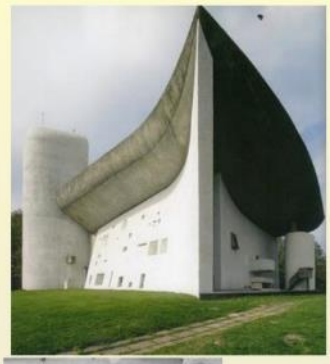
'**Function**' does not strictly refer to economy, ergonomics, efficiency or utility (the Vitruvian 'Utilitas') but can have a broader meaning: it can also refer to how spaces relate to each other and, consequently, to how people coexist and communicate. Communication is related to human senses: vision, hearing and touch.

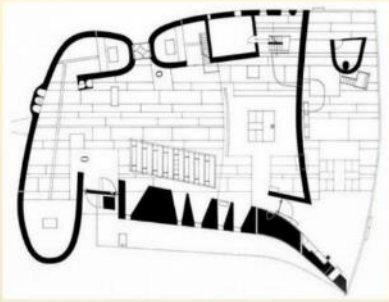
Ilias Papageorgiou, 2016

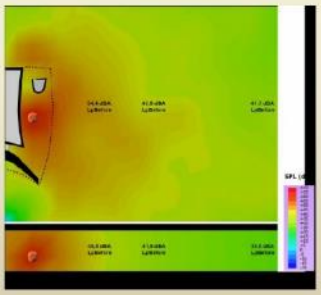
INTRODUCTION

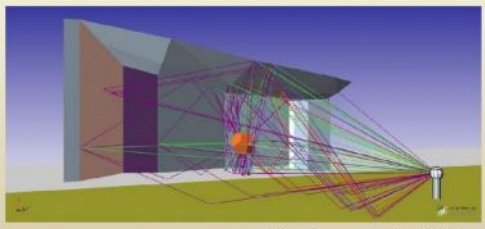
HISTORY OVERVIEW

Le Corbusier's chapel at Ronchamp









Ilias Papageorgiou, 2016

INTRODUCTION

HISTORY OVERVIEW

1800s

1856: Prof. Joseph Henry

"Treatise on Acoustics Applied to Public Buildings"

1877: Lord Rayleigh

"The Theory of Sound"

1895: Wallace Clement Sabine

Fogg Art Museum, 1895-1905

INTRODUCTION

HISTORY OVERVIEW

UNIVERSITY OF MALAYA

Buildings

1870: Der Grosse Saal der Gesellschaft der Musikfreunde, Vienna
1879: Central Music Hall, Chicago
1887: Chicago Auditorium, Chicago
1888: Concertgebouw, Amsterdam
1900: Boston Symphony Hall, Boston

1900-1948: None of note

1948: Royal Festival Hall, London
1961: Lincoln Center, New York

INTRODUCTION

HISTORY OVERVIEW

UNIVERSITY OF MALAYA

A Brief History of the Acoustical Society of America


Floyd R. Watson, Vern O. Knudsen and Wallace Waterfall

After exploratory inquires by Wallace Waterfall, Floyd Watson, and Vern Knudsen (pictured on the left), a group of some 40 scientists and engineers interested in acoustics met on 27 December 1928 at the Bell Telephone Laboratories in New York, NY, to consider forming a scientific society. Plans developed rapidly and the Acoustical Society of America was formally organized and held its first meeting 10-11 May 1929 with a charter membership of about 450.

In 1931 the Acoustical Society joined with three other scientific societies to form the American Institute of Physics, an organization designed to unite physics-related groups and to provide facilities for publishing and other common activities. The Institute now has 10 Member Societies covering a range of physics-related interests.

Since the Acoustical Society was formed, it has enjoyed a healthy growth in membership and in stature. The presentmembership of approximately 7000 includes leaders in acoustics in the United States of America and other countries. The Society has attracted members from various fields related to sound including physics, electrical, mechanical, and aeronautical engineering, oceanography, biology, physiology, psychology, architecture, speech, noise and noise control, and music. This diversity and the opportunity it provides for interchange of knowledge and points of view has become one of the strengths of the Society.


First Meeting Of The Acoustical Society of America, May1929

Two meetings of the Society have been held each year, except between 1942 and 1945. Papers are presented concerned with architectural acoustics; psychological and physiological acoustics; applied acoustics; instruments and apparatus; music and musical instruments; noise; speech communication; ultrasonics, radiation, and scattering; mechanical vibrations and shock; underwater sound; aeroacoustics; macrosonics; acoustical signal processing; bioacoustics; and many more topics. To assure adequate attention to these separate fields and to new ones that may develop, the Society establishes technical committees and technical groups charged with keeping abreast of developments and needs of the membership in their specialized fields.

An important element in the progress of the Society has been *The Journal of the Acoustical Society of America* (JASA). The *Journal* began as a quarterly in 1929, changed to a bimonthly in 1947, and to a monthly beginning in January 1957. Its approximately 7000 pages per year contain many of the papers presented at meetings, other contributed papers, a bibliography of current acoustical literature and patents, and meeting programs. The Journal is available in print, on CD

Follow Us

INTRODUCTION


HISTORY OVERVIEW
UNIVERSITY OF MALAYA
Acoustical Society of America
The purpose of the Society is to generate, disseminate, and promote the knowledge and practical
INTERNATIONAL COMMISSION FOR ACOUSTICS ICA
Acoustical Society of India
Dansk Akustisk Selskab
spa
Sociedade Portuguesa de Acústica
Portuguese Acoustical Society
ASJ Acoustical Society of Japan
中国科学院声学研究所
Institute of Acoustics, Chinese Academy of Sciences
CANADIAN ACOUSTICAL ASSOCIATION
ASSOCIATION CANADIENNE D'ACOUSTIQUE
Australian Acoustical Society
TÜRK AKUSTİK DERNEĞİ
SGA SSA
Swiss Acoustical Society
Société Suisse d'Acoustique
Schweizerische Gesellschaft für Akustik
Società Svizzera di Acustica
Internet: www.sga-ssa.ch
香港聲學學會
Hong Kong Institute of Acoustics
Institute of Acoustics
Austrian Acoustics Association
Österreichische Gesellschaft für Akustik
Akustinen seura ry
Acoustical Society of Finland
SAS Society of Acoustics (Singapore)
DEGA
CSVE 中国振动工程学会
Chinese Society for Vibration Engineering
사단법인 한국음향학회
The Acoustical Society of Korea
Asociación de Acústicos Argentinos
Acoustical Society of Thailand
INTRODUCTION


HISTORY OVERVIEW
UNIVERSITY OF MALAYA
How about Malaysia??
When we started this?
PAST

HISTORY OVERVIEW

UNIVERSITY OF MALAYA

LAWS OF MALAYSIA

REPRINT

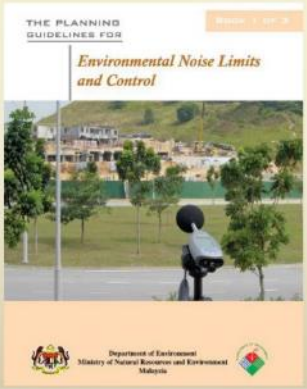
Act 127

ENVIRONMENTAL QUALITY ACT 1974

Incorporating all amendments up to 1 January 2006

Power to specify conditions of emission, discharge, *etc.*

21. The Minister, after consultation with the Council, may by regulations specify the acceptable conditions for the emission, discharge or deposit of environmentally hazardous substances, pollutants or wastes or the emission of noise into any area, segment or element of the environment and may set aside any area, segment or element of the environment within which the emission, discharge or deposit is prohibited or restricted.



Restrictions on noise pollution

23. (1) No person shall, unless licensed, emit or cause or permit to be emitted any noise greater in volume, intensity or quality in contravention of the acceptable conditions specified under section 21.

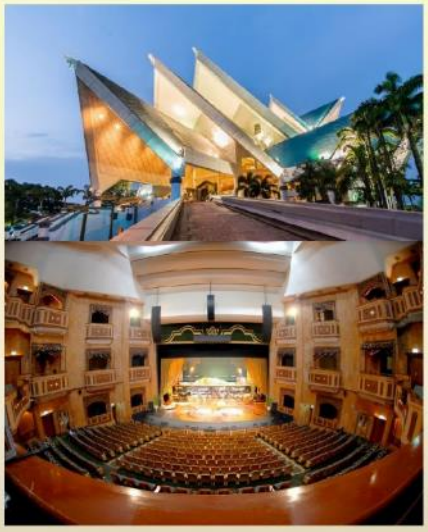
FACTORIES AND MACHINERY ACT 1967 [ACT 139]
P.U. (A) 1/1989
FACTORIES AND MACHINERY (NOISE EXPOSURE) REGULATIONS 1989
Incorporating latest amendment - P.U.(A) 106/1989

Etc .....

