

CHANGE LEADERS

Interview With

Mr. Daniel L. Dumbacher, Executive Director,

The American Institute of Aeronautics and Astronautics (AIAA)

Virginia, USA

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Mr. Daniel L. Dumbacher

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- Building the space economy in low earth orbit is a unifying priority and this is reliant on constancy of purpose, as we move towards Moon, Mars and beyond. Technologies like Advanced Manufacturing, Artificial Intelligence, Robotics, Nanotechnology, Cybersecurity, Data Analytics - will have a lasting and positive impact on the Space Industry.
- Future workforce is s very important in the (A&D) industry. We need highly skilled workers. This is a significant concern, exacerbated by the global pandemic. Workforce Diversity and fostering inclusion by encouraging women and under represented minorities are important.
- AIAA is encouraged by how many countries are engaging in the space economy... it's not just a few countries exploring and commercializing space - the democratization of space has begun.
- Educational Institutions need to focus on Systems engineering, or inter disciplinary engineering, which has become more and more important.

“Change Leaders”, is a series of interviews by **The Global Trade Driver & Explore The Space** with leaders in business, science & technology academia, government - world over, whose actions and ideas have a positive and big impact in their field of work. Please give your valuable feedback to info@tgtd.biz



Dan Dumbacher currently serves as the Executive Director of The American Institute of Aeronautics and Astronautics (AIAA). Previously, he was a Professor of Engineering at Purdue University. Prior to joining the faculty at Purdue, Mr. Dumbacher served as the Deputy Associate Administrator, Exploration Systems Development Division, for the Human Exploration and Operations Mission Directorate at NASA Headquarters.

During his career, he has received numerous awards and honors. He was awarded the W.A. Gustafson Teaching Award at Purdue in 2015 and was named an AIAA Associate Fellow in 2016. In 2014, he was awarded the coveted Silver Snoopy Award, and the NASA Distinguished Service Medal.

Mr. Dumbacher earned a bachelor's degree in mechanical engineering from Purdue University in 1981 and a Master's in Business Administration from the University of Alabama in Huntsville in 1984. He has completed the Senior Managers in Government study program at Harvard University. Mr. Dumbacher has authored several papers on liquid propulsion technologies, space transportation systems development, and systems engineering.

In this absorbing interview with D.V.Venkatagiri, CEO, The Global Trade Driver and Explore The Space, Dan Dumbacher shares his insights on AIAA's work, and the emerging opportunities and challenges in the Space Technology and Industry. Readers are sure to find this interview very valuable.

1. What are the major challenges that AIAA is facing as an Industry Association today ?

The Covid-19 pandemic forced the AIAA staff to pivot in 2020 to continue offering meaningful programming and services to our members. We worked closely with our individual and corporate members and built a strong foundation on the challenges we faced together. Our members have shown their enduring commitment to perseverance throughout the past year. The AIAA staff is drawing on our learnings from the past year to help us succeed while we create the "next normal." We know we will be working in the virtual world for several more months into 2021. Even as we begin to feel comfortable with more face-to-face interactions, AIAA future events will be hybrid in nature – part in-person, part online – to maximize our reach and impact. AIAA sees the global air travel ecosystem working together to build the traveling public's confidence back with real data and communication. AIAA looks forward to continued improvement in the commercial aviation sector following the huge economic impact from the coronavirus pandemic.

AIAA encourages stable and dependable government budgets that align with clear and achievable goals in order to provide the means to conquer the technological challenges we face across the aerospace & defense (A&D) industry. This is particularly important as government budgets are stressed with the pandemic response and addressing the needed public health and economic priorities.

2. AIAA is an American organisation with a global membership base. How do you manage situations when the interests of different countries including USA have to be addressed ?

AIAA believes it is essential to bring people of all backgrounds together to further our industry – which can uniquely support our national and international goals and build a better life for everyone on Earth. AIAA is committed to creating an environment that fosters a diverse and inclusive dialogue. AIAA established an International Task Force with representation to the AIAA Board of Trustees and the volunteer International Activities Group. The resulting efforts and insights are helping AIAA accelerate the development of our international strategy.

