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# SPACE BEYOND

The First Aviation & Aerospace Chronicle in Bangladesh

A BSMRAAU Publication

## Bangabandhu and Space Science in Bangladesh

Stepping into  
the Space Age

A report on BSMRAAU  
undertakings and  
accomplishments



Braving the  
Impact of COVID-19:  
Aviation Sector of Bangladesh

Face to face with the  
Vice Chancellor of BSMRAAU

Creating the next generations of  
space and aviation professionals

# Timeline of Aviation & Aerospace History

Men have sought after the power to fly since prehistoric days. Over thousands of years, countless tries have been made in Greece and in Rome, in Asia and in Europe by fearless souls to soar through the air, often met by tragic death. After a long wait, the Wright Brothers, on 17 December 1903, successfully flew their motor powered aircraft in the air of Kitty Hawk, North Carolina, United States.

The following Infographics welcomes readers to take a walk down the memory lane of our aviation history.

## Ancient Age

1700 BCE

**Greek mythological** figures Icarus and Daedalus explored the desire to fly by installing crafted artificial wings of feathers attached to the body with wax.



1000 BCE

Flying machines called **Vimanas** were mentioned in the Vedas with detailed description of their flights.



Flying Kites invented in China.

852 BCE

The legendary English **King Bladud** was apparently killed attempting to fly.



1010

**Roger Bacon** wrote the first known technical description of flight in his book 'Secrets of Art and Nature'.



875

**Abbas Ibn Firnas** from the Emirates of Cordoba built the first glider and attempts flight.



## Middle Age (AD)

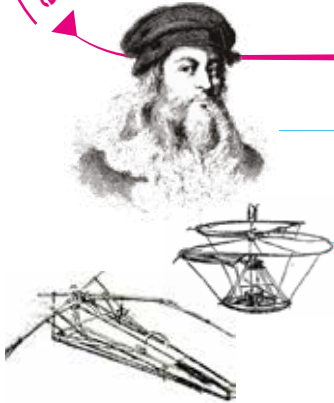
200 BCE

The **Chinese** invented sky lantern, the first hot air balloon.



1485-1500

**Leonardo Da Vinci** made many drawings and designs of flying machines, such as **helicopters** and **parachutes**, that were kept hidden and only discovered until 400 years after his death. (sketch dated 1488).



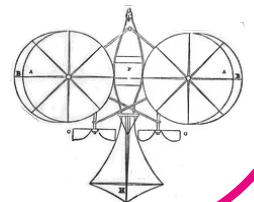
1700

The French used balloons to transport letters and passengers, **carrying 110 people and 3 million letters** in a single year.



1843

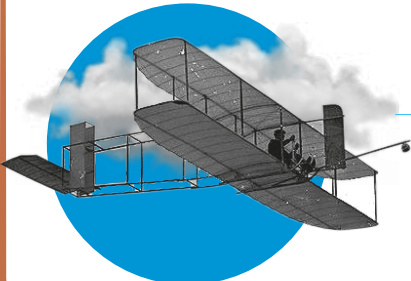
First Biplane designed was published by **George Cayley**.



1903

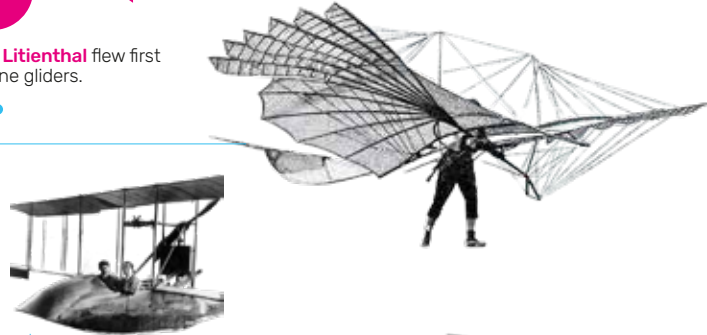
## Aircraft Age Begins

The **Wright Brothers** made the first manned, powered, controlled flight in a heavier-than-air flying machine.



1895

**Otto Litienthal** flew first biplane gliders.



1906

**Alberto Santos-Dumont** made the first successful powered flight in Europe.



1914

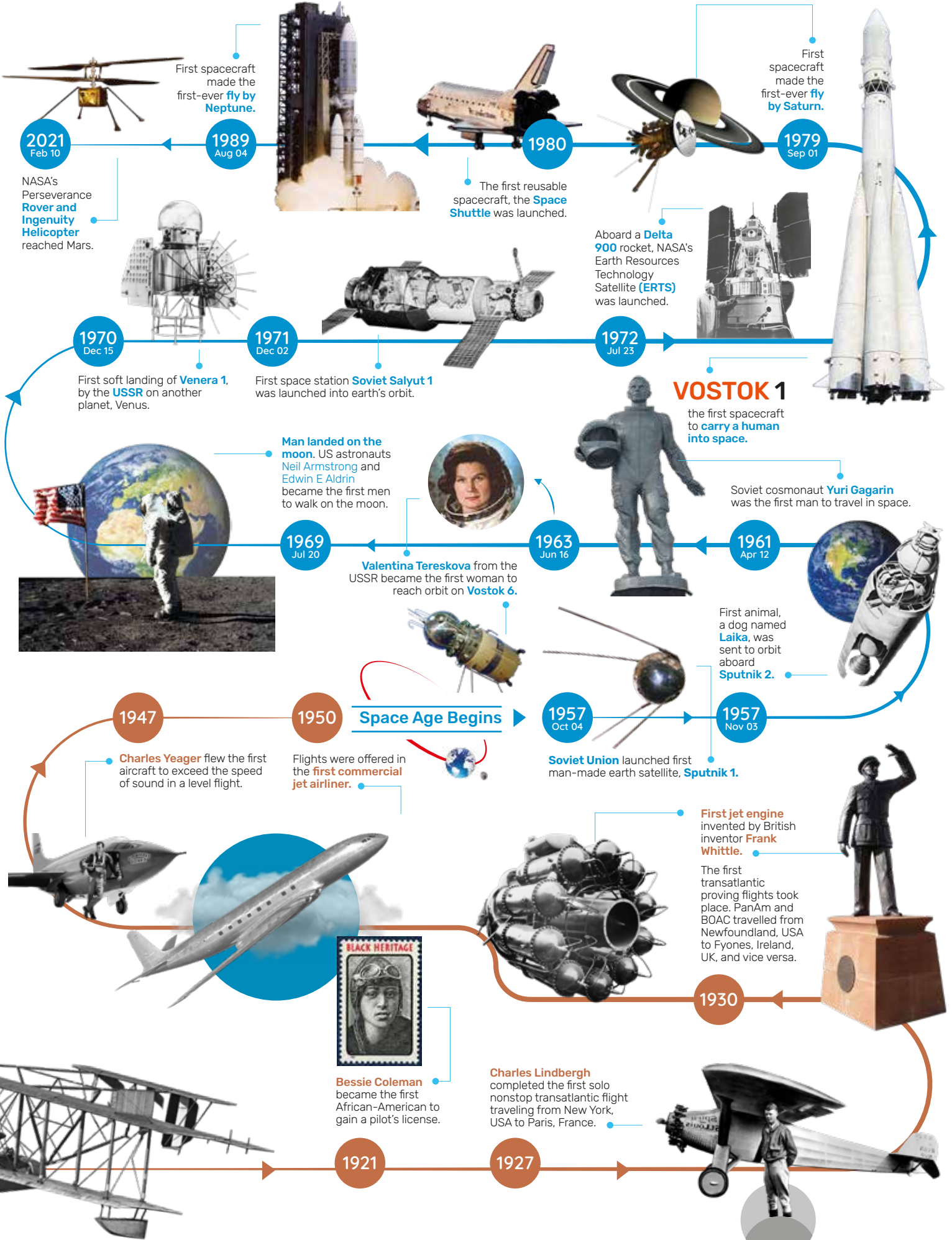
The **NC4** as the first plane crossed the Atlantic.

1919



Glider Age





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This colourful infographic illustrates different arrays of career lines that BSMRAAU students can pursue after the completion of their programmes.



Dear Reader,

Welcome to the Space & Beyond – the first aviation and aerospace chronicle of Bangladesh. This is a quarterly publication of Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU).

Building a knowledge-based aviation and aerospace echo system in Bangladesh entails creating and disseminating knowledge, keeping up-to-date with global trends and promoting academia-industry collaborations. Space & Beyond is a modest effort towards that end. Our aim is to promote knowledge, connect people and inspire the aviation and aerospace professionals, scientists and academia of Bangladesh and beyond. Accordingly, the chronicle is structured in sections to include aviation and aerospace related news, views, and short articles authored by the industry experts, scholars and students of BSMRAAU.

The lead story of this first edition of Space & Beyond explores the pioneering role of Bangabandhu Sheikh Mujibur Rahman in setting the foundation of Bangladesh's journey towards aviation and aerospace science and research. The regulatory and structural initiatives taken during the formative years of Bangladesh have paved the way for country's subsequent development and expansions in this sector. The rewarding 'Rendezvous' with the Vice Chancellor provides an insightful and holistic account of how this University is aligned with country's Perspective Plan 2041, and its future roadmap. The 'Perspective' section outlines BSMRAAU's current opportunities and potentials to pursue aviation and aerospace studies. The analytical article under 'Perusal' section explores the resilience and adaptive nature of country's aviation industry during the COVID-19 pandemic based on historical data of the air transportation sector. The 'Viewpoint' section includes gripping stories by our faculty and students on aviation and aerospace discipline and their captivating journey of joining the BSMRAAU family. Additionally, the infographics and sections under 'Campus', 'Aviation News', 'Ambit' and 'Carrier Point' apprise the inquisitive readers about aviation and aerospace trivia, news, events and opportunities. All in all, the varied contents are expected to appeal and provide solid information for inquisitive readers, aviation enthusiasts, and scholars alike.

Availing this opportunity, I would like to thank our Chief Patron, the Honourable Vice Chancellor, for his encouragement and support in bringing this first issue of Space & Beyond to light. My sincere appreciation to all the departments and contributors for their support. Finally, my deepest gratitude to the members of the Editorial Board including the Enlighten Vibes Team for their unwavering commitment to publishing this chronicle in time.

Sincerely

Group Captain **Mohammad Zahidul Islam Khan**, aesc, psc, PhD

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# Bangabandhu and Space Science in Bangladesh

Air Vice Marshal  
**Muhammad Nazrul Islam**

The desire to explore is an innate trait of humankind. By the turn of the 20th century, most of the land of the Earth had been explored and eyes began to turn to the skies. Men's quest to reach outer space turned into a reality when cosmonaut Yuri Gagarin became the first person to travel in orbit on April 12, 1961. On July 20, 1969, the American astronaut Neil Armstrong put his left foot on the lunar surface and famously declared, 'That's one small step for man, one giant leap for mankind.' Behind these early success stories of space exploration lies the spur and stride of visionary leaders, scientists, engineers and researchers.

**M**uch of the early space exploration was driven by the Cold War realities. As a result, the space programmes were secretive, competitive and prohibitively costly. However, with the growing awareness about the potential use of space to better understand our planet and to improve life on earth benefitting the whole of mankind, space science and technology programmes became more and more collaborative and accessible to developing countries like Bangladesh.

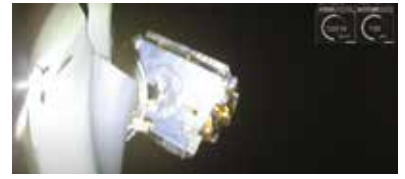


**Photo**  
Bangabandhu-1, the nation's dream satellite, is being lifted to orbit by SpaceX's Falcon 9 rocket from Kennedy Space Center in Florida, USA.



# Bangabandhu 1

propelled to its final geo-stationary orbital slot



The Earth Resources Technology Satellite (ERTS) programme of the United States of America was one such initiative launched around the time when Bangladesh emerged as an independent country. Under this programme, two experimental satellites - ERTS 1 and 2 (later renamed as Landsat 1 and 2), having almost identical orbital parameters, were launched into the space by the National Aeronautics and Space Administration (NASA) in July 1972 and January 1975 respectively. These were the first earth-observing satellites launched to monitor and study our planet's landmasses. The scientific mission of the ERTS (Landsat) programme was to provide the repetitive acquisition of high-resolution multispectral data of the earth's surface on a global basis to supply data to all nations participating in this programme.

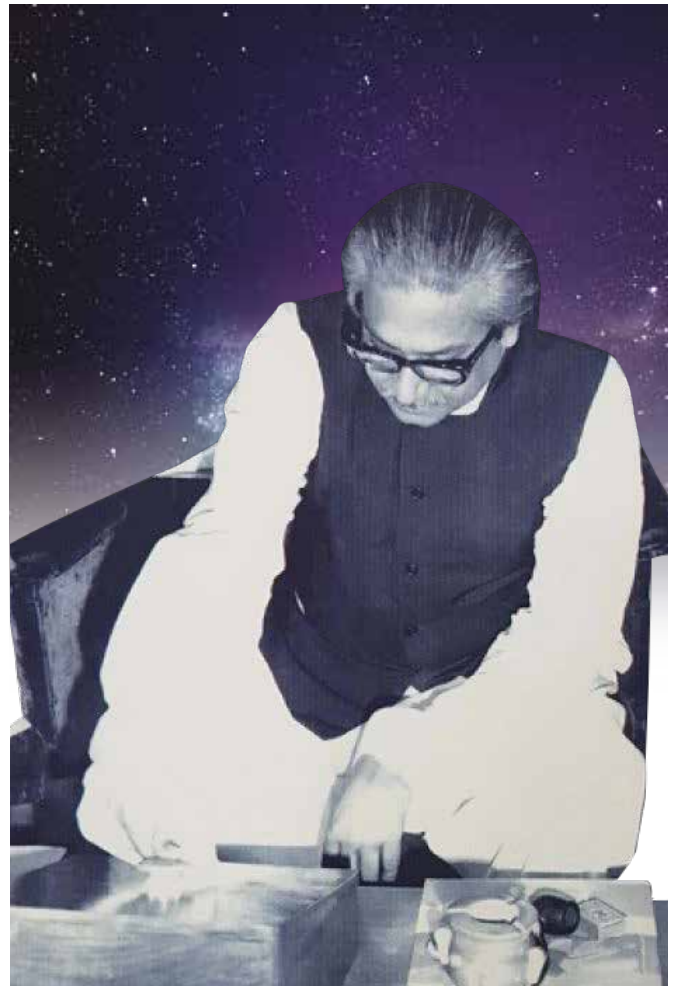
Bangladesh – then a newly born state, striving to overcome the wounds of war and rebuilding the country under the leadership of Bangabandhu Sheikh Mujibur Rahman, realised the importance of the new technology. A hurriedly prepared proposal was sent to NASA to participate in the ERTS programme and by February 1973, Bangladesh received the first ERTS (Landsat-1) imagery. Nearly 46 years later, Bangladesh became the 57th nation to have its satellite in space, transforming country's communications and broadcasting sector, reducing external dependency and accelerating the pace of building a digital Bangladesh. This article explores the remarkable history of space science in Bangladesh with a focus on Bangabandhu's vision about space science and technology.

## Building the Foundation

The cornerstone of Bangabandhu's vision was his love for the people of Bangladesh. He wanted to see Bangladesh becoming a worthy equal amongst the comity of nations. To achieve economic emancipation, Bangabandhu emphasised on science and technology-oriented education and indigenous capacity building. In his address at the first convocation of the Bangladesh University of Engineering and Technology (BUET) on March 20, 1973, and also at an assembly of teachers and writers in Chattogram in 1972, Bangabandhu highlighted the need for 'producing skilled human resources' and underscored 'acquiring and producing technological knowledge to offset external dependence.' But it was not easy to achieve this overnight for a war-ravaged country – particularly in the field of space science and technology.