PAST

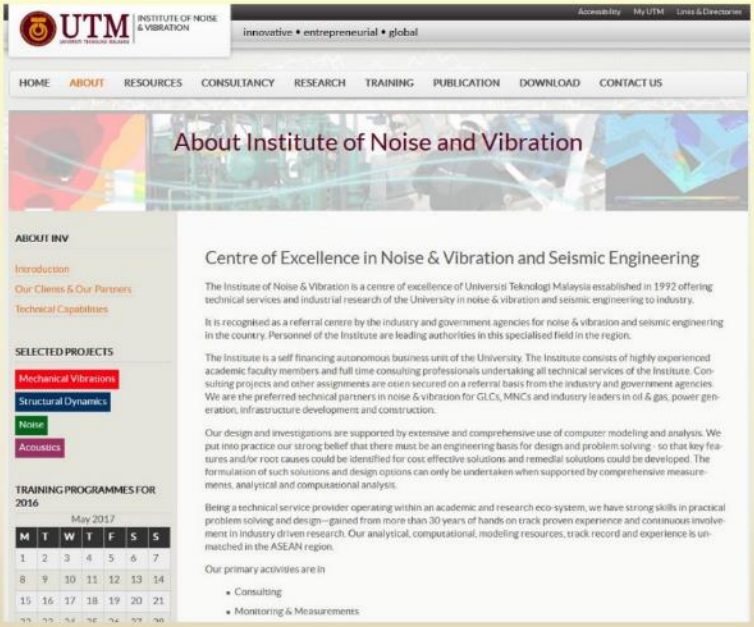
HISTORY OVERVIEW

UNIVERSITY OF MALAYA



PAST

HISTORY OVERVIEW

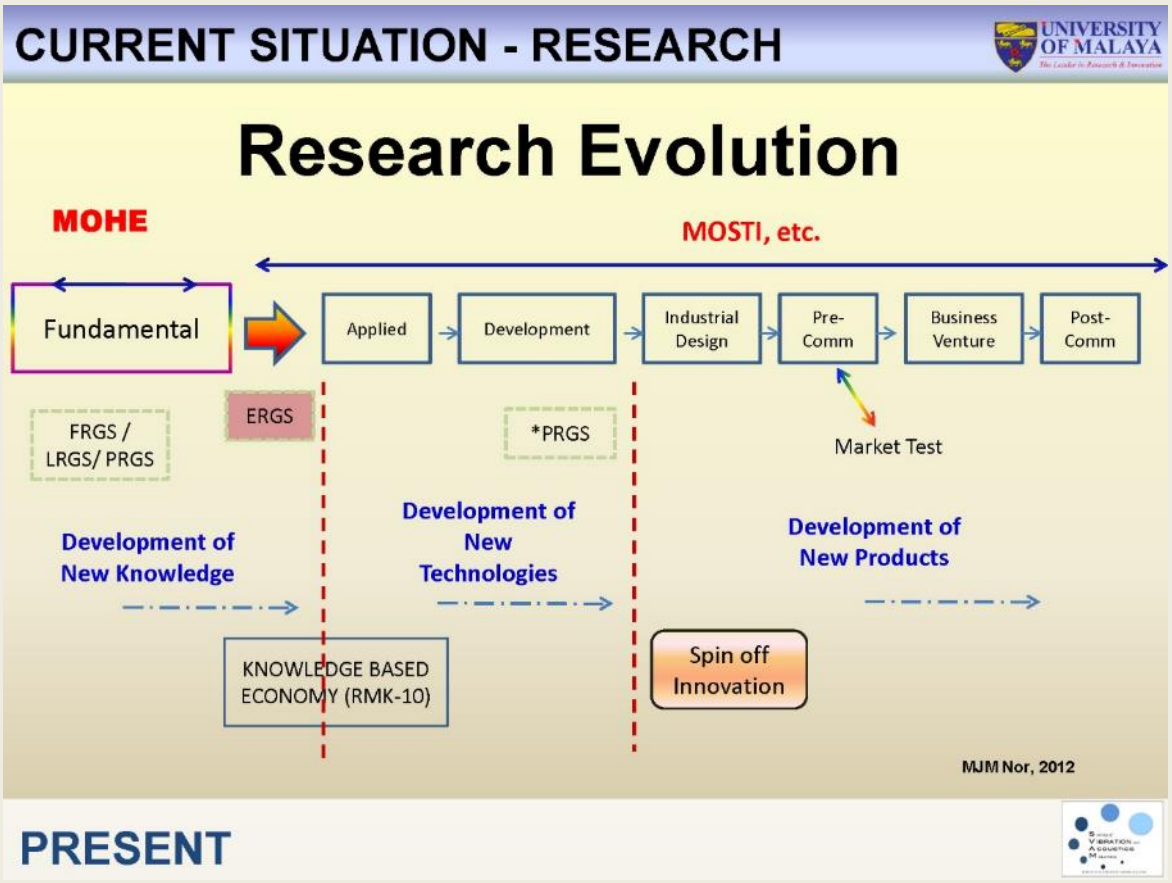


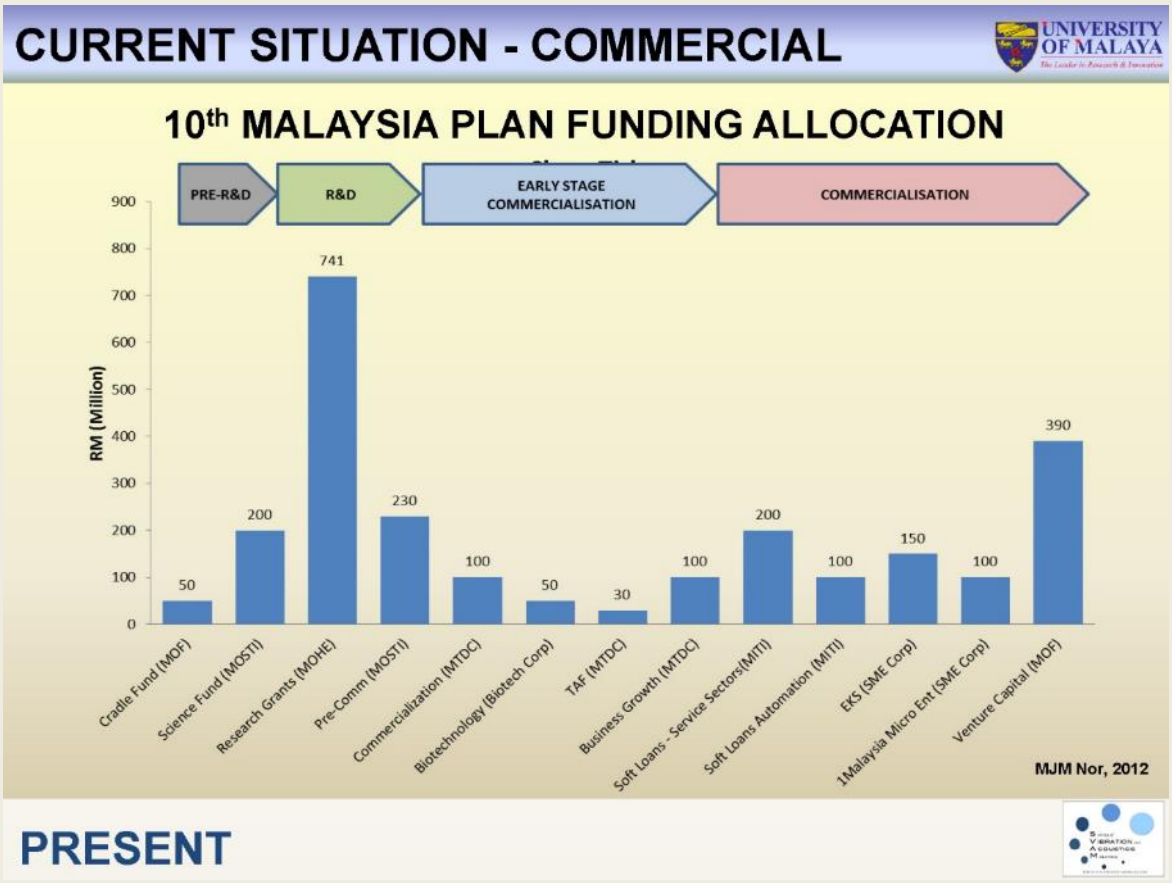
UTM Noise & Vibration Research Group

PAST

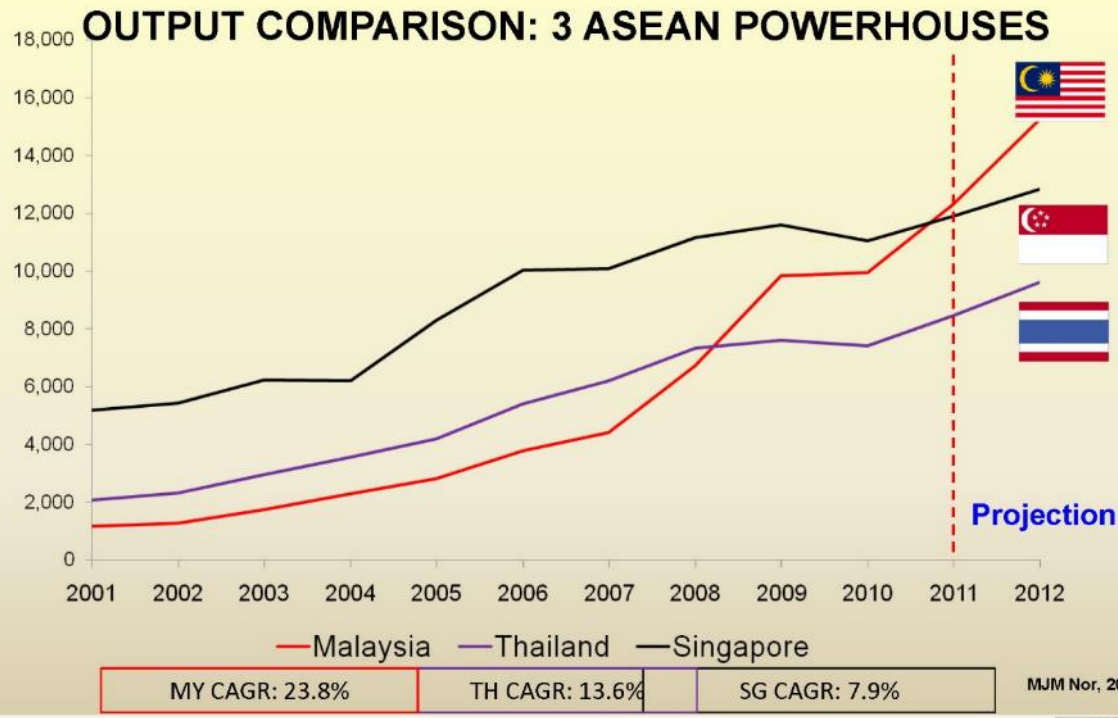
CURRENT SITUATION

PRESENT


CURRENT SITUATION - RESEARCH
UNIVERSITY OF MALAYA
Research Evolution
MOHE
MOSTI, etc.
Fundamental
Applied
Development
Industrial Design
Pre-Comm
Business Venture
Post-Comm
FRGS / LRGS/ PRGS
ERGS
*PRGS
Market Test
Development of New Knowledge
Development of New Technologies
Development of New Products
KNOWLEDGE BASED ECONOMY (RMK-10)
Spin off Innovation
MJM Nor, 2012
PRESENT