3. What the key forces / issues that are driving changes in the global aerospace Industry today?

Economic recovery in the aerospace & defense (A&D) industry is vital. The A&D industry felt a huge economic impact from the coronavirus pandemic, especially in commercial aviation. The aviation manufacturing industry, workforce, and supply chain has been severely weakened by the COVID-19 pandemic and will take several years to recover. Near the end of 2020, we saw the global air travel ecosystem working together to build the traveling public's confidence back with real data and communication. AIAA looks forward to continued improvement in the commercial aviation sector.

Mr. Daniel L Dumbacher,
Executive Director, AIAA
speaks...



Sustainability in flight is leading the aviation industry toward decarbonization by 2050. Aviation connects the world – people with people, producers with consumers, supply with demand, ideas with resources, and much more, ultimately increasing global productivity, standards of living, economic opportunity, and quality of life. AIAA believes the preservation of these benefits requires that our aeronautical industries, government, and academia collaborate in setting forth, investing in, and achieving sustainability goals that propel us into a cleaner and greener future for the United States and the globe. AIAA is working to support the aerospace community to achieve net zero carbon emissions by 2050.

Building the space economy in low earth orbit is a unifying priority to drive technological progress, grow national economies through investment in businesses both large and small, and inspire people around the globe. The emerging space economy provides the sustainable foothold for the next steps of space exploration. The path to the moon and then onward to Mars is reliant on constancy of purpose. Stable and dependable government budgets that align with clear and achievable goals provide the means to

conquer the technological challenges found in deep space exploration without excessive cost and schedule growth. Space exploration channels our innovative and entrepreneurial spirit and benefits our economy here on Earth – the prime contractor industrial base, high-tech small businesses, and start-up companies excited and invigorated by our return to the moon. Human space exploration, as well as robotic exploration, working together with scientific research and technology development, continues to draw more nations to explore, as we venture forth to the moon and beyond.

The maturation of commercial supersonic vehicle development and operations is needed to achieve high-speed flight in the 21st century. In 2020, we saw a significant increase in the investment in, or intended development of, supersonic vehicles for commercial applications. Investments by industry, plus a stated desire from U.S. federal regulators to develop an approach that balances the recognition for innovation and exploration with environmental and safety concerns, reinforces recent economic projections of an industry generating tens of billions of dollars in revenue and requiring significant numbers of highly skilled engineers, technicians, and manufacturers.



International policies and standards will facilitate the safe and efficient operation of such aircraft. Policies and regulations must keep pace with innovation for this industry segment reach its full potential.

Future workforce development is one of the most important areas for focus in the aerospace and defense (A&D) industry. AIAA looks forward to seeing the A&D industry work force of tomorrow be more representative of our society as a whole. It is essential that we continue to attract and retain the skilled, diverse 21st century workforce that will drive our

industry into the future. Industry leaders and policymakers must work together on an urgent basis to address the forecasted demand for highly skilled workers. This is a significant concern that has been exacerbated by the global pandemic. Challenges remain for employers in governments, industry, and academic institutions to:

- Increase diversity and foster inclusion by encouraging women and under represented minorities to pursue careers in the A&D industry.
- Ensure that current education and training programs evolve so they stay aligned with a modern and ever-changing workplace.
- Encourage and support K-12 educational environments to use readily available online STEM curriculum repositories that include aerospace relevant topics.

4. Which country / which countries (other than USA, Russia, China, Japan, India, Australia, Canada, Germany, France and U.K) in your opinion is / are making rapid / surprising progress in the Space Industry?