As an astute statesman and visionary leader, Bangabandhu took several founding steps to advance space science and technology research in Bangladesh. As alluded to in the introduction, soon after liberation, Bangladesh joined NASA's ERTS programme.

“As an astute statesman and visionary leader, Bangabandhu took several founding steps to advance space science and technology research in Bangladesh. The visionary steps taken by the father of the nation during the formative years of Bangladesh have paved the way for the country's subsequent engagements and expansions in space science.”



**Photo**

Bangabandhu officially inaugurating the Betbunia Satellite Earth Station on June 14, 1975



The programme was a major step in the merger of the emerging space and remote sensing technologies for the efficient management of earth's resources through research and development. Bangabandhu realised the benefit of the programme— in particular, its ability to provide scientific information to reduce disaster impacts on human lives and asset and natural resources appraisals. To accrue the benefits, he not only embraced the programme but also embarked on structural and policy reforms.

A people-centric approach drove Bangabandhu's structural and policy reforms. In 1972, Bangabandhu established the Space and Atmospheric Research Centre (SARC) within Bangladesh Atomic Energy Commission (BAEC). He also placed the ground station of Automatic Picture Transmission (which was set in 1968) under the function of SARC. A principal investigator was appointed for the national ERTS programme later renamed as

Bangladesh Landsat Programme (BLP) in 1973 and a Task Force was formed to facilitate the country's participation in NASA's Landsat programme.

As a visionary policy maker, Bangabandhu empowered the BAEC 'to carry out space and upper atmosphere research' and to co-operate with any foreign national authority or international organisation in respect of the peaceful uses of atomic energy and space and upper atmosphere research. The policy initiative also included steps like the formation of a National ERTS Committee for inter-ministerial coordination (in March 1974) and an independent body for Landsat studies under the Science and Technology division of the Cabinet. Consequently in 1974, Bangladesh signed an agreement with NASA ensuring formal participation in NASA's Landsat programme. Overcoming the initial challenges, Bangladesh started receiving the Landsat imagery and data— a trend that only continued to expand, enabling the scientists and analysts to use those for various scientific research projects.

The establishment of the first satellite earth station at Betbunia, Rangamati was another notable milestone during the era of Bangabandhu. He inaugurated the station on 14 June 1975, opening Bangladesh to the advanced telecommunication system to the outside world. Many amongst the older generation would remember the live telecast of the historic boxing bout between great Muhammad Ali and George Foreman in state-owned Bangladesh Television (BTV) - made possible by the Betbunia satellite earth station. The earth station was revamped with modern facilities in 2018 to serve as the secondary control centre for Bangladesh's first satellite, Bangabandhu-1, discussed later in the article.

The structural and policy reforms initiated by Bangabandhu were watershed moments for space researchers and scientists using remote sensing data. The visionary steps taken by the father of the nation during the formative years of Bangladesh have paved the way for the country's subsequent engagements and expansions in space science.

## The Journey Continues

Following the footsteps of the father of the nation, Bangladesh continued its pursuit for the peaceful use of space technology to benefit its people. The formation of the Space Research and Remote Sensing Organisation (SPARRSO) by merging the SARC and BLP in 1980 and the promulgation of the Bangladesh Space Research and Remote Sensing Organisation Act, 1991, provided a boost to the researchers using the remote sensing data. It helped to build indigenous capacity to apply space and remote sensing technology to survey the natural resources and monitor the environment and natural hazards in the country. SPARRSO has been entrusted with the task of providing relevant information in formulating national, regional and international policy concerning space science and remote sensing



Photo  
Bangabandhu raising the National Flag at the inauguration ceremony of Betbunia Satellite Earth Station on June 14, 1975



technology and their application in sustainable development. It is also responsible to promote regional and international cooperation and collaboration in peaceful uses of space science and technology.

The nucleus of space science and research, created during Bangabandhu's era, expanded over time to include many other sectors. The growing familiarity with the visual and computer analyses of satellite and airborne data for application in various sectors of the national economy led to the proliferation of the use of remote sensing data for different types of research.

The most common application of remote sensing data in Bangladesh is centred on the study of geology, meteorology, agriculture, forestry, statistics, fisheries, oceanography, cartography, water resources, and instrumentation. The expansions enabled research on flood forecasting, coastal zone monitoring, river mapping, seasonal variation in water flow and disaster signalling. Central to these expansions were a people-centric approach and indigenous capacity building – as envisioned by Bangabandhu. The country eventually was poised to enter into the space age – in particular, by launching its satellite into space and establishing a specialised university for aviation and aerospace research and development.

## Entering the Space Age



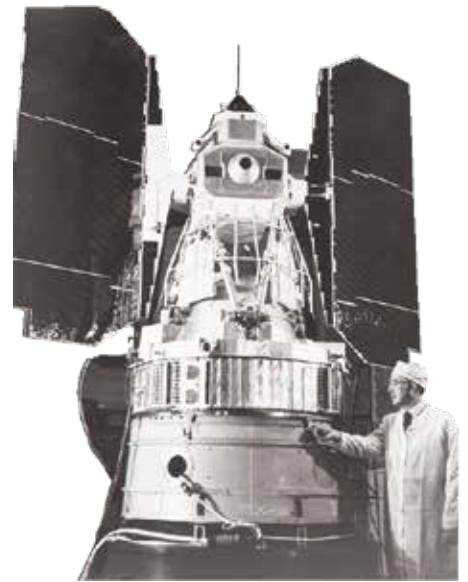
### Image Detail

Bangabandhu-1 satellite's coverage area

Materialising the dream of the Father of the Nation to reduce external dependency through the indigenous capacity building has been expedited under the great vision and farsightedness of our Honourable Prime Minister Sheikh Hasina. The successful launching of the Bangabandhu-1, country's first geostationary communications and broadcasting satellite, in May 2018 on-board Falcon 9 version 1.2 rocket from the SpaceX launch site at Cape Canaveral,

Florida, marked Bangladesh's phenomenal entry into the space age. This 3.5-metric ton platform, developed by Thales Alenia Space has two deployable solar arrays with batteries and a design lifespan of 15 years. The collaborative nature of the space projects is evident from the fact that the satellite was developed by a French company, placed into orbit by a US entity and the orbital slots were leased by Russia.

The major applications of Bangabandhu-1 satellite include Direct to Home (DTH) encrypted digital TV and radio signal transmission to the consumer, very small aperture terminal (VSAT) communications, backhaul and trunking, network restoration, and disaster preparedness and relief. Its primary service area is Bangladesh and neighbouring countries, while secondary service areas include South East Asia, Europe, Middle East and North Africa (MENA), as well as East Africa. The satellite is expanding and developing telecommunication and internet services around the country and beyond. It also enabled the country's telecommunication and broadcasting sector to reduce dependency on satellite services provided



February **1973**

Bangladesh joined NASA's ERTS programme and started receiving Landsat images



JUNE **1975**

Bangladesh commissioned its first Standard A Satellite Earth Station at Betbunia

February **1991**

The formation of the Space Research and Remote Sensing Organisation (SPARRSO)



May **2018**

The successful launching of the Bangabandhu-1 -country's first satellite



Photo  
BRAC-Onnesha, Bangladesh first nano-satellite

The deployment of BRAC Onnesha – country’s first nano-satellite, in the orbit from the International Space Station in 2017 is one such example of the nation’s potentials in this field.

by others and accelerate the growth and penetration of widespread digitisation in Bangladesh.

The home-grown capacity to develop nano-satellite has also contributed to Bangladesh’s entry into the space age. These small space crafts are poised to become powerful tools for space exploration for reasons that are easy to understand. The trends in technology miniaturisation have made it possible to develop small satellites on a mass scale, which are perhaps more sophisticated and capable than large satellites of the past. The deployment of BRAC Onnesha – Bangladesh’s first nano-satellite in the Orbit from the International Space Station in 2017 is one such example of the country’s capacity in this field. These platforms are much more tolerant of the inherent risks and technical challenges of spaceflight. The acceptability of the risks and cost of production associated with the small spacecraft projects against the trade-off of rewards of knowledge gained is likely to attract many more scientists and entrepreneurs to invest their time, money and talents in such projects. In sum, Bangladesh has made a humble entry into the space age leveraging the public and private initiatives in the field of satellite technology. The challenge now is to sustain, accelerate and expand this entry into the full spectrum of space technology to materialise the peaceful use of space and upper atmosphere research, envisioned by Bangabandhu.

## Sustaining the Entry into Space Age

Ensuring a steady flow of skilled human resources is one of the key aspects to sustain and expand any scientific endeavour. That is why every country in the world aspires to become a knowledge hub. Higher educational institutes and research centres play a key role in creating and sustaining a knowledge-based society. To that end, the establishment of the Bangabandhu Aviation and Aerospace University (BSMRAAU) under the active patronage of the Honourable Prime Minister in 2019, has become a key enabler for sustaining and expanding the country’s capacity in space science and technology research. The mission of the university is to transform people into aviation, space and technology professionals and enthusiasts, by providing world-class education.

The inception of this university is aligned with the country’s 2nd Perspective Plan 2021-2041 which envisions establishing Bangladesh as a knowledge hub country by 2041 emphasising the aviation and aerospace sector- among others. According to the Perspective Plan, this sector needs



Photo  
Mohammad Ashir, a young aviation enthusiast from Bashkhal meets VC, BSMRAAU with his amazing model of an aeroplane

Programmes like MSc in Space System Engineering, MSc in Satellite Communication Engineering and MSc in Aviation and Space Law will be the first of their kind in Bangladesh. These graduate programmes will enable the country to reach and connect students and young professionals to inspire Bangladesh’s next space generation.



## Bangabandhu-1 satellite ground station

The main ground station for **Bangabandhu-1** satellite in Gazipur's Telipara



“professional and skill-intensive” human resources and capacity to ensure “high productivity, high-income activities” – contributing to transform Bangladesh into a developed country by 2041.

Pursuant to its mission, BSMRAAU is going to introduce several graduate programmes related to space science. These programmes are in addition to the ongoing aeronautical engineering and avionics related studies. Programmes like MSc in Space System Engineering, MSc in Satellite Communication Engineering and MSc in Aviation and Space Law will be the first of their kind in Bangladesh. These graduate programmes will enable the country to reach and connect students and young professionals to inspire Bangladesh's next space generation. At the same time, other aviation and aerospace-related undergraduate and graduate programmes of the university are also going to contribute towards creating a growing cohort of science and technology enthusiasts and practitioners. The research and innovation activities of the university are expected to progressively create a knowledge base and expertise on aviation and aerospace research in general and satellite technology in particular.

### End Thoughts

At the root of Bangladesh's remarkable journey into space lies Bangabandhu's vision. The father of the nation's emphasis on education and patronisation of science and technology-oriented initiatives laid down the stepping stones of Bangladesh's journey toward the space age. The structural and policy reforms for space science research have been further expanded and accelerated by the initiatives of his daughter facilitating Bangladesh's entry into space.

From a humble beginning of conducting researches on remote sensing imagery obtained by space-based resources, Bangladesh has today been able to launch its satellite into orbit and reduce the external dependency of the country's telecommunication and broadcasting sector. The sustenance and expansion of Bangladesh's remarkable progress in the field of space science and technology hinges on creating the next generation of space scientists and enthusiasts – a task that BSMRAAU is committed to pursuing without an iota of failure. 🌍

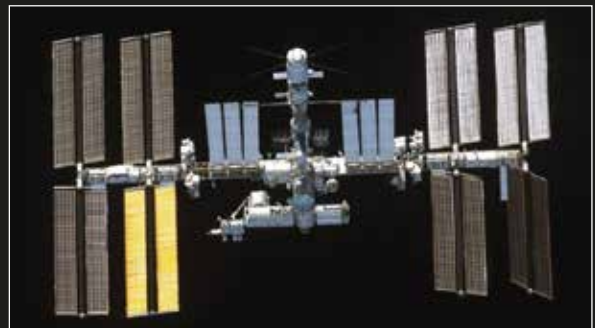
Air Vice Marshal, **Muhammad Nazrul Islam**, BSP, nswc, afwc, psc, GD (P)  
Vice Chancellor, BSMRAAU

### Fun Facts and Trivia ▶

# ISS International Space Station



- After the moon, the ISS is the second brightest object in our night sky - you don't even need a telescope to see it zoom over your house
- The ISS weighs about 420,000kg, that's about the same as 320 cars
- It flies through space about 250 miles from the Earth - a craft can get there from Earth in about six hours
- An international partnership of five space agencies from 15 countries operates the International Space Station
- 230 individuals from 18 countries have visited the International Space Station
- The space station has been continuously occupied since November 2000
- An international crew of seven people live and work while traveling at a speed of five miles per second, orbiting Earth about every 90 minutes.
- In 24 hours, the space station makes 16 orbits of Earth, traveling through 16 sunrises and sunsets
- The living and working space in the station is larger than a six-bedroom house (and has six sleeping quarters, two bathrooms, a gym, and a 360-degree view bay window)
- The astronauts living at ISS work out at least two hours a day
- Astronauts and cosmonauts regularly conduct spacewalks for space station construction, maintenance and upgrades
- The solar array wingspan (356 feet, 109 metres) is longer than the world's largest passenger aircraft, the Airbus A380 (262 feet, 80 metres).





## Stepping into the

# S P A C E A G E

A report on BSMRAAU undertakings and accomplishments

**BSMRAAU** is the only specialised public university of Bangladesh with a focus on aviation and aerospace sector

Pro-Vice Chancellor  
Air Commodore **Md Monjur Kabir**

**T**he inception of Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU) is rooted in Bangabandhu’s philosophy of education and the need for indigenous capacity building for national development. The process of materialising the dream of the Father of the Nation has been expedited with the great vision and farsightedness of our Honourable Prime Minister Sheikh Hasina. Under her active patronage, Honourable Education Minister Dipu Moni placed the Bangabandhu Sheikh Mujibur Rahman Aviation & Aerospace University Act -2019 in the National Parliament which was passed on 28 February 2019 facilitating the establishment of this university.

The BSMRAAU Act empowers this university (Article 6) to conduct teaching, learning and research activities on Aviation Engineering, Science and Technology, Aviation Management, Military Strategy, Security, Business Studies, Aerospace and Aviation Studies, National Security and Development Studies.

The foundation of this university is aligned with country’s Perspective Plan 2021-2041 which envisions of establishing Bangladesh as a knowledge hub country by 2041. According to the Perspective Plan, the aviation sector needs ‘professional and skill-intensive’ human resources and capacity to ensure ‘high productivity, high-income activities’ – contributing to transform Bangladesh into a developed country by 2041. Encapsulating the insights stemming from the national



### Vision

to become a leading international university in the field of aviation, space and technological studies through capacity building



### Mission

to transform the aspiring youth into aviation, space and technological professional and enthusiast by providing world class education

aspirations, guidelines and the BSMRAAU Act, the university has set its vision as: ‘to become a leading international university in the field of aviation, space and technological studies through capacity building.’ Consequently, the mission of the university is ‘to transform people into Aviation, Space and Technological professional and enthusiast by providing world class education.’

This report provides a brief summary of the academic activities, collaborations and significant recent activities of BSMRAAU.

Photo  
Internet



All happy faces captured at the launching ceremony of BSMRAAU academic session 2019-20 with Honourable Education Minister Dipu Moni along with VC, Pro-VC, faculty members and the students

## Pioneering History

The inception of BSMRAAU on 28 February 2019 was not just a drop in the ocean, but the entire ocean in a drop. It is the only public university for aviation and aerospace studies and research in Bangladesh destined to fulfil a national aspiration. Guided by the higher National Education Policy 2010 (NEP 2010) and Strategic Plan for Higher Education in Bangladesh 2018-2030 (SPHE 2030), this university is on track in building capacity, introducing new programmes and establishing faculties, departments and institute to produce aviation and aerospace professionals, scientists and enthusiasts.