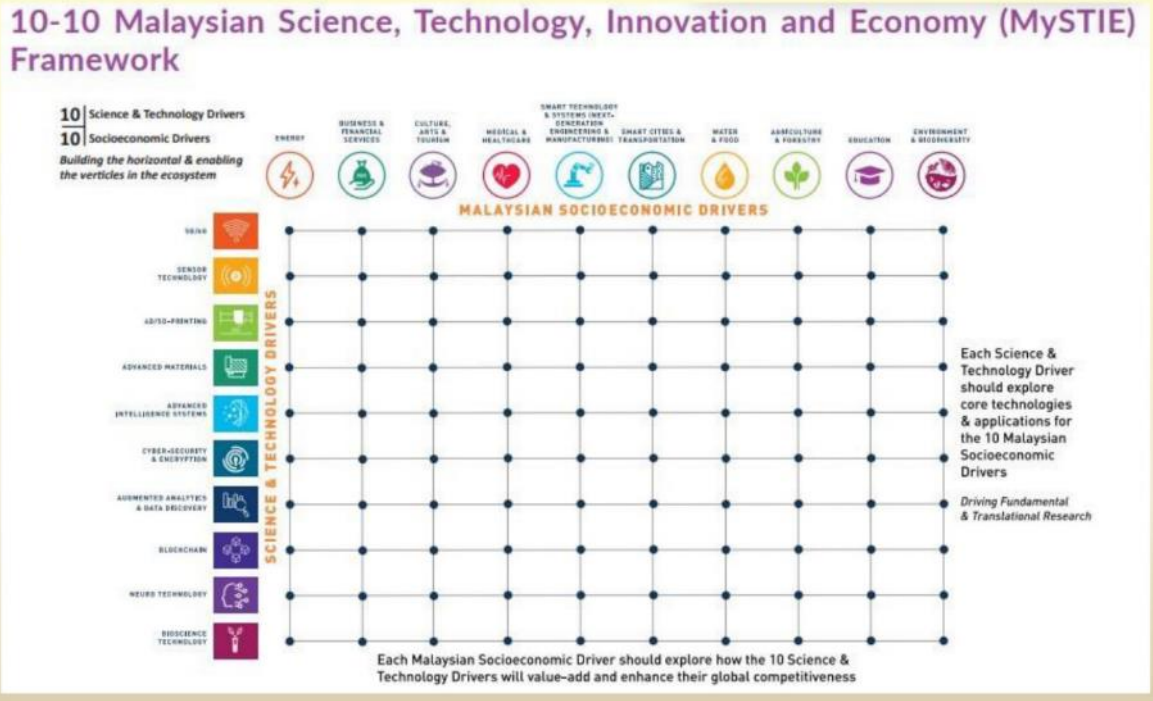

CURRENT SITUATION - COMMERCIAL
UNIVERSITY OF MALAYA
10th MALAYSIA PLAN FUNDING ALLOCATION
PRE-R&D
R&D
EARLY STAGE COMMERCIALISATION
COMMERCIALISATION
RM (Million)
900
800
700
600
500
400
300
200
100
0
50
200
741
230
100
50
30
100
200
100
150
100
390
Cradle Fund (MOF)
Science Fund (MOSTI)
Research Grants (MOHE)
Pre-Comm (MOSTI)
Commercialization (MTDC)
Biotechnology (Biotech Corp)
TAF (MTDC)
Business Growth (MTDC)
Soft Loans - Service Sectors(MITI)
Soft Loans Automation (MITI)
EKS (SME Corp)
1Malaysia Micro Ent (SME Corp)
Venture Capital (MOF)
MJM Nor, 2012
PRESENT

CURRENT SITUATION - COMMERCIAL



PRESENT

CURRENT SITUATION - R&D&C&I



PRESENT

CURRENT SITUATION – R&D - FACILITIES

UNIVERSITY OF MALAYA

PRESENT

CURRENT SITUATION - R&D&C&I

UNIVERSITY OF MALAYA

Game Changer XII
Aligning Research and Development towards Commercialisation, Wealth Generation and Economic Growth

Why is aligning R&D important?	How will this be achieved?	What will success portray?
Investment in R&D is still low. To achieve high-income nation status, it is important to commercialise R&D. The realignment of R&D towards commercialisation will achieve the following objectives: • Increase commercialisation as well as spur innovation and growth. • Produce more high value-added and industry-driven products and solutions. • Address the low investment in R&D&C&I. • Improve productivity and move up the value chain. • Address the low percentage of experimental development research.	Aligning R&D towards commercialisation, wealth generation and economic growth will require highly targeted initiatives that include: • Ensuring 50% of research funding will be focused on experimental development with high commercialisation potential. • Ensuring R&D&C&I activities are in line with national priorities with the newly established Research Management Unit (RMU). • Establishing a one-stop centre for technology commercialisation and transfer to scale up home-grown technologies. • Increasing investment by the private sector in R&D&C&I and access to alternative financing. • Establishing an endowment fund to source funds from industry, matching grants, crowdfunding and *waqf*. • Creating more local talent as technology developers and creators.	• 2.5% GERD to GDP. • Top 20 ranking in the Global Innovation Index. **Conducting R&D&C&I activities**

PRESENT

CURRENT SITUATION - RESEARCH

UNIVERSITY OF MALAYA

NOISE VIBRATION & COMFORT (NVC)

5th International Conference on Noise, Vibration and Comfort (NVC 2015)

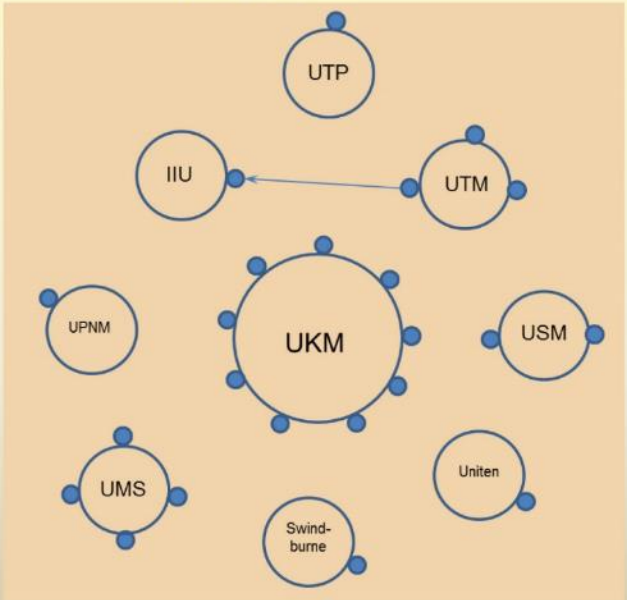
MJM Nor, 2012

PRESENT

CURRENT SITUATION - RESEARCH

UNIVERSITY OF MALAYA

PAPER PRESENTED BY MALAYSIAN RESEARCHER IN NVC 2005



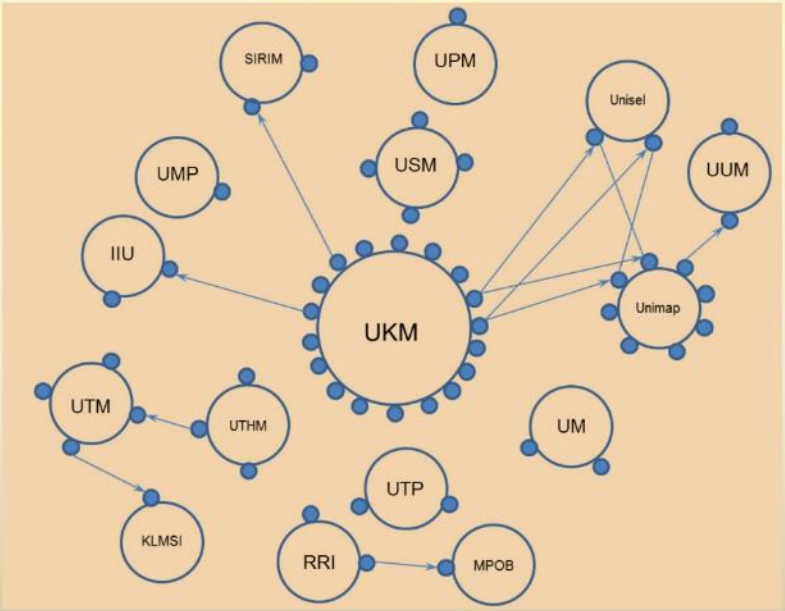
MJM Nor, 2012

PRESENT

CURRENT SITUATION - RESEARCH

UNIVERSITY OF MALAYA

PAPER PRESENTED BY MALAYSIAN RESEARCHER IN NVC 2007



MJM Nor, 2012

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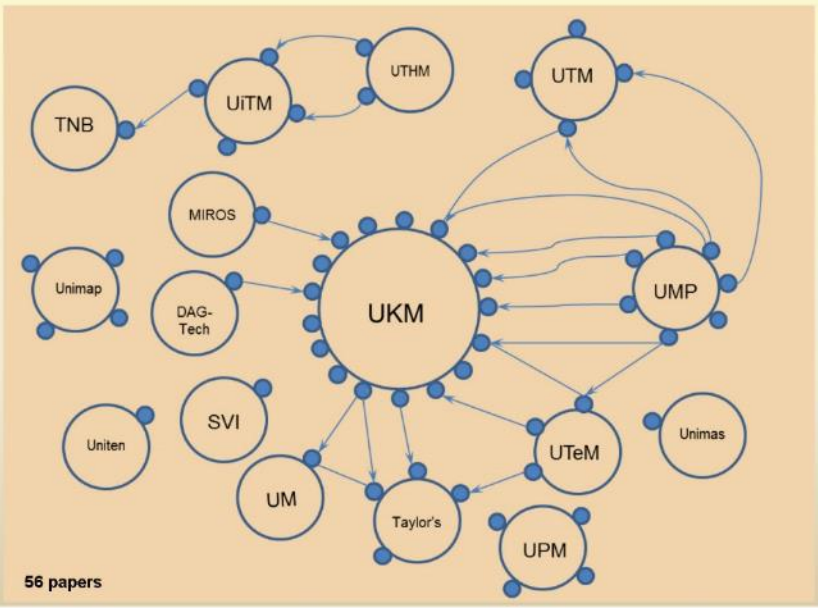
CURRENT SITUATION - RESEARCH