AIAA is encouraged by how many countries are engaging in the space economy. India has made rapid progress and is making great strides in space as demonstrated by Chandrayaan, the Mars Orbiter Mission, development of launch systems, and more to come. The UAE is also making great strides. What's important today is recognizing that it's not just a few countries exploring and commercializing space – the democratization of space has begun. Not every country engaging in space commerce is a big player, and that's okay. We see many countries using space to build their research base and their economies. Human space exploration, as well as robotic exploration, working together with scientific research and technology development, continues to draw more nations to explore, as we venture forth to the moon and beyond.

We invite representatives from all these space-faring countries to join us for ASCEND in November 2021. Powered by AIAA, this fast-growing annual event is propelling the global conversation about space commerce, exploration, and new discovery. ASCEND is enabling a vital interdisciplinary ecosystem and building new on-ramps to space for all.



The crew-2 launch of four astronauts marks the first time Space X has flown humans on a previously flown capsule

5. How would you like to respond to the critics of NASA's deep space mission?

Humans have always been explorers, pursuing the next horizon. We need to continue exploring to secure our own future. We need to learn about other planets to help us better understand our own planet and address the crisis of climate change. In addition, exploration helps build an economic future for generations to come.

6. What has been AIAA's achievement in India market. Are there good number of India Members in AIAA? What is your plan or target for India market in the next 5 to 10 years?

AIAA believes it is essential to bring people of all backgrounds together to further our industry – which can uniquely support our national and international goals and build a better life for everyone on Earth. AIAA is committed to creating an environment that fosters a diverse and inclusive dialogue. AIAA

established an International Task Force with representation to the AIAA Board of Trustees and the volunteer International Activities Group, which are accelerating the development of a global strategy. India is a key part of the AIAA global strategy. As India's space efforts continue to grow and be more impactful, AIAA looks forward to a long and fruitful partnership.

AIAA currently has more than 300 members from India, a mix of professionals and student members (undergraduate and graduate levels). We are privileged that AIAA members from India have been engaged with the Institute over the years, writing technical papers, nominating members for awards, serving on technical committees, and attending forums. We would be pleased to involve even more aerospace professionals and students in India as members and I invite anyone considering becoming a member to learn more about the benefits at aiaa.org/membership.

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speaks...**



7. We (Explore The Space) are working on a major programme on Advanced Materials for Space Exploration Vehicles. Can we have your opinion / inputs on the kind of research that is going on to bring in more Advanced Materials for Space Vehicles....?

There is much research on many fronts related to advanced materials for space vehicles being performed today. It covers the entire range of metals, as well as composite materials. As the industry continues to develop advanced manufacturing methods for the various materials and new material systems, new design options are created, along with new opportunities for increased functionality and complex systems. Research on advanced materials is the foundation for making future systems real to address the needs of people around the world. It all come down to the materials need to create the systems we need.

8. What has been the kind and extent of damage caused by the Covid Pandemic on the global

aerospace industry and what is the status of the recovery?

The United States and much of the world are reeling from the Covid-19 pandemic and dramatic impacts to national economies. This has created a crisis for the aerospace and defense (A&D) industry. As with many other business sectors, A&D has felt a huge economic impact from the pandemic. Near the end of 2020, we saw the global air travel ecosystem working together to build the traveling public's confidence back with real data and communication. AIAA looks forward to continued improvement in the commercial aviation sector.

9. As an organisation, Explore The Space, is focusing on promoting awareness about Space Industry to the youth in Schools and Colleges across different geographies. Can we have your inputs please?

The AIAA Foundation is committed to offering a wealth of resources that support students and educators at both the K-12 and university levels. The vision of the AIAA Foundation is "To inspire and support the next generation of aerospace professionals." Efforts include K-12 STEM education programs including classroom grants and hands-on activities, college scholarships, design competitions, student conferences and recognition awards.

Future workforce development is one of the most important areas for focus in the aerospace and defense A&D industry. AIAA looks forward to seeing the A&D industry work force of tomorrow be more representative of our society as a whole. It is essential that we continue to attract and retain the skilled, diverse 21st century workforce that will drive our industry into the future.