By dint of law, the university is linked with Bangladesh Air Force (BAF) - the largest stakeholder of aviation assets, establishments, and knowledge repository in Bangladesh. BAF is facilitating much of its ongoing activities and functioning in these formative years. As per the Law, the university is also responsible for supervising, managing, developing and maintaining the required standard of the academic activities of all aviation and aerospace-related institutes, academies and training centres of the country including those of BAF. The first office of the university was established at the Helicopter Simulator Institute (HSI) - a BAF facility in Dhaka. The office later shifted to its current location at the Old Airport Building - another BAF facility, and within months, started its academic activities, inaugurated by the Education Minister on 5 Feb 2020.

## Academic Activities: The Beginning

The quick-witted start of BSMRAAU's academic activities, within a few months of inception, was made possible by the hard work and commitments of our pioneers. Their hard work entailed provisioning the capacity and resources to conduct the aviation and aerospace programmes, preparing the unique curriculums and meeting University Grant Commission's (UGC) rigorous inspection requirements to enrol students. Initially, two graduate and one undergraduate programme namely: BSc in Aeronautical Engineering, MBA in Aviation Management and MSc in Aviation Safety & Accident Investigation, with the capacity of 30 students for each, were approved and the first batches of students for these programmes were enrolled.

At the beginning of our 4<sup>th</sup> year of inception, BSMRAAU has attained the capacity of conducting **02 undergraduate** and **05 graduate** programmes on aviation and aerospace discipline for nearly **300 students** - a remarkable feat attained by any public university during its formative years.

The in-campus class started from February 2020. However, our initial zeal and enthusiasm of in-campus academic activities got dampened by the onset of the global pandemic. Nevertheless, the BSMRAAU family proved resilient and adaptive. Braving the COVID-19 challenges, the university continued its academic activities using online platform including the conducting of exams. All students at the university were vaccinated and the in-campus academic activities resumed from October 2021 - allowing the team to operate with renewed zeal and enthusiasm.

## New and Upcoming Academic Programmes

Our efforts to start new programmes continued. Apart from enrolling the 2nd batch of students to the three on-going programmes, the university also introduced one undergraduate programme on Aeronautical Engineering (Avionics) and one graduate programme on Space Law in 2022 academic year. Two other graduate programmes on space system and satellite communication engineering have also been approved and the students will be enrolled in these programmes by July 2022. At the beginning of our fourth year of inception, we have attained the capacity of conducting two undergraduate and five graduate programmes for nearly 300 students on aviation and aerospace discipline - a remarkable feat attained by any public university during its formative years (see table 1 for details).

Programmes	Duration	Status
BSc in Aeronautical Engineering (Aerospace)	4 Years	Started in Jan 2020. Two batches
BSc in Aeronautical Engineering (Avionics)	4 Years	Started in Jan 2022. One Batch
MSc in Aviation Safety & Accident Investigation	2 Years	Started in Jan 2020. Two batches
MBA in Aviation Management	2 Years	Started in Jan 2020. Two batches
MSc in Aviation and Space Law	2 Years	Started in Jan 2022. One Batch
MSc in Space System Engineering	2 Years	Will start in Jul 2022 One Batch
MSc in Satellite Comm Engineering	2 Years	Will start in Jul 2022 One Batch

Table 1  
List of approved programmes at BSMRAAU





BSMRAAU signed MoUs with leading academic and industrial bodies for collaborative progress, research & development

Entity	Remarks
Swiss Drone, Switzerland	MoU Signed
Airbus	MoU & LoA Signed
North-western Polytechnic University, China	MoU Signed
Civil Aviation Authority of Bangladesh (CAAB)	MoU Signed
Straight Soluventions	MoU Signed
University of Dhaka, Bangladesh	MoU Signed
Cranfield University, United Kingdom	MoU Signed
University of Surrey, United Kingdom	MoU Signed
Bridge to Bangladesh, LLC	MoU Signed
Pico Satellite Company	MoU Signed
Aspire to Innovate (a2i), Bangladesh	MoU Signed

Table 2  
List of collaborations

In addition, the capacity and curriculum development for four more MSc programmes are underway. These are, MSc in Autonomous System Engineering, Aircraft Maintenance Engineers, Aeronautical Engineering (Aerospace) and Aeronautical Engineering (Avionics). By 2022-23 the university is likely to be capable of running these much demanding programmes. Keeping in mind these new programmes the university is developing its faculties and making new laboratory facilities as well as expanding its collaboration and cooperation with relevant entities.

### Collaboration

As a new and specialised university, BSMRAAU is actively seeking collaboration with reputed aviation and aerospace entities at home and abroad. Such collaborations are expected to help in faculty development, catalyse innovation and growth in technology and research. To facilitate the process of collaboration, the university has

signed a number of MoUs and LoA with several leading national and international universities and industry partners (see table 2 for details).

Apart from these, we have developed the curriculum and obtained academic council's approval for five undergraduate and two post graduate courses. However, student enrolment for these courses will start as we acquire the required capacity- in terms of faculty and infrastructure facilities. The university is in active communication with the University of Surrey and University of Cranfield to develop our faculty for these courses- in particular, the courses related to Space System Engineering and Space Communication & Navigation Technology.

### Faculty and Student Cohorts

A university can only be as good as its students and faculty. The quality of the faculty is central to disseminating knowledge to the students and assisting

Compared to the year 2020 there has been a nearly **72%** increase in the number of applicants



Games and sports develop a sense of friendliness and team spirit among the learners. Here, we are looking at the university football team along with their mentors showing the V-sign for victory

students with their learning process. We have implemented the Outcome Based Education (OBE) - a student-centric teaching and learning methodology, in which the programme development, delivery, and assessments are planned to achieve specific, measurable, attainable, result-focused, and time-bound objectives and outcomes.

In December 2021 we held country's first-ever seminar on Industry-University collaboration. The seminar exposed our students to the industry professionals and their expectations. In January 2022, we teamed-up with globally reputed scientists and aviation scholars to train and inspire our newly recruited faculty members. Eminent Indian space scientist and former Chairman of Indian Space Research Organisation (ISRO), Prof A.S. Kiran Kumar, Pro-Vice Chancellor of Cranfield University Prof Dame Helen Atkinson and Prof Nazmul Ula, of Loyola Maryland University, USA. conducted sessions in our faculty training event.

As a student focused university, each year we send our teams beyond Dhaka to Chattogram, Jashore, and Lalmonirhat for conducting the admission tests. Arranging

the admission tests in different parts of the country has lessened the aspiring students' long-distant travel need. We have observed an exponential growth in the number of students applying to join our undergraduate programmes. Compared to the year 2020, there has been a nearly 72% increase in the number of applicants seeking admission at BSMRAAU. It reflects that a large number of youths are primed to have a career in the local and global aviation and aerospace industry.



Institutional Quality Assurance Cell (IQAC) organised a 12-day workshop on OBE, participated by faculty members and senior leadership of the university

## Research and Publications

The small but enlightened faculty of BSMRAAU is active in research and innovation activities. The in-house drone project is maturing and expanding. The faculty members have also published their research paper in reputed national and international journals. A total of eight research papers authored by the faculty members of this university on diverse topics have been published. A book chapter authored by one of our faculty members was included in the book titled 'Bangabandhu and Bangladesh: An Epic of a Nation's Emergence and Emancipation,' published by BISS, marking the birth centenary of the Father of the Nation and fifty years of Independence.

## Conclusion

As a strategic tool of the government to achieve the projected developmental goals, we are committed to providing quality assured education, keeping in mind the local and global trends and demands of the aviation and aerospace sector. Our graduates are expected to possess advanced technical competence and an understanding of the broad conceptual and theoretical aspects of their fields of specialisation. 🇬🇧

Air Commodore **Md Monjur Kabir Bhuiyan**, BUP, nswc, ndc, afwc, psc, GD(P)  
Pro-Vice Chancellor, BSMRAAU

BSMRAAU inks contracts with Vitti Sthopati Brindo & Dev Consultancy service for feasibility study, master plan and DPP preparation for BSMRAAU for its Lalmonirhat Campus.



Chief of Air Staff Air Chief Marshal Shaikh Abdul Hannan

## Chief of Air Staff visits BSMRAAU

### S&B Desk:

Chief of Air Staff, Air Chief Marshal Shaikh Abdul Hannan paid an official visit to Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU) on August 26, 2021. Vice Chancellor, BSMRAAU Air Vice Marshal Muhammad Nazrul Islam welcomed the Air Chief to the university and took him around different facilities.

The Air Chief was informed that, besides the ongoing programmes, the university will start a few more post graduate and undergraduate programmes on space science, satellite technology, aviation and aerospace in the next academic year.

The Chief of Air Staff in his remarks, applauded the initiative and achievements of the university braving all challenges including the COVID-19. Hoping that BSMRAAU will play a leading role in spreading the standard and high-quality education in aviation and aerospace sector, the Air Chief assured that BAF will continue to assist the university in its noble endeavour.

Photo  
BSMRAAU photo archive



Turkish ambassador having a meeting with the Vice Chancellor of BSMRAAU

## Turkish ambassador visits BSMRAAU to discuss collaboration

### S&B Desk:

Ambassador of Turkey, His Excellency Mr. Mustafa Osman Turan visited BSMRAAU, Bangladesh's first public university for aviation and aerospace studies on February 15, 2022. Vice Chancellor, Air Vice Marshal Muhammad Nazrul Islam welcomed the ambassador to the university.

The ambassador was apprised of the university's current activities, and the specific areas for potential collaboration with Turkish higher educational institutes as well as aviation and aerospace industry partners.

The Turkish ambassador expressed his heartfelt thanks for the opportunity to visit and gather first-hand knowledge about the activities of the university. Assuring his highest considerations to facilitate collaboration between BSMRAAU and relevant Turkish higher educational institutes and industry partners, the ambassador emphasised that such ventures certainly would result in mutual benefit for both.

## BSMRAAU inks contract with Vitti and Dev for Master Plan of Lalmonirhat campus

### S&B Desk:

Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University



Contract signing for master plan of Lalmonirhat Campus

(BSMRAAU) inked a contract for 'Consultancy service for feasibility study, master plan and DPP preparation for BSMRAAU' on February 17, 2022 at its Dhaka campus.

According to the contract, Vitti Sthapati Brindo Limited and Dev Consultants Limited along with their foreign counterpart Yasui Architects and Engineers Inc., Japan is expected to complete the job by end of this year to facilitate the functioning of the university from its Lalmonirhat campus.

The signing ceremony was attended by the Vice Chancellor, Air Vice Marshal Muhammad Nazrul Islam and other high officials of the university.

Mentionable that, to avail the job 27 lead firms and their national and international partners contested through the government prescribed process and consequently, five firms were shortlisted and Vitti Sthapati Brindo Limited (Lead firm) and Dev Consultants Limited along with its foreign counterpart Yasui Architects and Engineers Inc., Japan was selected.

## Write for aviation and aerospace

SPACE & BEYOND the quarterly chronicle form BSMRAAU encourages and solicits articles and testimonials from experts from the academia and the industry, that intends to contribute in areas of study & research in the domain of aviation and aerospace.

Mail us: editor.chronicle@bsmraau.edu.bd  
Cell: +8801769995071



## VC BSMRAAU visits ISAE SUPAERO and Airbus facilities in France

### S&B Desk:

An eight-member team comprising the Vice Chancellor, BSMRAAU, Chairman BSCL and members from Armed Forces visited the space sectors of Airbus Space and Defence and Final Assembly Line (FAL) of Airbus Commercial Aircraft in Toulouse, France in September 2021.

During the tour, the VC took special interest to see the first ever aeronautical engineering institute in the world, ISAE SUPAERO (Institut supérieur de l'Aéronautique et de l'Espace) founded in 1909, located at the same city in France.

The visit has opened a new horizon for BSMRAAU to collaborate with this leading and oldest university on aerospace science. In particular, the degrees conducted by the university on Aeronautical and Space science are aligned with the BSMRAAU courses while the later also intends to sign an MoU with the ISAE-SUPAERO in near future. It's worth noting that BSMRAAU signed an MoU with Airbus shortly after its inception.



BSMRAAU VC Air Vice Marshal Muhammad Nazrul Islam on Third Raising Day of BSMRAAU

### 3<sup>rd</sup> Raising Day of BSMRAAU

Rejoice, it's a moment to celebrate!

### S&B Desk:

BSMRAAU – Bangladesh's first public university for aviation and aerospace studies, BSMRAAU celebrated its 3<sup>rd</sup> Raising Day on 28 February 2022. A simple flag-raising event with the national anthem commenced the day's events. This was followed by special prayers and a colourful cultural soiree by the students of BSMRAAU Cultural Club at the university's Dhaka campus.

Speaking on the occasion, VC Air Vice Marshal Muhammad Nazrul Islam said, 'Three years in the life of any university is a drop in the making of a mighty ocean of knowledge- the beginning of the challenges as well as expectations.' He also highlighted that the birth of BSMRAAU in 2019 was not just a drop in the ocean, but the entire ocean in a drop as it is the only public university for aviation and aerospace studies in Bangladesh. The VC observed that the hard work ahead to fulfil the national aspiration of making Bangladesh a 'knowledge hub country' and an 'aviation hub', is a fitting reason to celebrate and reflect on the 3<sup>rd</sup> Raising Day.

## BSMRAAU conducts 12-day OBE workshop to enhance aptitude

**S&B Desk:** Workshop on Outcome Based Education (OBE) concluded on October 31, 2021 at the Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU). University's Institutional Quality Assurance Cell (IQAC) organised the 12-day long workshop.

The workshop was part of BSMRAAU's efforts to build institutional capacity to achieve its vision of becoming a leading international university in aviation and aerospace.

In-house OBE expert, Lecturer Md. Samin Rahman conducted the workshop, steered by Distinguished Professor Md. Abdus Salam, Dean, Faculty of Aviation Engineering, BSMRAAU and national evaluator of Board of Accreditation for Engineering & Technical Education (BAETE), Bangladesh. The faculty members and senior leadership of the university attended the workshop.



Faculty members and senior leadership of the university attended the workshop

Photo

BSMRAAU photo archive



6.26 million

air passengers carried by the air carriers in a year registered in Bangladesh before the onset of COVID-19

# Braving the impact of COVID-19

## A Resilient and Adaptive Aviation Sector of Bangladesh

Dr. Mohammad Zahidul Islam Khan

The received wisdom about the impact of COVID-19 is that the pandemic has caused a significant downturn in the aviation sector in general and air transportation in particular. But how deep was this impact in the historical context of Bangladesh? Has the impact divided the industry into different realities about the air passengers and air cargo transportations? This article explores these questions taking Bangladesh's historical data on air transportation from the World Bank repository as evidence.

Figure 1 depicts the total passengers carried by domestic and international air carriers to and from Bangladesh for the period 1974-2020.

Evidently, the historical growth in air passengers was not linear. There has been an exponential but sustained growth in air travel to and from Bangladesh since 2011, reaching over six million in the pre-pandemic year (i.e., 2019). In contrast, during the '70s and for the most part of the '80s, the total number of passengers per year remained below the one million thresholds. The figures crossed the one million marks in 1988 and took more than 14 years to cross another half-million reaching 1.54 million in 2002 and another nine years to cross the 2 million marks in 2011.

But the growth since then has been exponential. Within three years of reaching



Air transportation is critical for the survival of several other sectors including travel and hospitality. The resilience and adaptability demonstrated by the aviation industry in difficult times deserve appreciation. Incentivising this sector will not only help to retain the growth trajectory of air transportation but also save jobs in other sectors, adding to the national GDP.