UNIVERSITY OF MALAYA

PAPER PRESENTED BY MALAYSIAN RESEARCHER IN NVC 2010



MJM Nor, 2012

PRESENT

CURRENT SITUATION - RESEARCH

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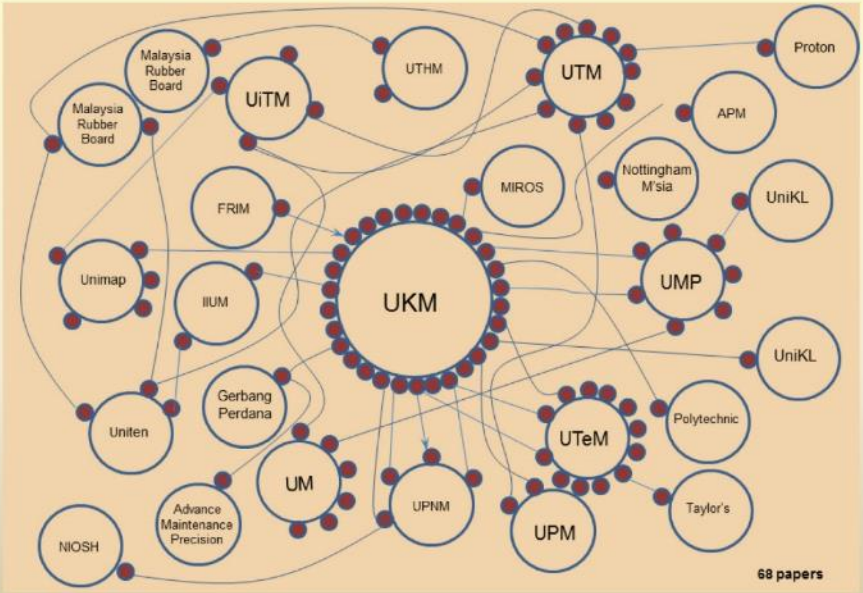
PAPER PRESENTED BY MALAYSIAN RESEARCHER IN NVC 2012



PRESENT

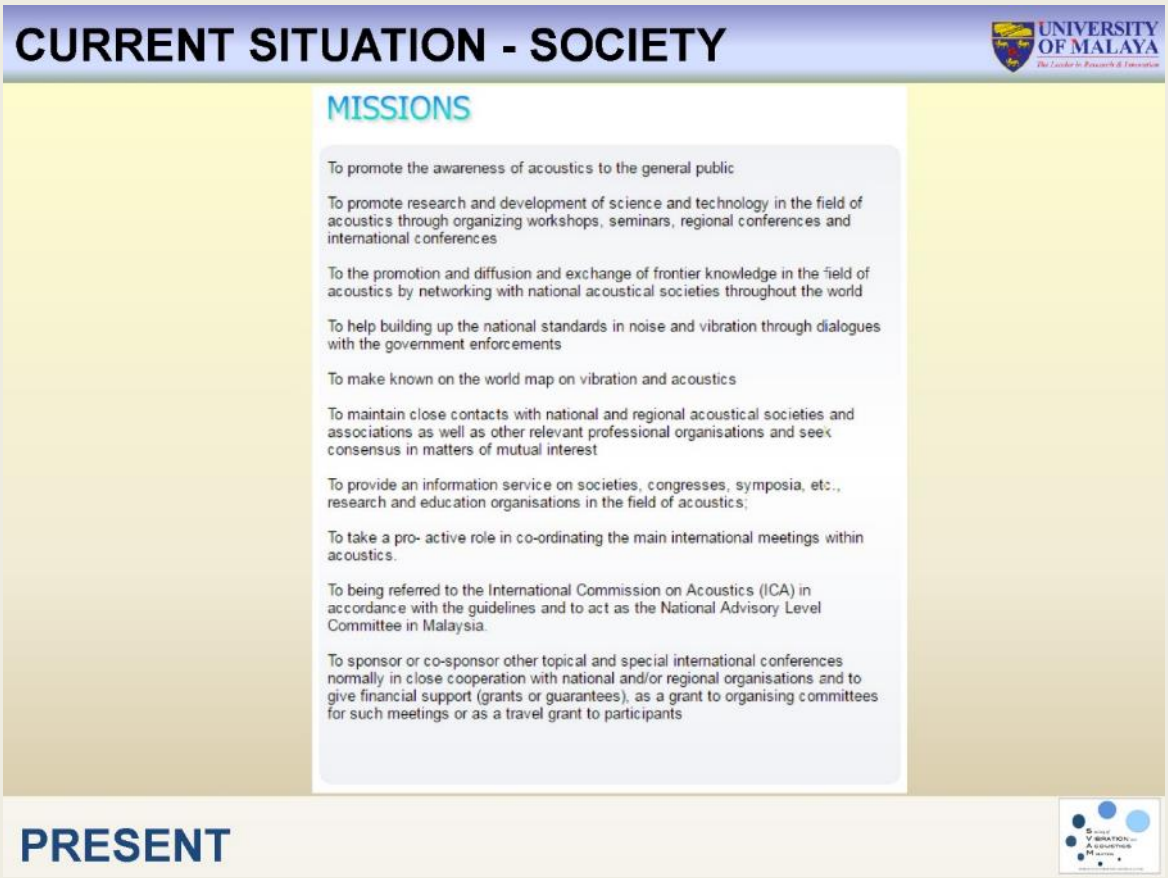
CURRENT SITUATION - SOCIETY

UNIVERSITY OF MALAYA

HOW ABOUT OUR SOCIETY? WHERE ARE WE NOW?

www.svam.my

PRESENT


CURRENT SITUATION - SOCIETY
UNIVERSITY OF MALAYA
MISSIONS
To promote the awareness of acoustics to the general public
To promote research and development of science and technology in the field of acoustics through organizing workshops, seminars, regional conferences and international conferences
To the promotion and diffusion and exchange of frontier knowledge in the field of acoustics by networking with national acoustical societies throughout the world
To help building up the national standards in noise and vibration through dialogues with the government enforcements
To make known on the world map on vibration and acoustics
To maintain close contacts with national and regional acoustical societies and associations as well as other relevant professional organisations and seek consensus in matters of mutual interest
To provide an information service on societies, congresses, symposia, etc., research and education organisations in the field of acoustics;
To take a pro- active role in co-ordinating the main international meetings within acoustics.
To being referred to the International Commission on Acoustics (ICA) in accordance with the guidelines and to act as the National Advisory Level Committee in Malaysia.
To sponsor or co-sponsor other topical and special international conferences normally in close cooperation with national and/or regional organisations and to give financial support (grants or guarantees), as a grant to organising committees for such meetings or as a travel grant to participants
PRESENT


CURRENT SITUATION - SOCIETY
UNIVERSITY OF MALAYA
BENEFITS
Membership Benefits
An internationally recognised professional qualification
Workshops, conferences and meetings on a wide range of acoustic related topics.
Membership of an active Institute
Access to a Register of knowledgeable expert Members
Local and national opportunities for networking
High quality published Proceedings
Website listing - a reference and referral tool for potential clients
A route to achieving Professional Chartered Engineer and Incorporated Engineer Status
Professional Development - providing encouragement and support
Access to a wide range of technical information from a well-stocked libraries
Involvement in the development of the profession
Technical reports/Codes of Practice/Publications
& much more!
PRESENT

CURRENT SITUATION - SOCIETY

CURRENT MEMBERS

SVAM Members

Universiti Kebangsaan Malaysia
UTeM Universiti Teknikal Malaysia Melaka
UPM Universiti Putra Malaysia
Universiti Tenaga Nasional
Universiti Malaya Kuala Lumpur
Universiti Sains Islam Malaysia
Universiti Teknologi MARA
USM Universiti Sains Malaysia
Universiti Malaysia Pahang
International Islamic University Malaysia
UTHM Universiti Tun Hussein Onn Malaysia
UTM Universiti Teknologi Malaysia
UMS Universiti Malaysia Sabah
Universiti Malaysia Sarawak UNIMAS
DAG Technologies
SI Acoustic Sdn Bhd
DJ Automation Engineering Ltd.
AVCM Acoustic Vibration Consulting Malaysia

PRESENT

CURRENT SITUATION - SOCIETY

1st International Colloquium on Noise, Vibration and Comfort (ICNVC2019)

PRESENT

CURRENT SITUATION - SOCIETY

UNIVERSITY OF MALAYA

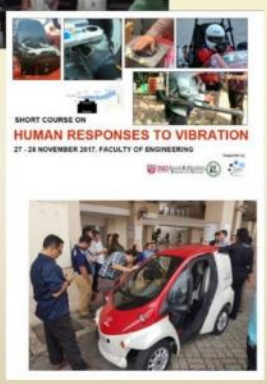
Building Acoustics YUMCHA

PRESENT

CURRENT SITUATION - SOCIETY

UNIVERSITY OF MALAYA

Other Activities

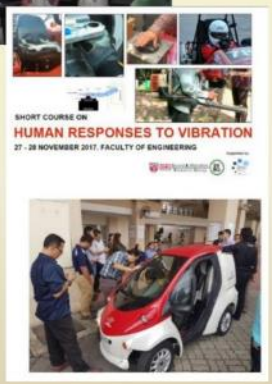


PRESENT

CURRENT SITUATION - SOCIETY

UNIVERSITY OF MALAYA

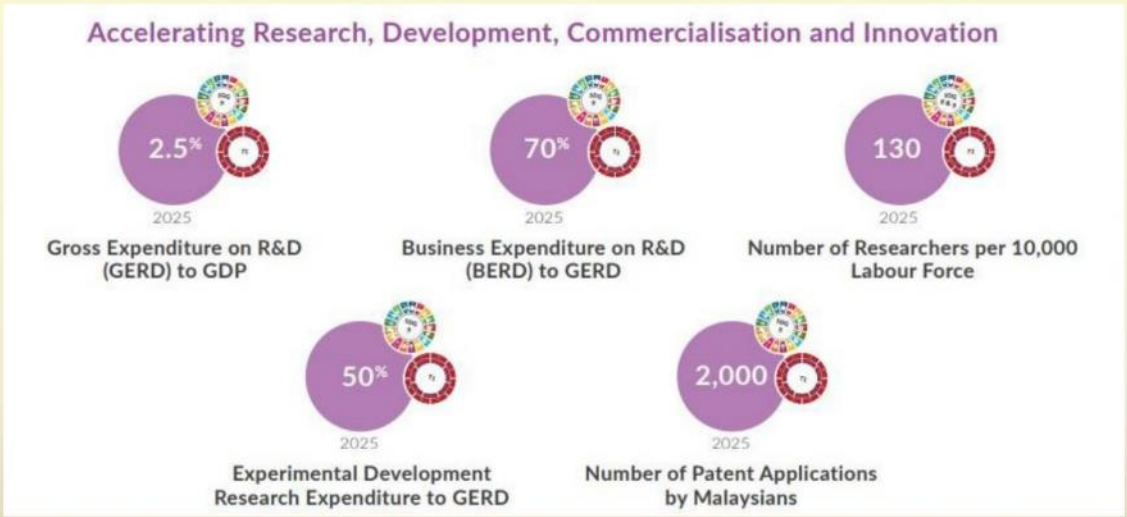
Other Activities



PRESENT

THE WAY FORWARD

UNIVERSITY OF MALAYA



FUTURE

THE WAY FORWARD

UNIVERSITY OF MALAYA
The Leader in Research & Innovation

WHAT CAN WE CONTRIBUTE?