Artist's conception of MER rovers on Mars

Ascend promotes the collaborative, inter disciplinary out comes-driven community of professionals, students and serious enthusiasts around the world who are accelerating humanity's progress towards our off - world future ! For more details please visit <https://www.ascend.events/>

10. In the last one decade or so, there has been many sweeping technologies - Artificial Intelligence, Nano Technology, Robotics etc - that have impacted the Space / Aerospace Industry. What kind of or which are the technologies, in your opinion will have a lasting and positive impact on the Space / Aerospace Industry?

In addition to artificial intelligence, nano technology, and robotics, I would add the following technologies that will have a lasting and positive impact on the aerospace & defense (A&D) industry:

Advanced Manufacturing: Advanced manufacturing will give us new ways to create new products or improve them, in addition to addressing challenges in the future.

Cybersecurity: Cybersecurity is an issue of growing prominence within the aerospace industry. It is becoming more and more essential to address cybersecurity on an ongoing basis in the mainstream of our core processes – from the design and development of new space systems to manufacturing and production to operations.

The aerospace industry is on a rapid growth trajectory, evidenced by boosts in private investments, new launch capabilities, and emerging commercial opportunities in low Earth orbit, to name a few. As we continue to drive this dynamic progress forward, we must aggressively protect it with strong cybersecurity practices.

Data Analytics: Across the A&D industry, we are using larger data sets and turning them into knowledge to inform our sound decision making to meet market needs.

Systems Engineering: Systems engineering, or interdisciplinary engineering, has become more and more important. The A&D industry must involve adjacent technologies such as artificial intelligence, nano technology, and robotics to address future challenges. There are challenges at the systems level and the marketplace is changing, so we must be more inclusive as an industry to include technologies that we are becoming more dependent upon. We also must address societal acceptance of what the industry is doing which makes policy and regulation even more important.

11. How equipped or prepared are the Colleges (Educational Institutions) to adapt their syllabus to the changing requirement of the Space industry?

We see great progress in educational institutions globally. Universities around the world are built on the technical disciplines, which is a strong foundation that must be retained. We also see the challenge for them to bring in adjacent disciplines and technologies in order to offer a more interdisciplinary and intra disciplinary education. We believe today's higher education must include systems thinking.

12. Be it the Oil or Computer or Pharma... all these industries have a great deal of international politics shaping their course... in such a scenario, how different is the Space Industry?

Global collaboration in space is essential. The international community has become more interrelated and engaged in space. What we do in space will require all of our capabilities and all of us working together to solve the challenges to continue making the progress we seek.

Glimpses of The Global Trade Driver & Explore The Space



ETS - Chennai Space Quiz Competition 2017- Winner -
Sir Sivaswami Kalalaya Sr. Secondary School Mylapore, Chennai



ETS - Chennai Space Quiz Competition 2018 - Winner -
Sir Bala Vidyalaya Senior Secondary School, Perambur,
Chennai



Raman - Armstrong Lecture Series on Space - Edition 1
Dr. Jayadeep Mukherjee, Director NASA FSGC along with
Dr. G. Gopinath, Registrar, Bharathidasan University, Tiruchirappalli
- December 2018



Certificate Course on "Introduction to Space Technology,"
Business Opportunities
PSCMR College, Vijayawada, August 2019



"Joy of Science", a fun-filled workshop,
RKM Hr. Sec. School (South), Chennai - February 2019



Online Quiz on Space Sciences & Technology
for School Students in UAE - July & August 2020

Established in 2016, "Explore The Space" (ETS), is an educational NGO promoting awareness on Space Sciences and Technology among Schools and Colleges through seminars, quiz programmes, study tours and research. ETS connects Institutions and Industry through its programmes.

Established in 2010, The Global Trade Driver (TGTD), is a niche facilitator of Businesses connecting Indian Companies within the domestic market and International Markets, particularly USA through Business Delegations, B2B meetings, Strategic Consultancy, Advocacy and other programmes.

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