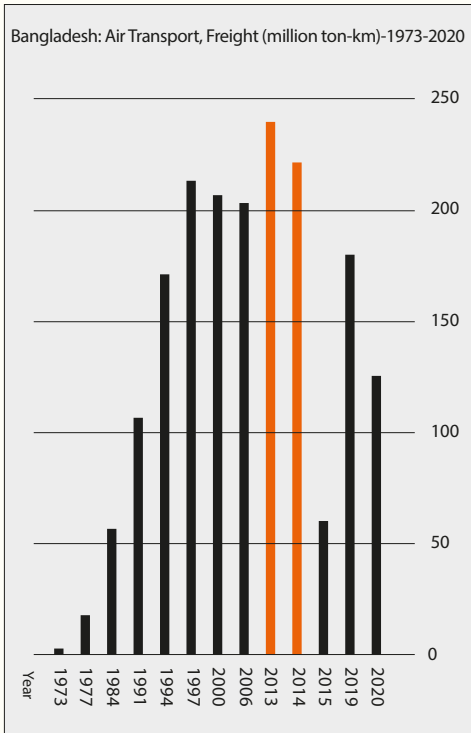
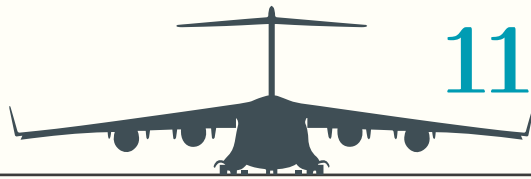
2 million marks, the number of air passengers carried by the air carriers registered in Bangladesh reached over three million and just before the onset of COVID-19, the air passenger figure had doubled reaching over 6.26 million. Interestingly, the pandemic had pushed back the air passenger figures only to those numbers of 2014 totalling three million. Such evidence tends to suggest that the growth in air passengers to and from Bangladesh since 2011 is sustainable and resilient and must be supported by a good recovery plan.

The year-on-year (Y-O-Y) growth of the air passengers (Figure 2) projects a more

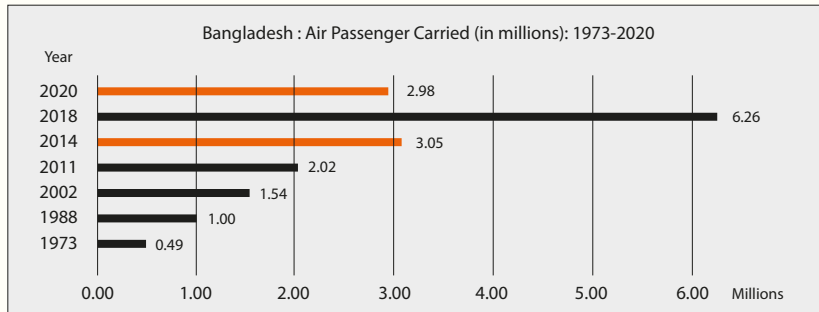
nuanced picture. It helps us to visualise the positive and negative growth compared to the previous year – useful to assess volatility and sustainability.

Surely, COVID-19 had the most shocking impact on the Y-O-Y growth rate (-52.33%) of air travel. Two other significant backslidings of the Y-O-Y growth rate were in 2007 (-28.14 %) and 1998 (-12.34%) – coincide with the global financial crisis, South Asian financial crisis and domestic political turmoil of those periods. However, with the exception in 2016, the Y-O-Y growth of air passengers has remained positive for a decade (2009-2019). During this period the Y-O-Y growth rate was

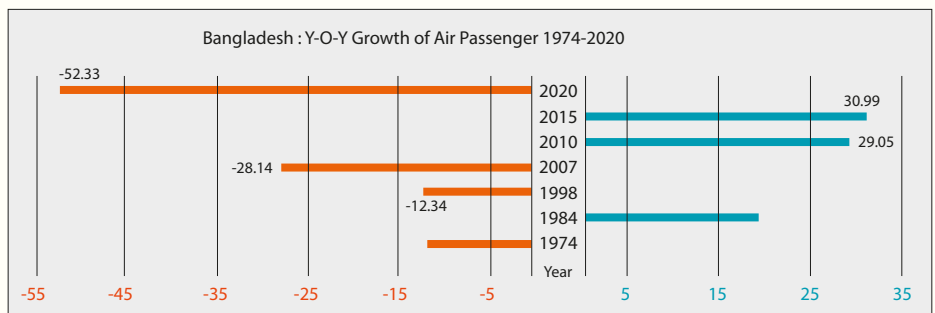
Photo Passengers are waiting for their flight during COVID-19 pandemic at Shahjalal Intl. Airport



**Figure 3**  
Key changes in Bangladesh's historical data (1973-2020) of air freight.  
Source: Author's collation from World Bank Data



**Figure 1**  
Key growth in air passengers carried by domestic and International carriers in Bangladesh (1973-2020).  
Source: Author's collation from World Bank Data



**Figure 2**  
Key changes in Year-on-Year (Y-O-Y) growth of air passengers 1974-2020.  
Source: Author's collation from World Bank Data

between 10 to 30 per cent each year. Such a consistent Y-O-Y growth trend tends to suggest that Bangladesh's recent growth in aviation sector is sustainable and solid, and demands to be incentivised to overcome the COVID-19 shock to recover and maintain the growth trajectory.

**Figure 3** projects Bangladesh's historical data (1973-2020) of air freight expressed in million ton-km. Air freight data is defined as the volume of freight, express, and diplomatic bags carried on each flight stage (operation of an aircraft from take-off to its next landing), measured in metric tons times kilometres travelled.

Indeed, many air transport operators had to shrink their operations and have been bankrupt laying off their crews.

According to this historical data, Bangladesh crossed the 50 million ton-km threshold of transporting goods by air in 1984. Crossing the 100 million ton-km mark took another seven years. However, reaching the 200 million ton-km mark of air cargo transportation was achieved within the next six years in 1997. Since then, the growth became erratic but remained mostly above 150 million ton-km. The pandemic seems to have had a lesser impact on air freight transportation. Although the amount of air cargo (117 million ton-km) transported in 2020 is slightly less than the previous year but remains significantly more compared to 2015-2018. It tends to suggest that the air cargo transportation in Bangladesh has rebounded amidst COVID-19 challenges and has potentials to grow further, provided the sector is incentivised and supported.

In sum, COVID-19 challenges have reinforced the value of aviation industry – in particular its air transportation sector. Air transportation is critical for the survival of several other sectors including tourism and hospitality. The resilience and adaptability demonstrated by the aviation industry in difficult times deserve appreciation. Incentivising this sector will not only help to retain the growth trajectory of air transportation but also save jobs in other sectors, adding to the national GDP. A better understanding and appreciation of the fungibility of investing and incentivising the aviation sector by the public and private stakeholders is the only cure to overcome the COVID-19 shock faced by the aviation industry.



“ I only see the hard work ahead of us, for which we are prepared, committed and inspired. ”

### Face to Face with the Vice Chancellor of BSMRAAU

Air Vice Marshal **Muhammad Nazrul Islam**, BSP, nswc, afwc, psc, GD (P)

## Creating the next generations of **space and aviation professionals**

**Space and Beyond: How is BSMRAAU aligned with our national aspiration? What distinguishes this university from the others?**

**Vice Chancellor:** The inception of BSMRAAU on 28 February 2019 was a historic and farsighted moment for the education sector in Bangladesh.

‘Historic’, because it is the only public university for aviation and aerospace studies in Bangladesh. ‘Farsighted’ because the establishment of this university is aligned with fulfilling a national aspiration.

For example, our National Perspective Plan 2041 envisions Bangladesh to become a ‘knowledge hub country’ by 2041; The plan identifies our aviation and aerospace sector requiring ‘professional and skill-intensive’ human resources and capacity noting that the sector is ‘still limited’ and ‘tends to be dominated by low productivity, low skills and unorganised activities.’

Similarly, our Strategic Plan for Higher Education published by the UGC identifies 2018-2030 as ‘the most challenging years for the nation.’ During this period, we will have to raise the standard of higher education to produce graduates ‘who will have wide-ranging skill sets and competence to thrive in the highly competitive global environment.’

Such alignments of this university with national goals and aspirations reflect the prudence and farsightedness of the government’s decision to establish this university. We are in our 4th year now- the beginning of the challenges as well as expectations. We look forward to the hard work ahead to transform this university into a leading international university in the field of aviation, space and technological studies.

**S&B: Would you be willing to tell us about your current and future undergraduate and graduate programmes?**

**VC:** We have some unique and industry driven academic programmes. Our current cohort of undergraduate students includes two batches of BSc in Aeronautical Engineering (Aerospace) and one batch of BSc in Aeronautical Engineering (Avionics) programme.

Current graduate students comprise two batches of MSc in Aviation Safety & Accident Investigation and MBA in Aviation Management and one batch of MSc in Aviation and Space Law.

From July 2022, we will start MSc in Space System Engineering, and MSc in Satellite Communication Engineering programmes. We also plan to offer MSc in Autonomous Systems Engineering, MSc in Aeronautical

## An exclusive interview with Vice Chancellor of BSMRAAU



Engineering (Aerospace) and Aeronautical Engineering (Avionics) programmes by the 2022-23 academic year.

Some of our courses are unique in the country. Keeping in mind the upcoming programmes we are developing our faculties, attaining new capacities, and expanding our collaboration with relevant global and local entities.

### **S&B: Is BSMRAAU conducting any kind of research? What are your research priorities?**

**VC:** BSMRAAU is a research-intensive university from the very beginning.

Currently we have set four priority areas: First, we want to build our own pro-type single engine light aircraft. This goal emphasises on aeronautical engineering discipline which we started in 2020.

Second, we want to build our own capacity in drone technology. We have already built a proto type octocopter and will continue to develop our capability in this area, collaborating with partners from home and abroad.

Third, our focus is on developing an echo system for space science and technology research and innovation in Bangladesh. We have obtained UGC's approval to offer two post-graduate programmes on Space System Engineering and Satellite Technology and have set up laboratories for building our own small size satellite (Pico/Nano).

Finally, developing indigenous capacity on rocket technology is also a priority area for BSMRAAU. We are collaborating with several reputed universities, institutions, research centres and experts on all these four priority areas to fulfil our national aspirations from this university.

### **S&B: Are you collaborating with other universities or industry?**

**VC:** Our collaboration with global and local aviation and aerospace entities is growing. We have signed MoUs with regulatory agency like CAAB, besides leading industry

partners like Airbus in addition to higher educational institutes like Dhaka University (Bangladesh), Cranfield University (UK), University of Surrey (UK), Shenyang Aerospace (China)- to name a few.

In December 2021, we held the country's first-ever seminar on Industry-University collaboration. The seminar exposed our students to industry professionals and their expectations. These collaborative activities are expected to benefit our students and faculty in a range of issues including carrier development, placement, internship and lifelong learning, and catalyse innovation and growth in our aviation and aerospace-related research.

### **S&B: What are your future plans about commencing academic activities from Lalmonirhat campus?**

**VC:** Starting our academic activities from Lalmonirhat is linked to infrastructural development. Our Strategic Roadmap-2041 outlines specific capacity building targets, both academic and infrastructural, that we want to achieve by 2041. In this fourth year of our inception, we are in the 'Initiation Phase' and on track according to our Strategic Roadmap.

In terms of infrastructure, you must have seen that the construction of our temporary campus on the BAF land at Lalmonirhat by the BAF Welfare Trust is about to be completed. By July 2022, we plan to conduct our ongoing undergraduate academic programmes from this temporary campus. We have also taken steps to build our permanent campus. The first big step, taken in February this year, was signing contracts for conducting the feasibility study, master plan and DPP preparation for our permanent campus in the government allotted land in Lalmonirhat.

Having our permanent campus will enable us to operate with our full potentials; we will be able to effectively contribute to achieving government's goals of ensuring inclusive and equitable quality education, promoting upward mobility and opportunities, and eliminating gender disparities for the vast majority of the people living in the northern districts of the country.

### **S&B: Recruiting and retaining faculty members for a specialised university like BSMRAAU must be difficult. How are you managing faculty development and ensuring quality education?**

**VC:** A university can only be as good as its students and faculty members. The quality of the faculty is central in disseminating knowledge and assisting students with their learning process. That is why we have implemented Outcome-Based Education (OBE), a student-centric teaching and learning methodology, in which the programme development, delivery, and assessments are well planned to achieve specific, measurable, attainable, result-focused and time-bound objectives and outcomes.

Our two-week-long OBE workshop in October 2021 facilitated the faculty to acquire in-depth knowledge on the OBE process including hands-on practice. In January 2022, we teamed up with globally reputed scientists and aviation scholars to train and inspire our newly recruited faculty. Eminent Indian space scientist and former Chairman of Indian Space Research Organisation, Prof A.S. Kiran Kumar, Pro-Vice Chancellor of Cranfield University Prof Dame Helen Atkinson and Prof Nazmul Ula, of Loyola Maryland University, U.S.A. conducted sessions in our faculty training event.

### **S&B: What do you think the future holds for this university?**

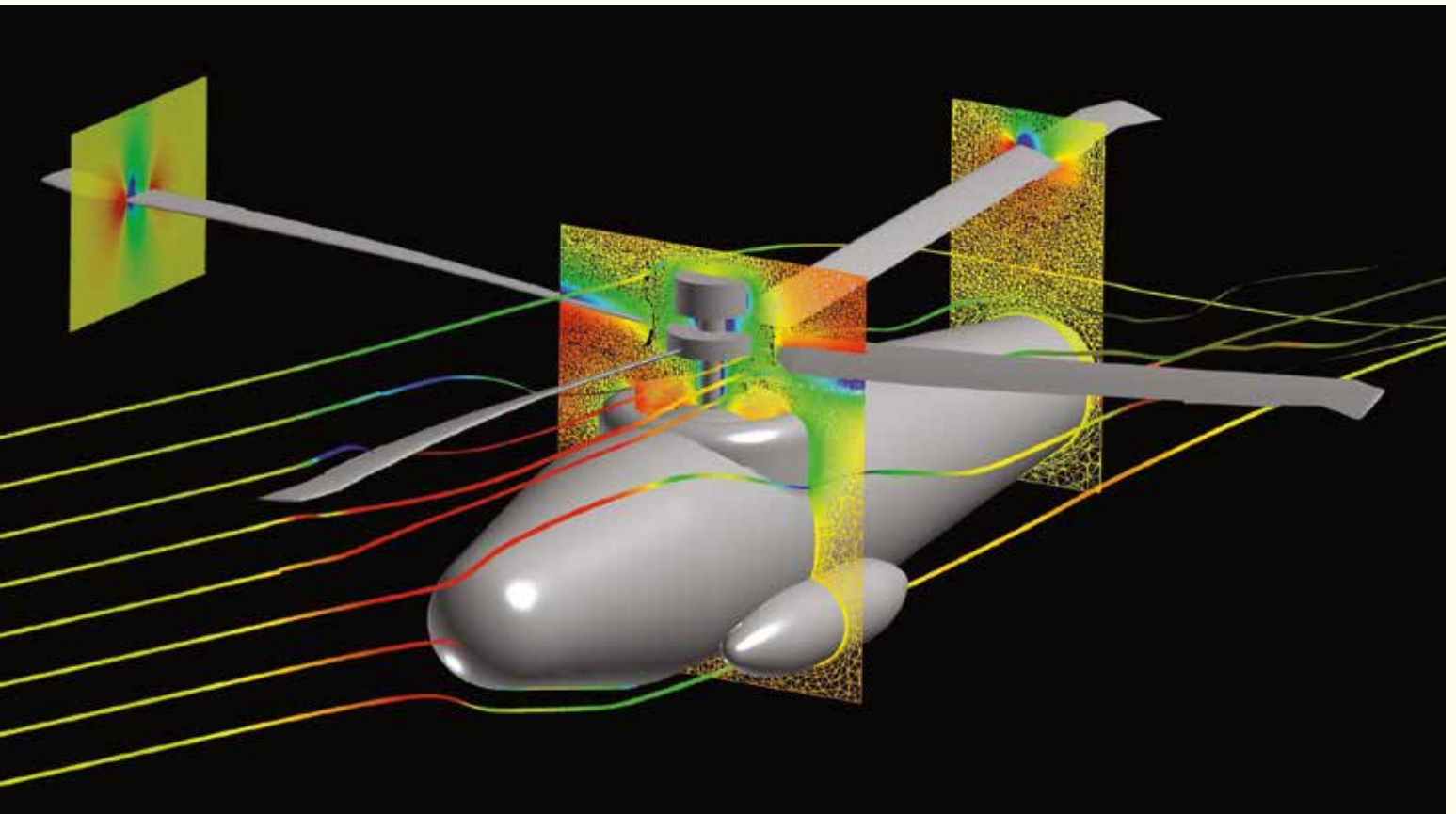
**VC:** We have just celebrated our 3<sup>rd</sup> Raising Day on 28th February. Looking into the future I only see the hard work ahead of us, for which we are prepared, committed and inspired. Our endeavour is to make BSMRAAU the hub of the nation's aviation and aerospace-related studies and research. We believe that the sustenance and expansion of Bangladesh's remarkable progress in the aviation and aerospace sector hinge on building our future space and aviation leaders, creating the next generation of scientists, engineers, professionals and enthusiasts- a task that BSMRAAU is committed to pursuing with passion and without an iota of failure. 🌍



# Physics, at the heart of aviation and aerospace

Fahima Nowrin

An aeronautical engineering degree is technically specialised from the start, as it focuses on a specific branch of engineering. Nonetheless, many general engineering ideas will be applied to the field of aeronautical engineering.