- Establish expertise and company databases/directory
- Developing guideline, code of practice or by laws
- Raise awareness of public with talk, seminar, conference etc
- Becoming international member
- Develop our Malaysian-based products/methods
- Develop new curriculum and create new job
- As funding resources
- Etc…

FUTURE

VI. PRODUCTS ON ACOUSTICS

PSV Scanning Vibrometer

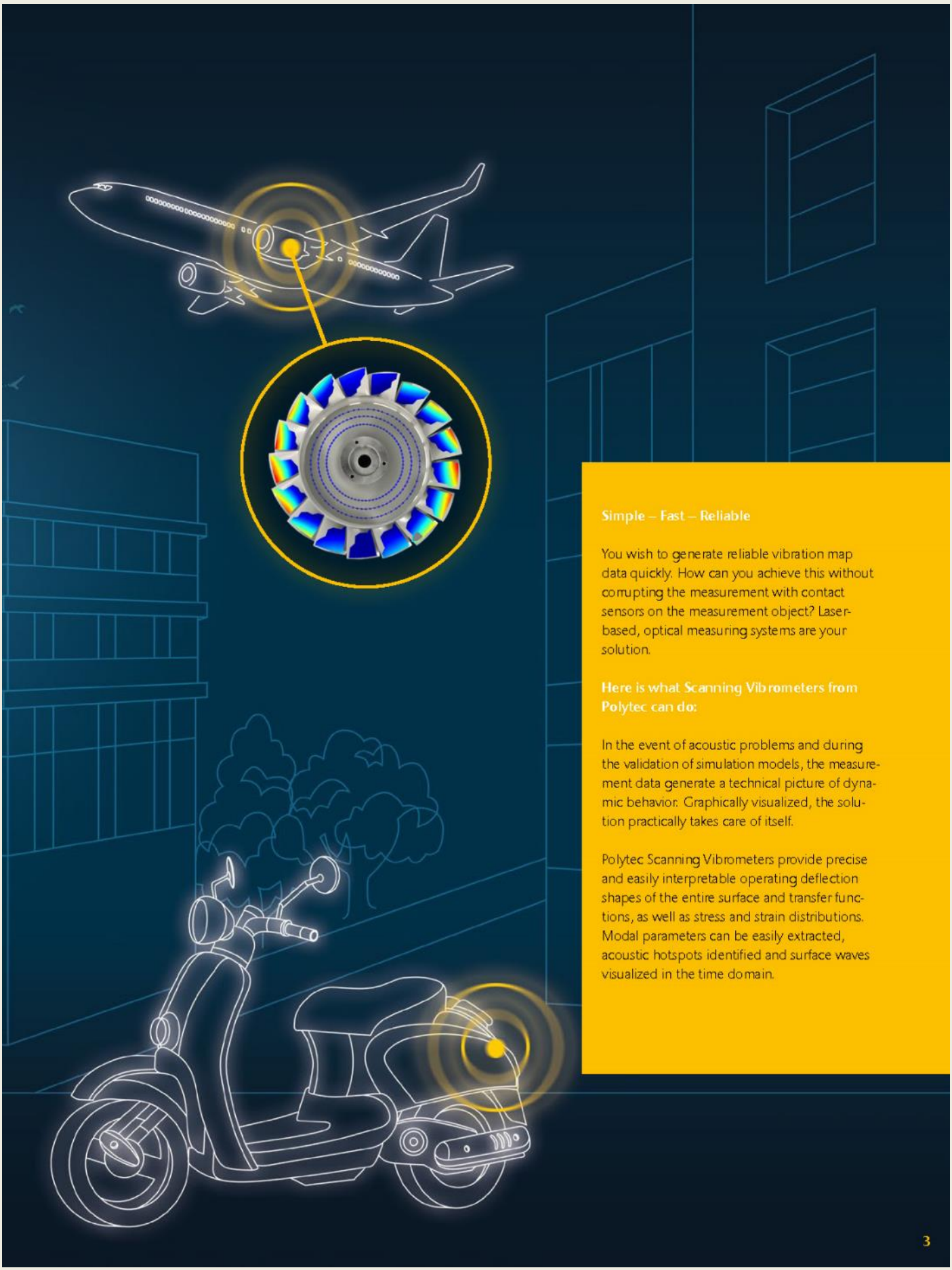
Polytec

PSV Scanning Vibrometer

Optical measurement of vibrations in 1D and 3D

Product brochure


The world vibrates
Measuring vibrations quickly and easily, making them visible and thereby understanding the world – that is our common goal. Harnessing vibration and acoustics for the greater good – that is the task.
Scanning Vibrometers from Polytec are the tool.
2


Simple – Fast – Reliable
You wish to generate reliable vibration map data quickly. How can you achieve this without corrupting the measurement with contact sensors on the measurement object? Laser-based, optical measuring systems are your solution.
Here is what Scanning Vibrometers from Polytec can do:
In the event of acoustic problems and during the validation of simulation models, the measurement data generate a technical picture of dynamic behavior. Graphically visualized, the solution practically takes care of itself.
Polytec Scanning Vibrometers provide precise and easily interpretable operating deflection shapes of the entire surface and transfer functions, as well as stress and strain distributions. Modal parameters can be easily extracted, acoustic hotspots identified and surface waves visualized in the time domain.
3

Improve your products quickly – with vibration measurements by Polytec.

Polytec Scanning Vibrometers are perfectly normal vibration measurement systems, but they can do so much more:

- As many measurement points as you really need, even in a small area
- As much bandwidth as you need
- Completely non-contact, so that everything vibrates as it really should
- So intelligent that the visualization shows everything, both the good and the bad
- So focused that no object is too small and so flexible that no object is too big
- So compatible that FE model validations become child's play
- As virtualizable as the CAE environment in which you work
- So robust that measurements can be taken reliably, even on hot or moving surfaces

Everything you need

The PSV Scanning Vibrometer is a vibration sensor, data acquisition system, signal generator, geometry measurement system* and evaluation system all in one.

The comprehensive PSV software package is specially designed for the full-field display of structure-borne vibrations. The intuitive operation of the PSV Scanning Vibrometer always enables successful measurements to be performed in a few minutes.

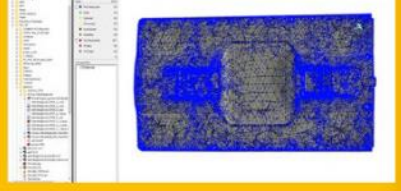
* optional: integrated geometry sensor or hand-held 3D scanner

4

Strong on the inside – open to the outside

The intuitive operation of the Polytec Scanning Vibrometer even enables beginners to perform successful measurements in just a few minutes. This is thanks to the PSV software. The comprehensive PSV software package is specially designed for full-field measurement and the display of structure-borne noise vibrations in a CAE-integrated development environment.

YOU CREATE A MESH

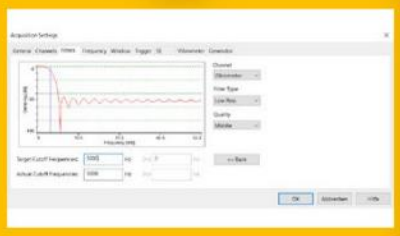


A live video image, intuitive drawing and meshing tools quickly provide a suitable measurement grid. Image processing* helps you detect the laser position and automatically creates a measurement grid based on the object contour, if required. The integrated distance sensor* provides the exact 3D coordinate for each measurement point.

For the expert:

- Measurement grids as provided in an FE simulation – Work with imported CAE geometry
- No CAE data? – Generate high-resolution measurement grids with a hand-held 3D geometry scanner*

YOU MEASURE

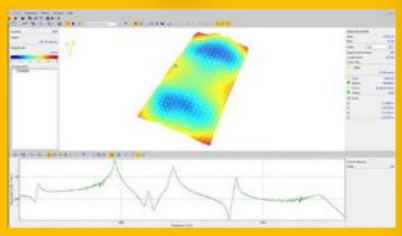


Results under control: You define the data acquisition setting and excitation in the time- or frequency domain – while your PSV Scanning Vibrometer automatically scans the object.

For the expert:

- Choose from 10 specific waveforms for sample excitation or freely define an excitation signal according to your requirements
- MIMO measurements* with multiple shakers and up to 8 additional sensors
- Optimize your result with signal enhancement and filter tools, as well as automatic measurement range settings

YOU ANALYZE



The clear graphic representation of the measurement results and extensive integrated evaluation and post-processing options support you in interpreting the measurement data. 3D animation, identification of resonances via cursor, Bode plots, deflection shape display in volume or sections are among the standard tools for vibration analysis.

For the expert:

- The Polytec SignalProcessor* enables individual and flexible signal post-processing
- Modal and order analyses can be performed efficiently with the tailored PolyWave software*
- Use our interfaces for MatLab®, LabView®, MS Excel®, Python, ASAM ODS*

* optional ** depending on the model and configuration

6

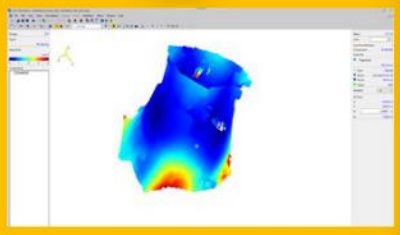
YOU AUTOMATE

Do you need more? – Sample macros in Visual Basic and an increasing number of ready-made macros** from the PSV community for special tasks extend the options of the PSV software.

For the expert:

- Everything under control – You use the open Polytec File Access interface and program your own solution with LabView®, Python or other languages to control the PSV Scanning Vibrometer or to access measurement data automatically.