**Photo**

Simulation of the UH-60 rotor system in the National Full-Scale Aerodynamics Complex. Elizabeth Lee-Rausch, Robert Bledron, NASA/Langley



**A**lmost every subject in this curriculum will need physics as a prerequisite. You can become an excellent aeronautical engineer if you have a strong knowledge of physics. We can predict that a large number of persons who major in physics will excel in the field of aviation in the future.

Robert Goddard, an American scientist and inventor widely regarded as the founder of modern rocketry, was a physics undergraduate at Clark University and received his physics Ph.D. in 1911. Goddard was born on the brink of a new era in which flying, rockets, nuclear fusion, and space travels were more of theories than facts. Goddard was one of a small group of experts dedicated to furthering rocket development.

The 11th President of India, A.P.J. Kalam, often known as the Missile Man of India, earned a bachelor's degree in physics before going on to obtain a bachelor's degree in aeronautical engineering at the Madras Institute of Technology in Chennai. SLV-3 was successfully launched and tested by A.P.J. Kalam, making India the fifth country in the world to have space launch capabilities. A.P.J. Kalam was then assigned to the Defence Research and Development Organisation (DRDO) to build and test missiles.

We can also call the name of Indian space scientist and former chairman of the Indian Space Research Organisation Aluru Seelin Kiran Kumar.

“ A physics degree demonstrates to a potential employer that you have the background, expertise, and motivation to excel in a variety of scientific or technological professions. This is a topic that cannot be avoided in aviation and aerospace engineering. Almost every course in these programmes will need physics as a prerequisite. ”



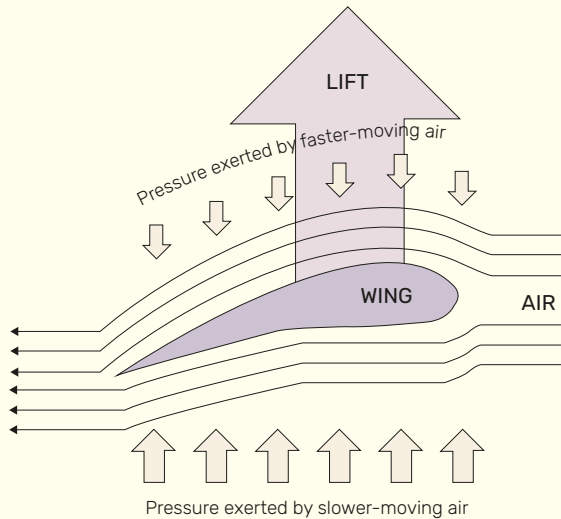
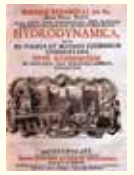
► **Photo**  
Swiss Mathematician and Physicist Daniel Bernoulli, born on 8 February, 1700 well known for 'Bernoulli's Principle'.



► **Photo**  
1 October, 1924.  
Professor Robert H. Goddard, instructor of Physics at Clark College of Worcester, Massachusetts is shown with the first rocket he experimented with, charged with gun cotton.



► **Photo**  
An eminent Indian aerospace scientist, A.P.J. Abdul Kalam also served as the 11th president of India from 2002 to 2007. His close involvement and efforts in India's civilian space programme and military missile development earned him the title 'Missile Man of India'.



**photo**  
Bernoulli explained how fluids behave when they are in motion. Air, like water, is a fluid; however, unlike water, which is a liquid, air is a gaseous substance.

Exoplanets, planetary science, observational cosmology, cosmic ray modulation/propagation and its interactions with the interstellar medium, energetic radiation from terrestrial and planetary lightning discharges, solar wind-magnetosphere interactions and energetic particle observations are among the current research topics in space sciences. Numerical modelling of atmospheric dynamics, cloud physics, and weather processes in the atmospheres of terrestrial, gigantic, and exoplanets are all part of the planetary science research. Astrobiology, stellar astrophysics, the physics of galaxies and active galactic nuclei, and the creation of improved instrumentation are all topics covered under Astronomy, Astrophysics, and Astrobiology.

Measurements and modelling of energetic radiation in the Earth's atmosphere, sensing technology development, electromagnetic wave propagation effects, lightning interaction with airborne vehicles and space launches, power lines, wind turbines, and other tall objects, lightning protection, and meteorological applications of lightning data are all topics covered in Atmospheric Electricity and Electromagnetics.

Observations with the Hubble Space Telescope and the James Webb Space Telescope, which can be involved in the development of instrumentation and the development of high-dynamic range imagers for future use in space observatories, are part of the research, which is conducted over a variety of different wavebands from radio to gamma-rays.

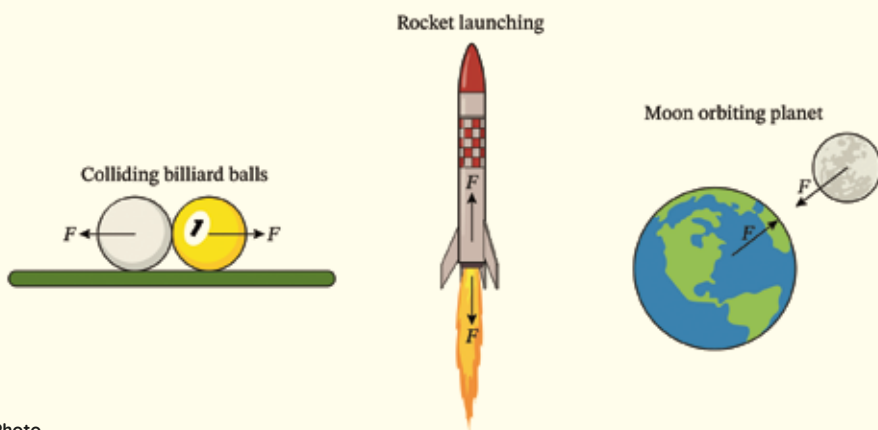
Space stations and robotic probes will be commonplace. Manned trips to other planets and moon settlements might be in the works in the future. Surely, to deal with this period, we must master physics in order to do cutting-edge research in the field of aviation and aerospace science.

Structures (the structure of an aircraft or a rocket), flight dynamics, aerodynamics (the heart of the aircraft), propulsion, and space dynamics are the primary topics in aeronautics. The fundamentals of mechanics will be applied to aircraft constructions.

The key component in this theme is still force. For studying the aircraft structures, moments regarding the wing, torsion, and shear forces are used.

Aerodynamics deals with air friction, often known as drag, and lift, which is the air's upward force. The Bernoulli Principle is in

charge of an aircraft's flight. The principles of gyroscopic and conservation of momentum, as well as levers and torque, are used in flight mechanics to ensure an aircraft's stability. Newton's Third Law of Motion is directly applied in propulsion, but it also deals with the design of an engine, therefore other physics principles, such as thermodynamics, are utilised. Space dynamics is concerned with the flight of spacecraft in orbit, and gravitational principles of physics are directly applied to satellite or spacecraft movement. These are only minor details applications of physics.



**Photo**  
Newton's Third Law of Motion: For a pair of interacting objects, it states that the force exerted by the first object on the second is equal in magnitude and opposite in direction to the force exerted by the second object on the first.

With the completion of the **third terminal**, **20**  
the **HSIA** will be able to serve more than  
million passengers in a year



## Bangladesh will one day manufacture its own aircraft : **Sheikh Hasina**

### **S&B Desk:**

The Honourable Prime Minister Sheikh Hasina hoped that Bangladesh will one day be able to produce aircraft and helicopters as the government wants to launch extensive training and research for engineers in this regard. 'InshaAllah, one day we'll be able to produce aircraft, helicopters and warplanes in our country through research. We want to impart training and conduct research accordingly from now,' She said this while addressing the President Parade (Winter) 2021 of the Bangladesh Air Force on December 30. The Prime Minister virtually joined the parade held at Bangladesh Air Force Academy in Jashore from her official residence Ganabhaban.

Sheikh Hasina said the Air Defence Notification Centre has recently been launched with the name of Air Defence Identification Area over the airspace of Bangladesh which is playing a vital role in the air defence and security management of the country. In the context of building a

digital Bangladesh, a certified tier III data centre was procured for the Air Force and its installation work is underway now.

The Prime Minister said, 'With this data centre, it'll be possible to perform various activities of the Air Force digitally instead of the traditional method. A Very Small Aperture Terminal (VSAT) hub and terminal station have already been procured for the Air Force. Bangladesh is now preparing to procure Bangabandhu Satellite 2 in the future. Besides, the Air Force will soon have a variety of sophisticated planes, high-powered air defence radars and simulators, ATS simulators, laser-guided bombs and anti-ship missiles. With the addition of the new equipment, I believe that the defence capability of the Air Force will be greatly enhanced.'

Pointing at the passing-out cadets, the Prime Minister said the Air Force has reached today's position due to the foresight, professionalism and hard work of their predecessors. 'You must take it further using your talents, professionalism and patriotism. We want to see Bangladesh Air Force to be equal to the air forces of the developed world,' she said.

*Source: UNB; Dec 30; 2021*

## Shahjalal Airport third terminal work 30% done

### **S&B Desk:**

The construction work of the third terminal of Hazrat Shahjalal International Airport (HSIA) is 30% complete. The concerned people think that it will be possible to inaugurate this terminal by June 2023.

Chairman Civil Aviation Authority (CAA) Air Vice Marshal M Mofidur Rahman told that, work is in full swing. About 5 thousand workers are working in shifts day and night.

Shahjalal Airport is currently able to serve 6 million passengers a year. With the completion of the third terminal, the airport will be able to serve more than 20 million passengers.

Expressing satisfaction over the progress of the work, Minister of State for Aviation and Tourism Mahbub Ali told, 'Our goal is to launch the third terminal by June 2023. We have not stopped working on a single coronavirus epidemic. The way things are going, I hope we will be able to open the terminal for passengers before the scheduled time.'

*Source: Daily Industry; Feb 14, 2022*



## Airbus deals with BSMRAAU to share skills

### **S&B Desk:**

Airbus Defence and Space's Asia Pacific region Vice-President Johan Pelissier said in Dhaka that they saw a potential in the growing aviation sector of Bangladesh. He also said that they were very interested to build a long-term partnership with Bangladesh sharing skills, setting up world-class training facility and expanding operations.







Signing of MoU with Airbus

'This partnership will allow transferring skills,' Johan Pelissier said after signing a letter of agreement with Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU). A memorandum of understanding (MoU) was signed on November 29, 2020 between the newly founded university and the Airbus.

Welcoming the MoU signing, Johan Pelissier said that they expect their market to grow in Bangladesh in coming decades. According to the Airbus senior executive, the European multinational aerospace corporation has similar training institutes in Mexico and France but the agreement with BSMRAAU is the first of such arrangements in Asia.

It is a big achievement for us,' said Civil Aviation Authority of Bangladesh Chairman Air Vice Marshal Muhammad Mafidur Rahman. While (the then) VC Air Vice Marshal AHM Fazlul Haque said, 'With the training and maintenance collaboration, that graduates of the university would get approval from the European Union Aviation Safety Agency to seek jobs in international market.'

Earlier, the signing took place in presence of Deputy Education Minister Mohibul Hasan Chowdhury, the then Chief of of Air Staff Air Chief Marshal Masihuzzaman Serniabat and envoys from the United Kingdom, France, Spain and Germany.

Source: New Age; Dec 10, 2020

## Bangladesh modernises its Air Traffic Management infrastructure

### S&B Desk:

The Civil Aviation Authority of Bangladesh (CAAB) has signed contract with Thales for a full turnkey modernisation of the country's Air Traffic Management system.

Under the agreement, Dhaka airport will get the new and modern radar with an air traffic control system which is aimed at enhancing the safety and security of the country's airspace. The radar currently operational at Hazrat Shahjalal International Airport belongs to instrument landing system (ILS) category, while the new one falls under communication, navigation and surveillance/air traffic management (CNS/ATM) category.

The installation of the radar is expected to take roughly three years with full government funding. The agreement would cover the supply, installation and operation of navigation and surveillance systems, including radar and related air traffic management equipment.

Source: Times Aerospace; Oct 28, 2021

## Ad-din Foundation purchases first two Bell 505 helicopters

### S&B Desk:

Bell Textron Inc. announced the sale of the first two Bell 505 helicopters in Bangladesh to Ad-din Foundation, a private non-profit organisation serving underprivileged people in Bangladesh.

The Bell 505 helicopters will be used for patient transfers between the eight hospitals that Ad-din operates across Bangladesh, medical evacuations and corporate transport. Lane Evans, director, Bell 505 sales, says, 'We are proud that Ad-din has chosen the Bell 505 for their medical and corporate missions, and we look forward to providing the support they need to launch their helicopter operations.'

Source: World Aviation; February 14, 2022



New aircraft would be used to set up new routes

## Biman to double its fleet in 10 years

### S&B Desk:

Biman Bangladesh Airlines has formulated a plan to expand its fleet size up to 45 aircraft from the existing 22 by 2031 to generate more revenue. The national carrier also proposes that Boeing as well as other aircraft manufacturers be considered during the next procurement.

Six old aircraft of the existing fleet will be replaced during 2021-2031 period. The proposals were discussed at the 247th meeting of Biman's board of directors. The airlines will purchase Boeing 777, 787-8 and 787-9, 737-800 and Dash 8-400 in the next 10 years, according to the plan. The estimated company listed price of the Boeing 787 is \$284 million. A Boeing-777 will cost \$310 million. The price will be \$106 million for a Boeing-737-800.

The airliner would also increase the number of flights on international and domestic routes. The plan to double Biman's fleet might be finalised soon. The new aircraft would be used to set up new routes from Japan to North America, including the Toronto route and increase flight frequencies to Middle Eastern and Chinese destinations.

Of the 22 aircraft operational now, the manufacturer of all but two were Boeing while the rest were made by Canada's Bombardier Inc.

Source: Dhakatribune, April 8, 2022

The airport runway extension project at Cox's Bazar will extend the existing

9,000ft runway by **1,700** ft

## Tripartite MoU signed boosting country's satellite capacity

### S&B Desk:

A tripartite Memorandum of Understanding (MoU) was signed on March 6, 2022 for commercial production of space life suitable modules in Bangladesh. Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU) signed the MoU with Bridge to Bangladesh (B2B) and Aspire to Innovate (A2I) for establishing Pico satellite labs.

State Minister for ICT Zunaid Ahmed Palak, as the chief guest of the signing ceremony said, 'Bangladesh needs to launch numbers of satellites for boosting agricultural production, urban planning, and early flood detection. The MoU signed today will increase our capacity to produce pico, nano-satellites along with observatory satellites.'

The MoU aimed at establishing a space ecosystem in the country was signed by Air Commodore Mohammad Abdullah Al Mahub on behalf of BSMRAAU, Faruq Ahmed Jewel, Head of Technology of A2I, Sajedul Islam, Vice-President of B2B, and Professor Dr Najmul Ullah.

Source: UNB, Mar 10, 2022

## Biman Bangladesh Airlines implements Sabre tech

### S&B Desk:

Airline technology provider Sabre announced that it has successfully migrated Biman Bangladesh Airlines to the SabreSonic Passenger Service System (PSS).

Bangladesh's national flag carrier has moved from its legacy technology system to Sabre's modern PSS in the first phase of its technological transformation as it moves forward with plans to grow its route network this year.

Dr Abu Saleh Mostafa Kamal, managing director and CEO, Biman Bangladesh

Airlines told, 'We're thrilled with the way Sabre has worked with us. These innovative solutions mean we are now ready to respond to new market demands while creating improved experiences for our travellers.'

Source: Sabre; Feb 28, 2022

19% complete despite challenges

## Cox's Bazar Airport Runway extension project underway

### S&B Desk:

The construction of runway extension in Cox's Bazar has reached a major milestone as all the work on reclaiming land from the sea has been completed.

The Civil Aviation Authority of Bangladesh (CAAB) inked the deal for the project with the Chinese joint venture of Changjiang Yichang Waterway Engineering Bureau (CYWEB) and China Civil Engineering Construction Corporation (CCECC) on February 9, 2021. Prime Minister Sheikh Hasina inaugurated the construction work on August 29 last year. The estimated cost of the project is Tk1,568.86 crore. The deadline to finish construction is May 10, 2024.

Under the agreement, the contractor will extend the existing 9,000ft runway by 1,700ft towards the Maheshkhali Channel. Once completed, it will be the longest runway in the country.

Source: Dhaka Tribune; Mar 31, 2022



The new 10,700ft-long runway at Cox's Bazar will allow much larger aircraft to take off and land at the airport

## News in Brief

### Biman launches Dhaka-Toronto flight feasibility study

Biman Bangladesh Airlines finally formed a committee to conduct a feasibility study to assess the viability of its long-awaited Dhaka-Toronto route. The authority just concluded that direct flights to Toronto would not be viable after a test flight on March 26, having stopped short of conducting a thorough feasibility study before announcing that the direct flights would begin in June.

### MIST team conquers NASA Space Apps Challenge 2021

The team MIST MOHASHUNNO was crowned with the local champion and the global nominee in NASA International Space Apps Challenge 2021 for showcasing the complexity and design of James Webb's engineering hardware deployment and its aesthetics through origami artwork. Organised by NASA and BASIS, 800+ teams from different universities took part in the competition.

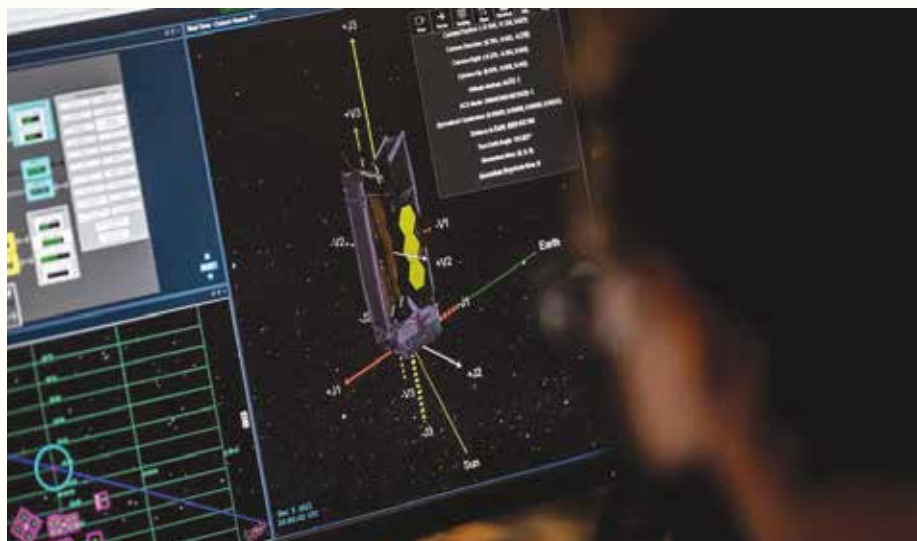
### Brac team wins Kibo Robot Challenge

Brac University's Enigma Systems team has won 2nd place in Kibo Robot Programming Challenge. This educational programme is hosted by Japan Aerospace Exploration Agency (JAXA) in cooperation with National Aeronautics and Space Administration (NASA). It involves students solving various problems by programming free-flying robots (Astrobee and Int-Ball) in International Space Station (ISS).

### Agartala to get direct air connectivity with Dhaka, Chattogram

Agartala will get direct flights connecting with Dhaka and Chattogram. Airlines are expected to start services along the Agartala-Chattogram and Agartala-Dhaka international routes in the next six months. The proposed international flight service with Bangladesh will surely boost Tripura tourism & take the state to a new height in terms of air connectivity.

The largest and most powerful telescope ever to be launched into space,  
which will take over from Hubble,  
will directly observe a part of space and time  
never seen before.



Systems Engineers Christopher Murray (R) works at his console at the Webb Mission Office ahead of its launching at the Space Telescope Science Institute (STScI)



Future commercial space station 'Orbital Reef'

## NASA plans to retire ISS, use private stations

### S&B Desk:

The American space agency NASA says, after 2030, it plans to retire International Space Station (ISS) and use privately developed stations.

ISS, the floating space laboratory, launched into space in 1998 has been operating for more than 20 years. It has been widely praised as a scientific success. But NASA and its international partners have recognised that it cannot continue to operate forever. Late last year, the administration of U.S. President Joe Biden announced it was committed to extending ISS operations through 2030.

Last month, NASA released a report that said NASA officials look forward to the final years of the ISS being its most productive. It also notes that the ISS is currently the busiest it has ever been, with the addition of private space companies now transporting astronauts and supplies. In the future, NASA says its goal is to completely move to privately developed space laboratories for all its space lab needs. This way, NASA will be paying the space station operators 'only for the goods and services the agency needs.'

NASA has already chosen three private American companies to develop future space stations. One of them will be led by Blue Origin, the company that announced plans last October for its 'Orbital Reef' station. Another developer will be space services company Nanoracks. It has said it is teaming up with Voyager Space and Lockheed Martin to develop 'the first-ever free flying commercial space station (to be operational by 2027).' The third company, Northrop Grumman, said it will develop a 'free-flying space station' for NASA.

Source: VoA; February 13, 2022

## Webb telescope to look for first light of cosmic dawn

### S&B Desk:

Looking into deep space and 13.5 billions of years back in time, the James Webb telescope promises to offer the clearest glimpse yet of the Universe's cosmic dawn, when the earliest galaxies began to form.

NASA says, the largest and most powerful telescope will take over from Hubble and directly observe a part of space and time never seen before. This is the Universe in its youth, just a few hundred million years after the Big Bang.

Looking farther into space means looking farther back in time because of how long it takes for light to travel -- sunlight, for example, takes eight minutes to reach our eyes on Earth. Hubble reached its limit at 13.4 billion years, with the discovery of the oldest galaxy yet observed, GN-z11.

Hubble, which was launched in 1990, looks mainly at visible light -- but Webb focuses on infrared. With its significantly greater sensitivity than Hubble, it is expected to provide much more detailed images, which will allow scientists to explore this era in extraordinary detail.

Webb has been jointly developed by NASA, the European Space Agency and the Canadian Space Agency. The ambition is to help explain a key stage in the evolution of the Universe, when 'the lights went on, when the very first stars began to form'.

John Mather, Senior Scientist for the Webb telescope says, 'If we really want to know where our atoms came from, and how the little planet Earth came to be capable of supporting life, we need to measure what happened at the beginning.'

Source: Prothom Alo; December 12, 2021



Klaus Pontoppidan, project scientist at Webb speaks during an interview



Talk about realising the dream of flying cars, or just the drones, one obstacle engineers are striving to overcome is noise.

'This is a very exciting time for aerospace, we can influence what they will sound like based on decisions designers make now.'



UC aerospace engineering professor Daniel Cuppoletti uses an anechoic chamber covered in sound-absorbing panels to study engine and propeller noise in drones and flying cars

## Engineers design a quieter future for drones and flying cars

### S&B Desk:

Talk about realising the dream of flying cars, or just the drones, one obstacle engineers are striving to overcome is noise. University of Cincinnati aerospace engineering students are studying solutions to dampen sound in assistant professor Daniel Cuppoletti's lab in UC's College of Engineering and Applied Science.

If flying cars are to succeed, Cuppoletti said, they'll have to be quiet.

'One helicopter flying over your roof will keep you up,' Cuppoletti said. 'If you want 1,000 drones flying over cities in urban centres, noise will be a huge problem.' A potential aggravating factor is sheer scale. While the United States sees about 5,700 commercial aircraft flights each day, drones with their diverse applications have the potential for thousands of flights in major metropolitan areas each day.

Cuppoletti is studying how to manipulate sound from drones through engineering

design. He tests sound in a room lined with sound-absorbing padding that eliminates echo. Using an anechoic chamber, a room covered on all sides by sound-dampening material and outfitted with a suite of eight microphones, Cuppoletti tests the frequency, wavelength and amplitude of sound, among other factors that affect our perception of noise. He and his students are developing a guidebook that manufacturers of drones and flying cars can use to anticipate what their novel designs will sound like based on UC's engineering and physics experiments.

'This is a very exciting time for aerospace,' Cuppoletti said. 'We can influence what they will sound like based on decisions designers make now.'

Source: *EurekaAlert!*; January 31, 2022



Model of an ultra-quiet electric flying machine

## News in Brief

### India resumes regular international flights after two years

After a two-year hiatus forced by the COVID-19 pandemic, India has resumed regular international flights. Indian carriers have prepared for a return to their pre-pandemic schedule in that end, while other airlines such as Emirates, Virgin Atlantic and Lot Polish have also announced plans of renewed service to and from India. As many as 60 airlines from 40 countries are permitted to operate 1,783 frequencies to and from India in the summer schedule effective between Mar 27 and Oct 28, according to India's Directorate General of Civil Aviation.

### US airlines ticket sales show rapid recovery

Rising fuel prices may present an obstacle, but the airline recovery in the United States appears to be on track for now. With the coronavirus variant receding and pandemic restrictions being eased, the industry turned a corner last month, according to an analysis by the Adobe Digital Economy Index, which draws on online sales from six of the top 10 US airlines. According to the analysis, ticket sales for domestic flights in February exceeded those for the same month in 2019, a first since the pandemic began two years ago.

### Morocco and Israel to cooperate in civilian aerospace projects

Israel and Morocco signed an agreement to cooperate in civilian aerospace projects as the two countries push for closer economic ties after resuming their diplomatic relationship last year. The agreement would cover potential projects in innovation and airplane maintenance and transformation. Earlier, Israel and Morocco agreed a defence pact covering intelligence and cooperation in military industries and procurement.

At this point, the scramjet took over and 'quickly accelerated' the vehicle to a cruise speed over **Mach 5**, which it maintained for an 'extended period of time'.

It reached altitudes higher than 65,000ft and travelled over 556km.



## Airbus expects demand for 2,210 planes in India over next 20 years

### S&B Desk:

Airbus expects Indian airlines to order 2,210 planes over the next 20 years, up from a previous forecast of 1,900, it said on March 24, 2022, citing growth in the country's aviation sector.

With low-cost carriers making up the bulk of the Indian market, Airbus expects airlines will need 1,770 narrow body planes to grow their fleets and replace old planes, with the remainder being wide body planes.

The country's domestic and international air travel market is expected to grow 6.2% per year over the next 20 years, outpacing average global growth of about 3.9%. Domestic air travel in India is recovering from the pandemic, helping airlines such as IndiGo, which is Airbus' biggest customer for its A320 narrow body planes, and Vistara.

Airbus said in last November it expected a market total of 39,020 jetliner deliveries over the next 20 years, fractionally lower than the 39,213 it forecast two years earlier.

Source: reuters.com

cancelled more than 200 at the weekend. British Airways (BA) cancelled 662 flights in the week, though that includes long-haul flights suspended due to sanctions and restrictions, such as on Russia and COVID-affected parts of Asia respectively. The number of flights cancelled due to staff sickness in recent days was in the single digits, but delays in government-required checks for new staff were hampering the ramp up of flights into summer.

Staff shortages are a problem on the ground as well as in the air. Queues at Manchester Airport, Britain's third busiest after London's Heathrow and Gatwick, snaked out of one terminal, and passengers complained of hours waiting at the baggage carousel.

Dublin Airport warned passengers that lengthy queues were likely for weeks as it rebuilt its operation and recruits and trains new security staff. Ryanair, Europe's largest low-cost carrier whose passenger numbers topped pre-pandemic levels last month, has called on the Irish government to use the army to deal with the delays, fearing the impact on the key Easter holiday period. Germany's biggest airport operator Fraport also warned passengers of Easter delays. The group, which runs facilities in nine countries and the main airport in Frankfurt, aims to hire 1,000 worker this year, and recruited about 300 in January-March.

Source: Bdnews24.com; April 4, 2022

## US conducts second successful HAWC hypersonic test

### S&B Desk:

The US Defence Advanced Research Projects Agency (DARPA) has conducted a second successful test flight of its Hypersonic Air-Breathing Weapon Concept (HAWC) vehicle. After release from a carrier aircraft, the Lockheed Martin-produced hypersonic vehicle was boosted to the launch envelope of its Aerojet Rocketdyne air-breathing scramjet engine. At this point, the scramjet took over and 'quickly accelerated' the vehicle to a cruise speed over Mach 5, which it maintained for an



Thousands of staff deserted during the Covid-19 pandemic causing a blow to the aviation industry

## Hit by staff shortages Airlines and airports struggle with travel recovery

### S&B Desk:

Thousands of holidaymakers have seen their Easter getaways disrupted or cancelled because airlines and airports do not have enough staff to meet the recovery in demand as pandemic restrictions are eased in Europe. High rates of COVID-19 in Britain have caused staff absences for

airlines and airports that were already struggling to recruit after workers deserted the industry during the pandemic.

Low-cost carrier EasyJet was one of the worst affected, saying it cancelled around 60 UK flights on an average day and

## The ISS is physically divided into two sections,

the United States Orbital Segment and the Russian Orbital Segment. The U.S. and Russia keep the research laboratory continuously staffed with astronauts and cosmonauts.



The HAWC vehicle reached an altitude higher than 65,000 ft at a Mach 5 speed and travelled over 556 kilometres

'extended period of time'. It reached altitudes higher than 65,000ft and travelled over 556km.

DARPA did not provide the exact date of the test, or other details such as the launch aircraft and exact flying time. It also did not state if the vehicle struck a simulated target. Notably, hypersonic weapons are seen as playing a niche, but critical role in future conflicts, allowing for the rapid prosecution of time sensitive targets. Beijing and Moscow have also conducted extensive work into hypersonic capabilities.