YOU COMMUNICATE



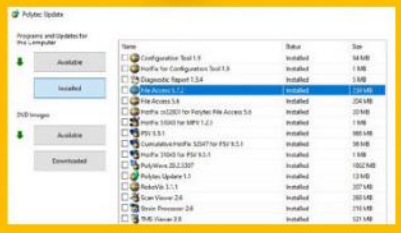
Communicate your results to a wider audience – 3D animations provide an intuitive understanding of the measurement results. In addition, texture data from the hand-held 3D scanner makes a good impression with a photo-realistic presentation of results.

Details become clear with profile lines and sections through volumes, and you find the right optimization approaches.

For the expert:

- Present more than images or animations with the free-of-charge Polytec ScanViewer. Embed free 3D view controls and select frequencies and present your results live in PowerPoint®.

YOU ARE UP TO DATE



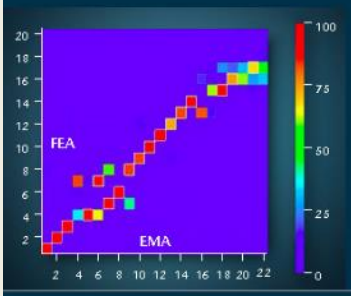
Software maintenance enables you to secure the new software functions of tomorrow today. Polytec Update automatically informs you as soon as a new software version is available for download.

As an educational institution, you secure lifelong software maintenance at particularly favorable conditions with our University Program.

For the expert:

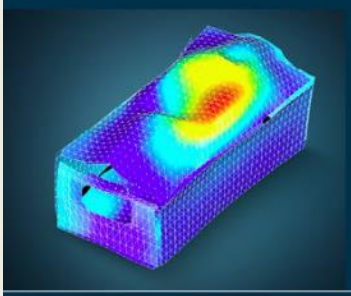
- Also in safety critical environments Polytec Update can be used by it's unique offline update procedure.

Efficient product development with your Polytec Scanning Vibrometer



Post-Processing

If the comparison with the operating deflection shapes and the identified resonant frequencies is not sufficient, subsequent curve fitting e.g. with the PolyWave Post-Processing Suite** is the next step for model updating. You validate your durability models with high-resolution stress and strain distributions calculated from the raw data in the Polytec StrainProcessor**. Export interfaces open the way to your usual software tools.

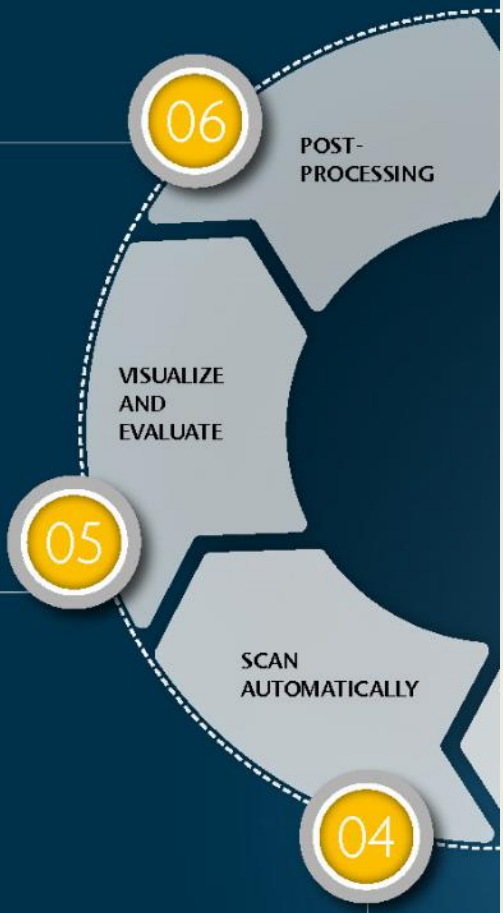


Visualize and evaluate

An initial assessment of the measurement results is provided by impressive frequency-selective 3D animations of the deflection shapes in false colors or with a photo-realistic object texture. Intelligent cursors are available for evaluation of the transfer functions and an initial assessment of the damping values. Coherence functions support the quality assurance. A wide range of mathematical functions for individual post-processing can be found in the Polytec SignalProcessor*.

Scan automatically

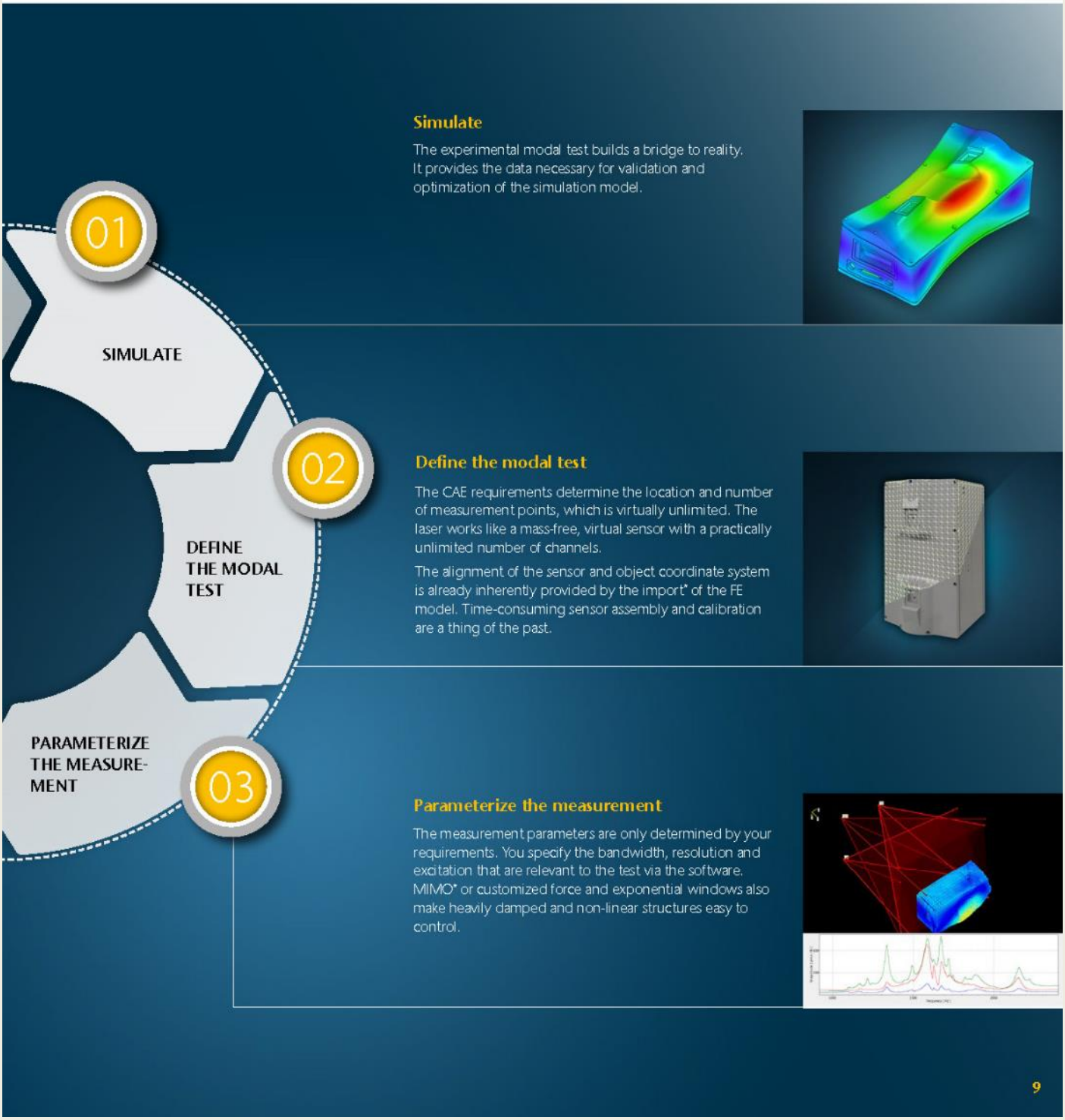
You start the measurement with a click of the mouse. The software controls the optimum focus during the measurement, so that even small deviations from CAE and real geometry are compensated for. The signal quality is evaluated at the same time. Several algorithms are available to derive the perfect signal from every measurement situation. You have time for other important tasks during the automatic measurement.



* optional ** depending on the model and configuration

8

The PSV Scanning Vibrometer provides an extremely powerful, easy-to-integrate platform to optimize your product development cycle, dramatically shorten time to market and increase product quality. Open data interfaces seamlessly integrate the PSV Scanning Vibrometer in your CAE workflow.



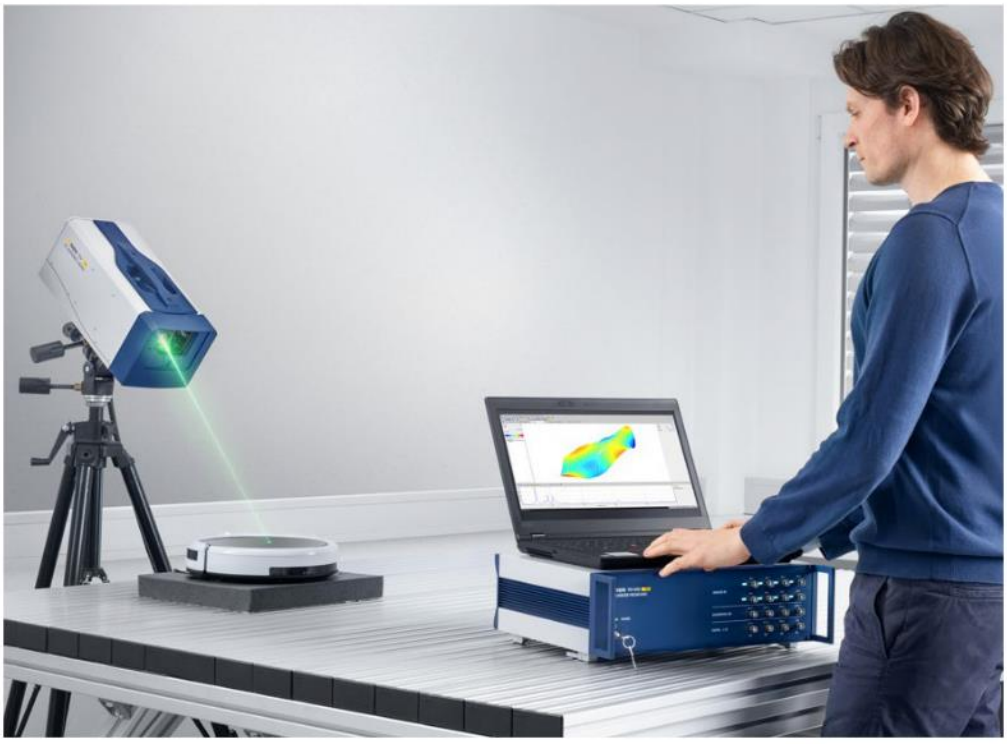
Flexible configuration

The PSV Scanning Vibrometer measures and visualizes vibrations from micro to macro up to 25 MHz – and down to the sub-pm range. The distribution of out-of-plane vibration amplitudes and phases is acquired across a wide area in the 1D configuration. It becomes a 3D system for measuring spatial vibration information simply by adding two more scan heads.