Source: Independent; Sep 27, 2021

## US-Russia space partnerships in jeopardy with Ukraine invasion

### S&B Desk:

Invasion in Ukraine threatens partnership of two decades between the space agencies of the United States and Russia built through mutual cooperation at the International Space Station.

Although Voyager Space president Jeff Manber doesn't believe the partnership is immediately in jeopardy, also notes that, Roscosmos, the Russian Space Agency hasn't renewed its role beyond 2024, even as the U.S. prepares to extend operations to 2030.

President Joe Biden announced wide-reaching economic sanctions against Russia, specifically mentioning that the penalties will 'degrade their aerospace industry, including the space program.' Biden did not specifically referenced the ISS partnership in his speech, and NASA's follow-up statement noted 'the new export control measures will continue to allow U.S.-Russia civil space cooperation.' According to NASA, no changes are planned to the agency's support for ongoing in orbit and ground station operations.

The ISS is physically divided into two sections: the United States Orbital Segment and the Russian Orbital Segment. The U.S. and Russia keep the research laboratory continuously staffed with astronauts and cosmonauts, with the roles of each nation's segment mutually dependent on the other— ranging from life-support systems to thrusters that keep the ISS in orbit.

For now, NASA said in a statement that the agency 'continues working with all our international partners, including the State Space Corporation Roscosmos, for the ongoing safe operations of the International Space Station.' Currently there are seven people on board the ISS: five astronauts— four American and one German— and two Russian cosmonauts.

The future of the ISS, with or without Russia, depends on Congress for approval, which also presents as a potential hurdle following events in Europe.

Source: CNBC; February 25, 2022



Russian cargo Progress 77 spacecraft, seen through the window of SpaceX's Crew Dragon spacecraft

## News in Brief

### Three final FlyZero concepts show vision of the future for aerospace

Three distinctive aircraft concepts have revealed a potential vision of the future for aerospace. The FlyZero designs were unveiled by the Aerospace Technology Institute (ATI) as one of the project's biggest steps towards its aim of realising zero-carbon commercial aviation by 2030. According to studies, hydrogen could be used for 100% of short-haul flights and 93% of existing scheduled long-haul flights.

### Vertical Aerospace partners with Leonardo for VX4 fuselage development

U.K.-based Vertical Aerospace's recent partnership with Leonardo aims to help the eVTOL company develop the carbon composite fuselage for its VX4 air taxi.

Under the agreement, Leonardo will be lending its expertise in composite aerostructures development and manufacturing on civil and defense aerospace programs to help Vertical develop its first six certification aircraft.

### India inaugurates drone manufacturing facilities of Garuda Aerospace

The Prime Minister of India Narendra Modi has virtually inaugurated the drone manufacturing facilities of Garuda Aerospace at Manesar in Gurugram and Chennai. The Chennai-based Garuda Aerospace is a drone-as-a-service (DAAS) company.

Modi virtually inaugurated the drone manufacturing facilities in two locations and pressed a button to take off 100 Kisan drones simultaneously in 100 villages. The 100 drones commenced agriculture spraying operations in 16 states to celebrate 75 years of independence as part of the 'Azadi Ka Amrit Mahotsav'.

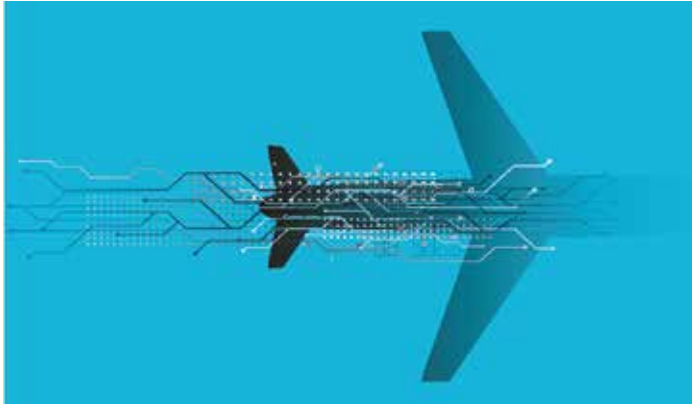




A six hour flight collects

**240** terabytes

of data from the aircraft



## Data Science in Aviation Industry

Aviation industry is one of the most sophisticated transportation industries in the world.

During the air transportation, an airline company generates huge volume of data related to engine systems, fuel utility, weather, passenger information, etc. Data Science technology introduces a greater opportunity to the aviation industry to manage and utilise this large volume of data for a flawless industrial operation.

Now a days, the more advanced aircrafts, sensors and other data collecting tools generate more complicated data sets that need to be managed by Data Science technology.

International Air Transport Association (IATA) facilitating around 280 airlines or 83% of the total air traffic has made an initial release of Airline Industry Data Model (AIDM) which aims to assist seamless flow of data. In addition, IATA also has the New Distribution Capability (NDC) scheme which aims to provide customers' access to full and rich air content as well as a transparent purchase experience.

Data Science will enable air carriers to provide the personalised experience that customers are looking for.

### Airline Safety

Immense amount of data gets generated when a flight is in operation. On an average, a six-hour flight collects around 240

terabytes of data from the aircraft. The Airbus A350 has around 6,000 sensors in the aircraft, and it generates 2.5 terabytes of data every day.

Thus, the data collected from the airlines can be scrutinised and analysed to improve flight safety using Data Science technology. Data Analytics also helps to identify major risks and the solutions to ensure passenger safety. This will become more crucial day by day when air traffic is expected to double in the next few years.

### Smart Maintenance

Issues like luggage mishandled at the airport during check-out or at the conveyor belt can be easily addressed based on the data collected through Data Analytics.

Data Science can also help to optimise the airspace in terms of flight routes, runway bandwidth and types of aircraft, etc. that creep up the increase in airport traffic.

Compensations given to the passengers or expenses on aircraft maintenance can jolt the financial condition of an airline. Cancellations or delay-cost have become a barrier to the financial growth of the airlines. When the technicians have access to real-time data, they can easily identify the problems and probable glitch to get it solved or the parts replaced.

### Messaging Automation

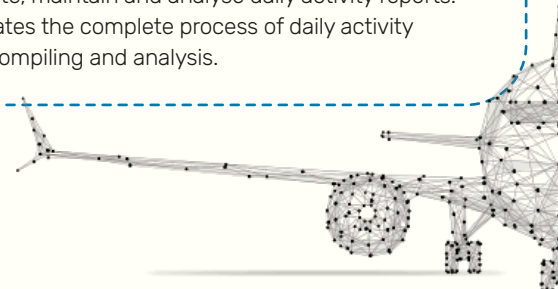
A customer should have the right to know immediate, proper and effective resolution to all his queries and grievances. If they did not get it, the result would be loss of customers. The faster resolution increases chances of customer retention. All this can be achieved with the help of Data Science that can determine the right data collected at the right time and analysed to be put to the right use.

### Customer Satisfaction

Passengers' preference and spending behaviour can be identified by using Data Analytics. Airlines can identify their customers' needs even better with the help of data they collect and analyse. Data can be collected not only during the process of rolling out an offer but also even after it.

### Performance Measurements

Aviation industry is more competent than any other on a global as well as domestic level. Sometimes it can be a little overwhelming for the airlines to generate, maintain and analyse daily activity reports. Data Science automates the complete process of daily activity reports generation, compiling and analysis.



“ Time heals but only when we make up our mindset to do so. ”

## Cost Reduction

As per the aviation rule, any damage that a passenger suffers due to baggage loss is compensated by the airlines. This increases the expenditure of the airlines. The application of Data Science has arrived as a saviour in these circumstances. It has resulted in reduction of costs with the introduction of real-time baggage tracking system. The data thus collected and analysed saves baggage from being lost, damaged or delayed.

## Application in Bangladesh

Some private operators of Bangladesh have started using Data Analytics and Data Science to promote faster and easily accessible service to their customer. For instance, royalty card, special pricing, discount and offers are designed based on the customer consumption pattern and frequency, review and satisfaction data.

But there is an unlimited potential for the application of Data Science left behind. The air transportation network system is complex, multidimensional, highly distributed, and interdependent where Data Science is the faithful future of modern aviation industry that can make it more advanced and competitive as well as environment friendly. 🌍

### Ishtiaque Ahmed

Student ID: 20016005  
MBA in Aviation Management

# BSMRAAU

## Flying into the realms of a dream

'Ladies and gentlemen, welcome on-board flight321! This is your Captain speaking. Our flight time today will be roughly 4 hours and the estimated time of arrival is 1430hrs local time. The weather is super good. I hope you've smooth skies! Enjoy the flight. Thank you!'

It would be wonderful if I were the captain for real. Probably I might be one someday. I've cherished the passion for aviation in my heart since early days that I could remember. Sadly, I was marked unfit due to short eyesight and got rejected at 80 BAFA on December 31, 2018. Thanks to almighty, he has given me



nerves of steel. Time heals but only when we make up our mindset to do so.

I completed my HSC, appeared in admission tests, and got admitted at RUET. The wish for flying; being a pilot was still rotating in my mind. When Bangabandhu Sheikh Mujibur Rahman Aviation & Aerospace University (BSMRAAU) got established, that 'Aviation' word led me here. And there it was in 2019; the last admission test in which I appeared.

Results came out and I faced the viva board and still was on the waiting list afterward. It was January 23, 2020; I was staying in Dhaka. I can remember the time precisely. It was 15:13 on my phone's display. I got a call from an official of BSMRAAU and was asked whether I wanted to get admission there. I was like, 'What now!'

On January 25, 2020 I completed my admission formalities here at this newly established university in the department of Aerospace Engineering. And guess what, I'm the last student of this first batch here. That's it! Got a clearance for take-off; V1; 'Rotate' and I'm airborne.

Soon Bangladeshis are going to mark themselves in a space race, and we hope that will be through the hands of BSMRAAU. It's mesmerising what BSMRAAU has been accomplishing. No other public university in Bangladesh has progressed so fast within this short period.

Every opportunity begins with a take-off. BSMRAAU has facilitated me with an organised platform to turn my passion into a profession. Engineering is my major concern now but I still dream of flying. I still look up into the night sky and get lost in the plethora of illuminations by the airplane's lights.

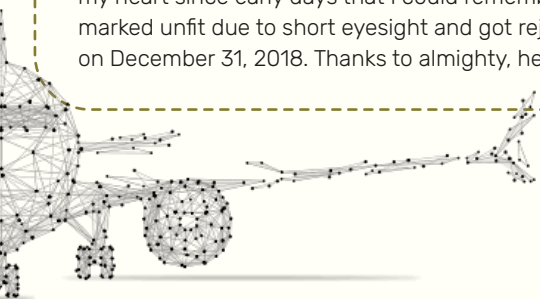
We're almost halfway through our flight cruising at FL360. I have got lots of work to do including a course correction coming up in a minute. We'll talk again. Have a relaxed flight and enjoy the blue skies!

This is your captain signing off for now quoting the words of Robert Frost-

*'But I have promises to keep  
And miles to go before I sleep!'* 🌍

### Mehedi Hasan Hridoy

Student ID: 20014030  
BSc in Aeronautical Engineering (Aerospace)





## I shared with my mother, the idea of joining Air Force

I still remember an incident from class 5 where one of my relatives asked me, 'What's your aim in life?' The answer came almost spontaneously from the same person, 'A doctor, right?'

Shutting down an 11-year-old child and deciding her fate is a very familiar case in Bangladesh. Almost all of us had this unpleasant experience. Well, at that moment, I had zero idea about my future career but as time passed, I started dreaming which didn't end with the sunrise but gradually grew with determination and passion.

Having a family member who was a part of the Air Force, I dreamt about joining there too. After completing my A levels, I shared the idea of joining the Air Force with my mother but she hesitated and finally refused my proposal.

That was it, no other choice but to become an engineer. Two and half months left, I completed the new syllabus of HSC and leaving a sick mother at the hospital, began the war for admission.

After taking numerous admission exams, finally I got selected for the viva voce of Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University. On the day of the viva in January, I stepped into the temporary campus for the first time. Meeting other candidates, I understood most of them came here to attend the interview because studying aeronautical engineering is their fascination. I was wondering what should be my answer if anyone asked me. I came here because of family pressure? It would sound crazy.

I wasn't asked by any candidates but yes by the viva board members and my answer was 'my mother wants me to become an engineer and I was interested to join Air Force, thus for fulfilling both, dreams, aeronautical engineering is the best option I have. Hence, with a final selection, my life turned over a new leaf.'

BSMRAAU is the best place where anyone can advance his/her aspiration. To start, let's talk about the instructors. They never think twice to give us extra time even on the weekends; during leisure time they never refuse to help us on any matter. During the pandemic situation, many of the faculty members were

“Whenever I look at an aircraft flying in the free sky, I see myself, I see freedom and I see the enhanced knowledge of the greater mankind.”



affected by covid-19 but still, they didn't quit taking classes online. They did face thousands of problems but never stopped smiling because, in some way they knew that their smile is a light of hope for us; it is an inspiration for us to study.

In BSMRAAU, each department has 30 seats. Being 30 students in one class makes it very cooperative for both teachers and students. A one-to-one system can be built. It is very easy for students to understand lectures and teachers to invigilate each student.

I enjoy going to university to study and learn things. It is no longer a habit but a fascination. I love my courses and all credit goes to my dear university. Whenever I look at an aircraft flying in the free sky, I see myself, I see freedom and I see the enhanced knowledge of the greater mankind. 🇷🇷

**Eipshita Sarder**

Student ID: 20014010  
BSc in Aeronautical Engineering (Aerospace)

## Ever thought of becoming an aerospace engineer?

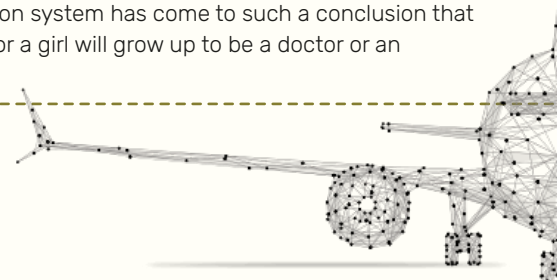
'The birds can fly/And why can't I?'

- By John Trowbridge

Aerospace engineering is the thing that can make it possible.

It is one of the most demanding and challenging fields to work in that requires a lot of hard work, intelligence and creativity. It is a term used to collectively refer to the atmosphere and outer space. Aerospace activity is very diverse, with a multitude of commercial, industrial and military applications.

Everything in life remains uncertain. But overcoming that uncertainty, strong people make impossible things possible. Sadly, our education system has come to such a conclusion that it assumes a boy or a girl will grow up to be a doctor or an







95% of the approximately  
**\$366** billion  
in revenue earned in the space sector in **2019**  
was from the space-for-earth economy



engineer. I also fell into that social narrative and affirmed my dream to be an engineer. And then I thought that aerospace engineering isn't much common in Bangladesh and felt more attractive to me than the other subjects. From then on, I kept on thinking I would study aerospace engineering. But I also found at that time that Bangladesh had no government university in that respect and I could not afford to go abroad to study all this.

As I said before, human life is based on complete uncertainty. So, when Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University (BSMRAAU) came into being and the time came for my admission test, I found in newspaper the University circular of admission test for the first batch. It seemed my dream would finally come true.

In my opinion, aerospace engineering is very different from all the other subjects. The demand for aerospace-related job is rising. The topic collaborates with many other industries e.g. airlines, aircraft design and space travel. Since the profile of aerospace engineers includes crafting and testing critical equipment like airframes for commercial and fighter planes, missiles, satellites, rockets among others, the engineer can derive immense satisfaction as these designs would serve people in years and decades to come.

Our university has the richest teachers in the country and the Vice Chancellor of our university is constantly adding new dimensions to improve the quality of our university. Now this be my request to Allah, the Most Merciful, that I may be able to strive for the fulfilment of my dreams in an honest way and we can spread the name of the country and the university all over the world.