On the road or in the lab

The compact notebook variant enables mobile measuring worldwide. The carefully designed system cabinet* offers excellent ergonomics and storage options for everyday work. This means that the entire system is readily available when going from lab to lab.

* optional



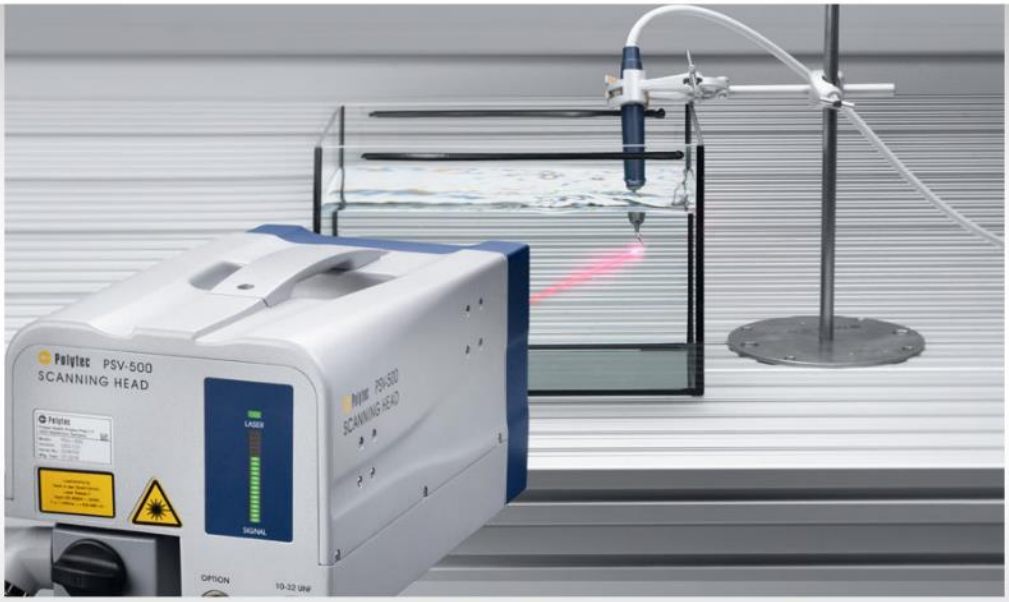
Our technological lead – for your application

Scanning heads with a helium-neon laser

The precise helium-neon laser with its small laser measuring spot is suitable for measurements on extremely fine structures and even measures in and through water and other transparent media.

Tiny structures

Transparent media (water, glass, etc.)



12

Polytec has been carrying out research for over 30 years to ensure the best performance of laser vibrometry in real-world applications. A large number of patents document this spirit of innovation. The path led us from our classic high-precision HeNe technology and the world's first use of infrared laser technology for top performance at high stand-off distances and low-noise digital data acquisition, to the next quantum leap in optical vibration measurement: the QTec® technology.

QTec® makes Scanning Vibrometer measurements up to 10 times faster. The patented multi-path interferometry eliminates the influence of rough surfaces on the signal quality and therefore measures reliably on all surfaces with low noise. **Each technology has its strengths in its area of application. With Polytec, the choice is yours.**

Large structures

No surface preparation

High vibration velocities up to 30m/s

Scanning heads with QTec® technology

The multi-path interferometer technology QTec® based on an infrared laser is the preferred choice if you wish to measure high vibration velocities of up to 30 m/s or from high stand-off distances. It specializes in acquiring meaningful measurement data, even on dark, moving or rotating objects, as well as biological objects.

More about the patented QTec® technology can be found at www.polytec.com/qtec

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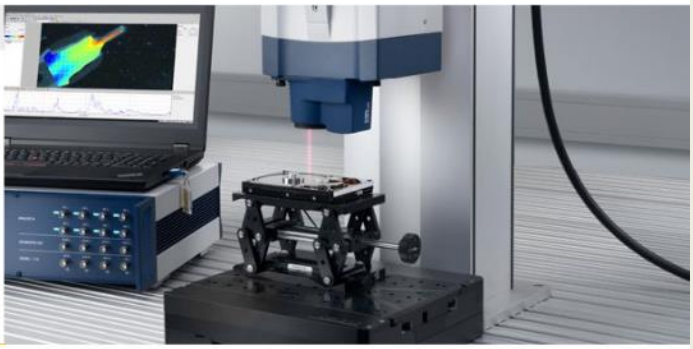
Growing with your demands

Every measurement task is different. We have learned this in over 30 years of scanning vibrometry. Together with our customers we have developed accessories that make each PSV Scanning Vibrometer applicable to your needs.

With the right accessories, you can...

...measure even the smallest components

Get really close: this is possible with the optical and mechanical accessories for positioning, illumination and magnification. This makes the finest structures visible and measurable.



...trigger on noise

Unambiguous measurement data is obtained with an adjustable acoustic gate unit for triggering the measurement even during transient processes.

...localize noise

With the acoustic fingerprint in your ear, you can find the specific source of the disturbance directly from the measurement data, unaffected by ambient noise.

...position precisely and flexibly

Correct alignment and fast measurement, even in difficult positions, with application-optimized stands. You have the choice, from manual to fully automated.

...master even complex geometry and measurement setups

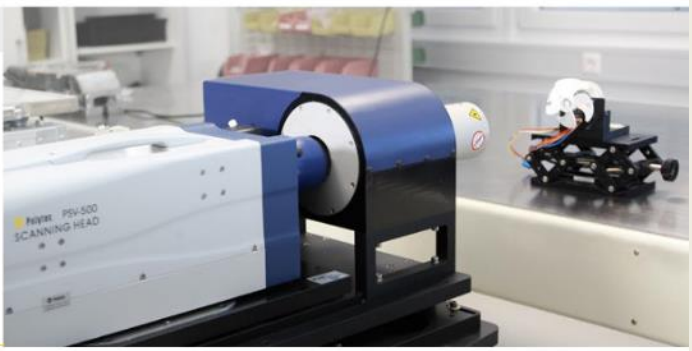
Complete geometry data not only helps with setup and measurement; it also provides a convincing presentation of the results. Texture and geometry measured with the hand-held 3D scanner complement the CAE interfaces of the PSV software to perfection.

...measure in tough test bench conditions/ wind tunnels

Highly sensitive optics in wind, noise, dirt and dust? Thanks to the optically tailored protective window, it can be done.

...measure on rotating parts

The derotator enables you to measure as easily as if the object were standing still. The rotation of the object is optically compensated for.



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Fully automatic vibration measurement in 3D

Polytec offers you a unique automated measurement station with RoboVib® by intelligently combining a 3D Scanning Vibrometer with an industrial robot. It is suitable for a wide range of different measurements – from complex components to entire vehicle bodies. RoboVib® enables you to automatically collect indispensable data for the development of your new product in a modal test.

16

Start faster

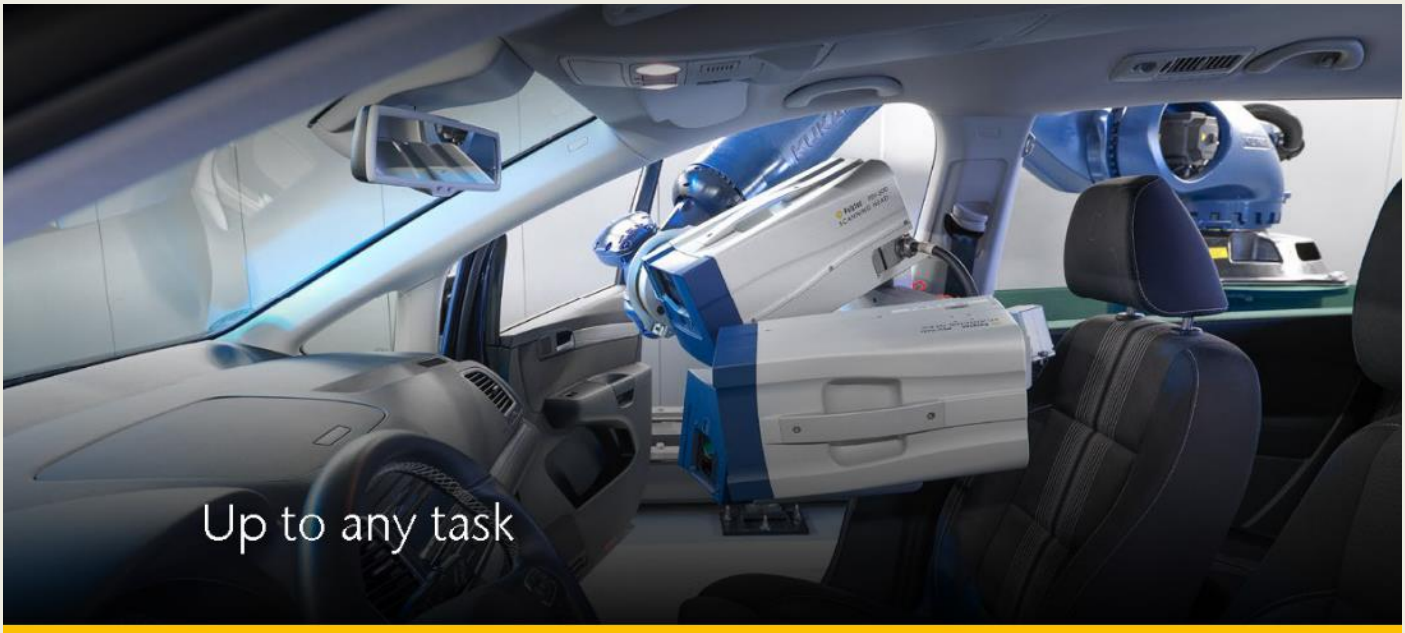
The test is prepared almost entirely on the computer. The robot program is defined in virtual rooms and the programming is checked for collision and subsequent result quality. Test rooms and prototypes are used exclusively for measuring. If you process similar objects, the programs can be reused or easily modified. This saves time, and serial measurements are also processed efficiently.