Again, nothing is certain in human life. Man brings everything in his favour with his talent and effort. And for that he needs support. I think that the biggest support of my life is my university. It has good scope and will increase in future. Moreover, job opportunities are available in airlines, air force, corporate research companies, defence ministry, helicopter companies, NASA and many others.

### Oleullah ole

Student ID: 20014025  
BSc in Aeronautical Engineering (Aerospace)

## Space Economy Prospects of Bangladesh



The space is a vacuum where no air flows, so sounds can't penetrate; even if someone screams, nobody can hear the voice.

People on Earth may presume the space ecosystem has been formed just to keep afloat the planet in the solar system, but there's more to it than what meets the eye. Although space seems empty, it is completely filled up with tiny gaseous molecules, dust, and different rays like high-energy x-rays, cosmic rays, gamma rays etc.

The Organisation for Economic Cooperation and Development (OECD) defines space economy as the complete range of functionalities and the use of surrounding resources that create and provide values and benefits to human beings by means of exploring, understanding, managing, and utilising space resources. In terms of economic aspects, American multinational investment bank and financial services company Morgan Stanley's Space Team predicts that the global space resource could generate revenue of more than one trillion dollars or more in 2040, which is circling up by \$350 billion at present.

Commercial space industry is no longer considered a difficult matter of business to implement space-based economic corridor. The Space-X project has proved the emergence of space tourism under the dynamic leadership of its founder, Elon Musk. The California based SpaceX's recent achievements in connection with National Aeronautics and Space Administration (NASA) as well as prospective efforts by Boeing, Blue Origin, and Virgin Galactic to put people in space will mark the opening of a new horizon of spaceflights led by private firms.

Moreover, the space economy includes all public and private sector involvement in developing, providing, and using space-related products and services, such as, research and development, manufacturing and use of space infrastructure like ground stations, launch vehicles, satellites, etc. to space.

According to Harvard Business Review, 95% of the approximately \$366 billion in revenue earned in the space sector in 2019 was from the space-for-earth economy, including goods or services produced in space for use on the green planet, Earth. This economy is flourishing continuously.

The Space Economy initiative unpacks this complex topic for Bangladesh to break down the issues into core elements and providing an optimistic road map on how to make a strong space economy that delivers tangible socio-economic benefits for all strata of the people.

### Sahib Jada Eyakub Khan

Student ID: 20016017  
MBA in Aviation Management

*SPARRSO maintains a large archive of historic satellite images of Bangladesh since 1972. Entire country coverage with Landsat data of 1984 and 1988, and a large number of images of the early nineties are also available. SPARRSO continues to acquire, process and analyse images for various end users.*

Iffat Huque

The complex and dynamic environment of Bangladesh, its susceptibility to natural hazards and heavy dependency on natural resources makes spatial information a crucial ingredient for the development process. The existing communications infrastructure is inadequate to support efficient collection and dissemination of information. Therefore, activities related to photogrammetry, remote sensing and spatial information science have been developing over the past three and a half decades.

During the nineties, increasing numbers of development activities within the country and tremendous technological advances worldwide caused a major increase in the use of these technologies. Practical

applications of remote sensing products started filling the gaps in available up-to-date information.

The nineties have also seen a large increase in local professionals capable of dealing with these technologies. However, the activities are still mostly limited to government organisations and donor funded projects.

Bangladesh Space Research and Remote Sensing Organisation (SPARRSO) is one of the leading agencies that that have been working in these fields.

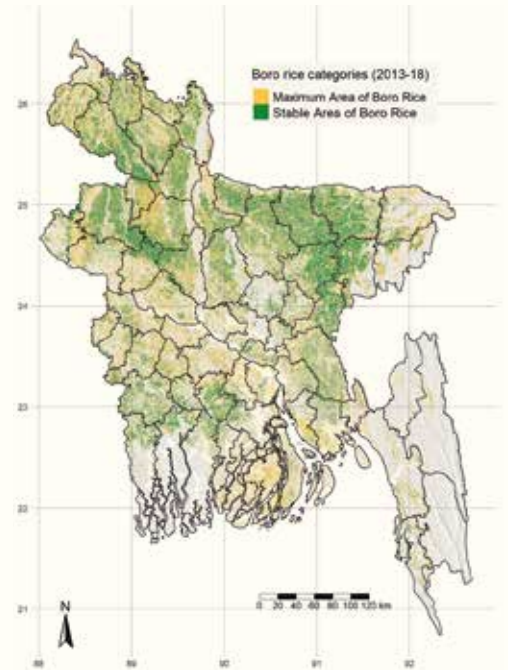
### The primary days

Although remote sensing was introduced in Bangladesh in the late sixties, its institutional recognition came with the establishment of SPARRSO. It is an autonomous organisation under the Ministry of Defence of the Government of Bangladesh. Its major objective is to apply remote sensing technology to surveying the natural resources and monitoring the environment and natural hazards in the country.

It operates and maintains satellite ground receiving stations, conducts research and develops capabilities for both visual and digital interpretation of satellite and airborne data for applications in various sectors.

Total current number of its personnel is 190 which includes scientists, engineers, technicians and administrative staff.

The introduction of remote sensing technology in Bangladesh dates back to 1968 when the first Automatic Picture Transmission (APT) Station was set up. With NASA's launch of the Earth Resource Technology Satellite (ERTS-1), the Bangladesh ERTS Programme, one of 35 Principal Investigator Programmes worldwide, was initiated in 1972. Subsequently renamed the Bangladesh



Landsat Program (BLP), it was basically building institutional and technical capability in Bangladesh for remote sensing activities.

A major activity of BLP included the generation of the first landuse/landcover map of the entire country using Landsat MSS data of 1979. During this period, Geostationary Meteorological Satellite (GMS) and National Oceanic and Atmospheric Administration (NOAA) ground receiving stations were made operational.

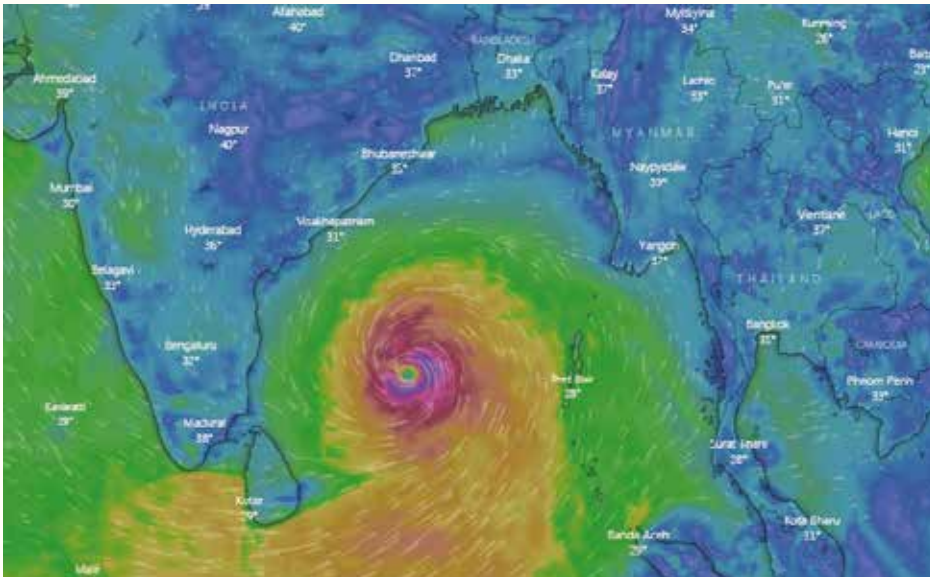
The BLP became SPARRSO in 1980 under an expanded budget of the Government.

UNDP, French Government and USAID continued supporting SPARRSO's build up. Between 1980 and 1983, a LANDSAT/SPOT ground receiving station along with a VIPS digital image processing system was set up under French support, but unfortunately did not become operational.

#### Figure details

Identifying dry-season rice-planting patterns in Bangladesh using the landsat archive, 2013-18

In **1983**, under the UN/ESCAP Regional Remote Sensing Programme, **SPARRSO** became the national focal point for space and remote sensing activities in Bangladesh.



**Photo**  
Cyclone Amphan over the Bay of Bengal

As the Bay of Bengal is a well-known breeding ground for tropical cyclones, once a cyclone is identified it is continuously tracked. The hourly images from the satellite are used to produce animated motion pictures of the cyclone which help in forecasting its track. The weather monitoring data and forecasts are disseminated to different user agencies, e.g. the Bangladesh Meteorology Department, Disaster Management Bureau and the media for disaster preparedness.

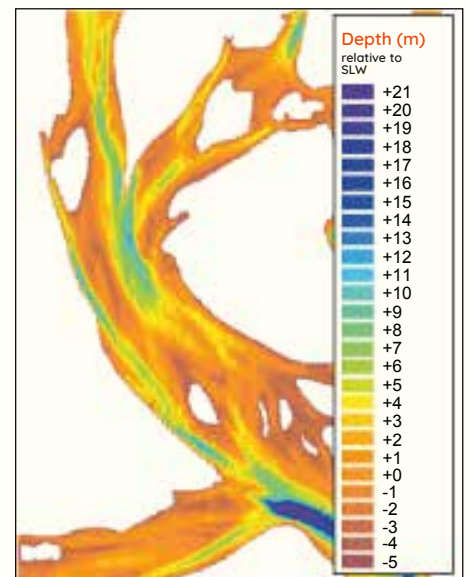
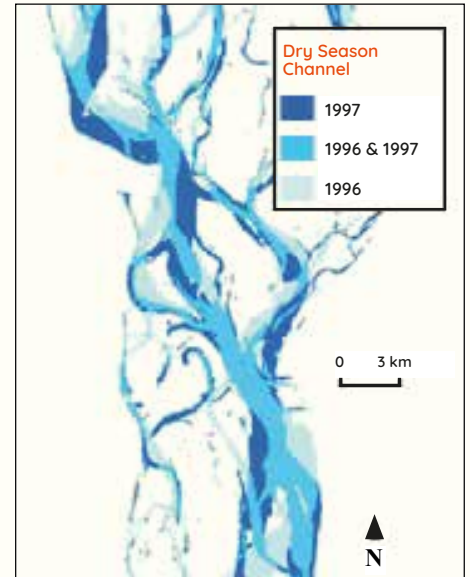
Under its Agro-Climatic Environmental Monitoring Project (ACEMP) sponsored by USAID in the early eighties, SPARRSO acquired complete digital image processing system including the necessary hardware and software. Scientists and engineers were trained in hardware, software maintenance and image processing techniques.

### Monitoring the phenomena

Bangladesh being highly prone to tropical cyclones, tornadoes and heavy monsoon rainfall, many of SPARRSO current activities are concerned with meteorology and climatology.

The Advanced Meteorological Satellite Ground Station (AMSGS) receives data from Japanese GMS-5 and NOAA series of polar orbiting satellites.

The data from GMS-5 is acquired on an hourly basis and is used to study the large-scale atmospheric processes and the dynamic features of the weather in the entire region covered by the satellite.



**Figure Details**  
River erosion and morphological change are quantified through multitemporal presentation and analysis (top) and with river bathymetry mapping (bottom)

The NOAA AVHRR (Advanced Very High Resolution Radiometre) data is collected on a 6 hourly basis. The GMS-5 and NOAA AVHRR images are regularly analysed to identify the rain bearing clouds from cloud top temperature, tornado cells, depressions and tropical cyclones.

Iffat Huque

Remote Sensing Specialist, EGIS, Environment and GIS, Support Project for Water Sector Planning, Dhaka, Bangladesh



# Why pursue a career in aviation and aerospace

1  
2  
3

It gives you the opportunity to explore sophisticated innovations and an opportunity to learn

The increasing popularity of space exploration and air travel needs expertise in design and maintaining improvements. This is why there is a high demand for Aerospace professional at present and in the near future

it is one of the highest paid careers on earth!

Are you ready to take off? **Let's go!** >>

## ENGINEERING



This 21st century and beyond will see revolutionary changes in aircraft design such as the development of more environmentally-friendly aircraft and vehicles for space tourism.

To become an engineer, one needs to be creative and be able to apply his/her knowledge of maths and science in a practical setting.

Aeronautical and/or aerospace engineers design and develop everything from airliners, helicopters and drones to fighter jets, satellites and space vehicles.

Working for aerospace manufacturers, one can become highly skilled in building the airframes or other components which make up the aircraft, such as the landing gear, engines and electrical/electronic or avionics systems.

Aircraft engineers can travel the world maintaining, inspecting and servicing aircraft to high international safety standards specialising in either mechanics (engines, airframes) or avionics (instrumentation, electrical/electronic equipment) or specialist aircraft maintenance companies.



**AEROSPACE ENGINEER**



**AERONAUTICAL ENGINEER**



**ENVIRONMENT ENGINEER**



**AVIONICS ENGINEER**



**SYSTEM ENGINEER**



**CHEMICAL ENGINEER**

## FLYING



Commercial pilots work for airlines or helicopter firms. In addition to carrying scheduled and charter airline passengers, pilots may work for freight operators, fly business aircraft, become a flight instructor, or even tow sky banners!

An aspiring pilot needs to be enthusiastic about flying but also calm and level-headed with good co-ordination, excellent communication skills, excellent health and a strong academic record. Both a medical test and aptitude testing are important requirements for pilot employment.

To become a pilot, one must obtain Airline Pilots Licence (ATPL) and a CAA Class 1 Medical certificate.



**ASTRONAUT**



**COMMERCIAL PILOT**



**FLIGHT INSTRUCTOR**



Current Undergraduate and Graduate Programmes at:

**BSMRAAU**

- BSc in Aeronautical Engineering (Aerospace)
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- MSc Aviation Safety & Accident Investigation
- MBA in Aviation Management
- MSc in Aviation & Space Law

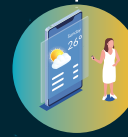
## SCIENTISTS



A physicist explains things of the universe and the world around us, like, force, energy, light, gravity and radiation; may work in different areas, including engineering, industry and research.

Atmospheric scientists e.g., a meteorologist study weather, climate, and other aspects of the atmosphere. They develop reports and forecasts from their analysis of weather and climate data.

They use highly developed instruments and computer programs to do their jobs. For example, they use weather balloons, radar systems, satellites, and sensors to monitor the weather and collect data.



METEOROLOGIST



PHYSICIST



GEOLOGIST

## MAINTENANCE



Aircraft maintenance engineers maintain, inspect, repair and service aircraft to achieve internationally-approved licences and sustain aviation's high safety standards all over the world.

Specialising in either mechanics or avionics, they work for airlines, maintenance, repair and overhaul (MRO) divisions of aerospace manufacturers or specialist aircraft maintenance companies.



AIRCRAFT  
MAINTENANCE



AIRCRAFT  
REPAIRING

## OPERATIONS



Flight operations duty officers or controllers are part of the team responsible for the day-to-day operations. They make sure that the airline has the right aircraft in the right place at the right time, with the right crew, ready to go.

They may be responsible for dealing with serious issues, such as air traffic control problems and adverse weather conditions, arranging for aircraft to undergo maintenance and, when necessary, repair. Flight operations staff devise rosters allocating pilots and cabin crew to flights. They also arrange cover for any absences.

People who man these tasks require good planning skills, strong communication skills, both written and spoken besides the ability to remain calm under pressure and be a quick thinker.



STATION MANAGER



AIR TRAFFIC  
CONTROLLER



AIRPORT GROUND  
STAFF


The world of aerospace and aviation is diverse, exciting and offers fantastic opportunities for all seeking a career in it.

Here goes a few website links that might be helpful


[www.avjobs.com/careers](http://www.avjobs.com/careers)

[www.careersinaerospace.com](http://www.careersinaerospace.com)

To learn more, please connect with us via:

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