Measure faster

The laser method works extremely accurately and many times faster than conventional tactile methods. This means that the measurement data is sometimes available to you overnight and at a significantly higher spatial resolution derived from the finite element model. This makes it much easier to validate your models. For example, you can completely test a car body in 1-2 days, instead of spending weeks on the test preparation alone, as was previously the case.

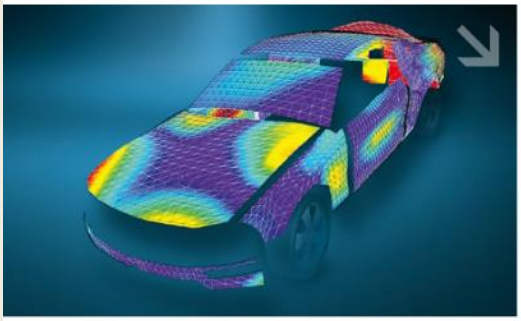
Faster time to market

Experienced Polytec engineers carry out planning, setup, measurement and analysis on your behalf. Polytec thereby ensures that your product reaches the market faster and better with test consulting, automatic experimental modal analysis and data evaluation.



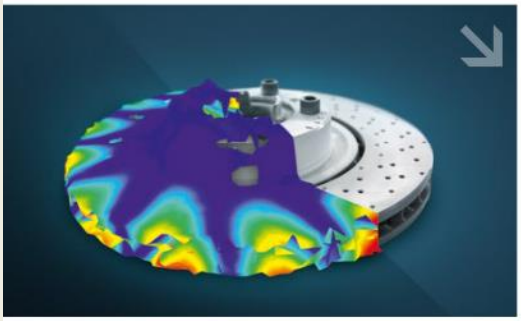
Up to any task

Vibration engineering tasks are the same in all industries. Amplitudes, resonance points and deflection shapes are essential for evaluating products during development and eliminating weak points. However, even if dimensions and frequencies vary, the dynamics and flexibility of PSV technology can meet your requirements.



Experimental modal analysis

An experimental modal test includes planning, setup, measurement of the transfer functions, display of the deflection shapes and curve fitting of the measured data. MIMO setups are configurable with PSV-3D at any time, in order to excite all modes reliably*. The PSV Scanning Vibrometer allows precise measurements at a high number of measurement points, resulting in very meaningful MAC values when comparing experiment and simulation.



Operating deflection shape analysis

Three-dimensional scanning vibrometry is a unique tool for you as a test and simulation engineer. It enables you to determine operating deflection shapes and eigenmodes of complex objects quickly and extremely accurately over a wide frequency range. Its non-contact method means that the PSV-3D Scanning Vibrometer guarantees reliable measurement data by reflecting the true vibration characteristics of the measured object. Ideal for your high demands regarding performance, accuracy and data analysis in structural dynamics testing and ultrasonic investigations.

* optional

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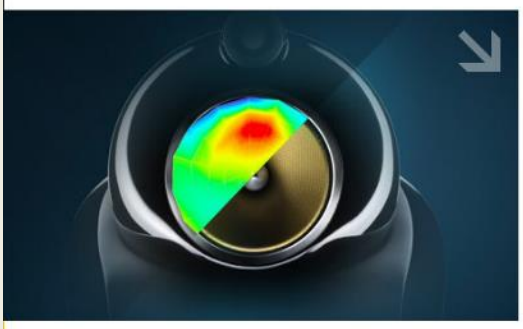
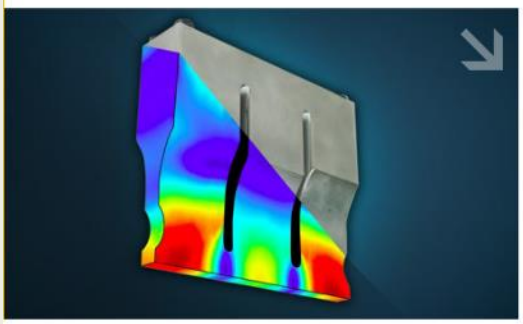


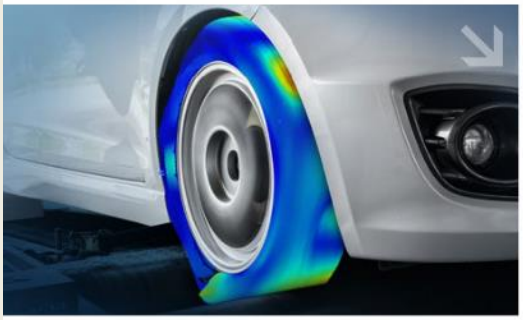
Acoustics & NVH

Designing quiet, low-vibration products is the task of simulation and testing. Scanning Vibrometers from Polytec enable you to detect sound sources quantitatively and with a high spatial resolution. 3D visualization helps you understand musical, medical and technical acoustics.



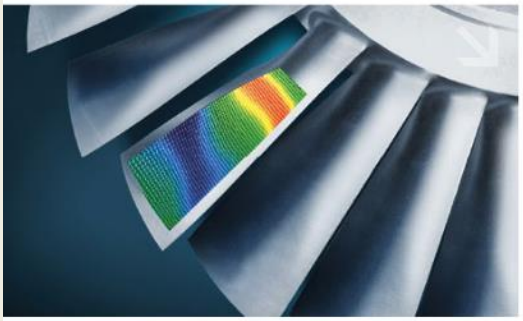
Ultrasound & non-destructive testing

Well-known manufacturers of ultrasonic equipment for industry and medicine rely on Polytec Scanning Vibrometers for their research and development. Measure and visualize vibration characteristics of actuators and sensors by means of laser vibrometry – the precise and reliable tool for FE validation, optimization and troubleshooting.



Rotating parts

Direct measurement on rotating surfaces represents a challenge for conventional measurement technology but is possible at any time with the PSV Scanning Vibrometer.



Stress & strain measurement

Scanning 3D vibrometry provides fast and accurate comparison of stress and strain calculations. It derives measurement points directly from the FE grid and avoids the instrumentation costs of conventional tactile methods. The high spatial resolution localizes and determines stress maxima, thereby improving component design.

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VII. JOINT ZOOM SEMINAR

The following joint zoom seminar was held on the International Noise Awareness Day,27 April 2022 at 4pm Singapore time jointly with the Society Vibration Acoustics Malaysia(SVAM) There were some thirty participants.

Name of Speaker: Associate Professor Nazli Che Din,Department of Architecture, Universiti

Malaysia.

CV of Speaker: Associate Professor Nazli Che Din obtained Bachelor of

Engineering(Architecture),Master's in Engineering(Architecture),PhD in Architectural

Acoustics all from the Oita University,Japan. He is a graduate Member of Board of Engineer

Malaysia,Architectural Technologist of Board Architect Malaysia,Engineering Technologist of

Board of EngineerMalaysia,Professional Technologist of Board Tedchnologist Malaysia. He is

also a member of the International Institute of Acoustics and Vibration(IIAV), and the

President of the Society Vibration Acoustics Malaysia(SVAM).He is currently the Deputy

Dean of Research and Development,Faculty of Built Environment.He has published several

papers, one book, book chapters and has several inventions.He is

also involved in several consultancy works.

Title of talk: Acoustics in Malaysia.:the Past,the Present and the Future

Summary of talk:

Malaysia is considered as one of the most competitive developing countries, and it is the

fifth largest in South Asia with the population is estimated to be 32.7 million people in

2021. With rapid development in Malaysia nowadays, environmental factors such as

noise became one of the public concerns. Hence, controlling noise became the top

concern in the development of acoustics in Malaysia. Further evolving into constructed

environment notably in big cities, superior understanding and experience of

environmental and architectural acoustics become mostly essential. These extraordinary

demands pave the way for collaborations between local and international acoustic

researchers, universities, and professionals in driving efforts such as a noise related study.

This presentation gives a summary of the developments of acoustics in Malaysia, covers

its past, present and portrays its future including the possibility of how the acoustical

professionals and academics in Malaysia would benefit from

worldwide partnerships and educations in acoustics.

Zoom ID: 822 8039 4497

Zoom Passcode: 678211

Zoom

link: https://us02web.zoom.us/j/82280394497?pwd=V0hjbXdTeEZFdXhFMkxwMVpqdm5HUT0

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The zoom seminar was free to all members of SVAM and SAS

and non-members will need to only a token SGD 10.

WE have already organised joint zoom seminars with Acoustical societies from Thailand, Indonesia,and Malaysia..

In this pandemic age, regional collaboration can work better than international

collaboration. **We will be looking forward in forming a regional ASEAN Acoustics**

and Vibration Commission compared with the Western Pacific Acoustics Commission.

There is tremendous scope for regional collaboration in acoustics and vibration such as organising the First ASEAN Acoustics Conference.

VIII.REPORT ON CONFERENCES

The Regional Conference on Acoustics and Vibration (RECAV) organised by the Society of Acoustics(Singapore) and the Association of Acoustics and Vibration Indonesia(AAVI) was successfully held in Bali,Indonesia from 27 to 28 Nov 2017. There were 110 presentations from 14 countries with 60% of them from Indonesia.

There were also some 18 exhibition booths. This reflected strong local participation and the international nature of the conference.

IX. BID FOR FUTURE INTERNATIONAL CONFERENCES

The Society of Acoustics(Singapore) will be hosting the ICSV28 in Singapore from 24 to 28 July 2022 at the Marina Bay Sands Hotel m as a hybrid event. Please visit website: www.icsv28.org.

The Society of Acoustics(Singapore) will be bidding for hosting the ICA 2031 in Singapore in 2031.

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Government Bodies

www.mom.gov.sg

www.nea.gov.sg

www.lta.gov.sg

Technical and Research Sites

Corporate Sites

www.metaultrasound.com

www.noisecontrols.com (The Society welcomes interested parties to contribute relevant websites to the above e useful links. For more information, please contact us. Thank you.)

Disclaimers

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President: Woon Siong Gan

E-Newsletter compiled by Woon Siong Gan