BRIDGING SKIES

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INSPIRING YOUNG MINDS TO INNOVATE

Every technological breakthrough or development begins with an idea. To plant the seeds of innovation, the aviation community, including government agencies and top global companies, have implemented a slew of programmes to engage the youth and aviation enthusiasts to think up inventive ideas that could transform the industry.

In an intensely competitive industry such as aviation, innovation is key to maintaining market leadership. This means driving the workforce to incite technological breakthroughs, discoveries and enhancements.

Increasingly, the aviation community is engaging with today's youths and exciting them into the world of aviation, Their potential ability to bring fresh perspectives to the development of aviation, in Singapore or otherwise, is an important factor in sharpening our global competitiveness. Informal avenues in the form of science competitions and programmes have therefore emerged, encouraging enthusiastic youths to explore new frontiers in aviation technology.

PLATFORMS TO TURN IDEAS INTO REALITY

Solid, well-thought out ideas are born of creative minds which need to be cultivated and nurtured. To get enthusiasts to think creatively and innovate as early as possible, aviationrelated organisations are providing platforms for youths to get involved in aviation innovation exercises, such as the annual programmes organised by the Singapore Space and Technology Association (SSTA) – the Singapore Space Challenge (SSC) and Space Academy Singapore (SAS).

SAS is an intense five-day space-themed training programme with a heavy aerospace component, conducted by experts like former NASA engineers. It provides those aged 14 to 21 with insights into space and aerospace studies, while SSC is a national design competition for 15 to 25-year-olds, which aims to promote technical and industrial research and challenges the thinking process and creativity of students. Participants are allowed to let their imaginations run wild as many space projects are yet to be fully tried and tested, if at all. However, they must work within certain realistic boundaries, such as engineering and cost limitations. In addition, they are often only able to access theoretical knowledge, for example, regarding materials found on Mars, so they need to extrapolate and use these theories to come up with refreshing yet realistic design concepts.

SSC 2011 is focused on harnessing satellite technology for aviation purposes, with students given access to the expertise of air traffic control personnel from the Civil Aviation Authority of Singapore (CAAS). A winning team of a previous SSC designed a satellite with real-world applications – it supported anti-piracy operations at sea – and the project was presented at a recent satellite conference. Jonathan Hung, President, SSTA, noted: “Many security agencies have been looking at this idea, but to conceptualise the whole command and control environment requires very complex, systems thinking and it shows how innovative the students are.”

On the national front, Singapore’s defence research and development organisation, DSO National Laboratories (DSO), runs many youth outreach activities, including the Singapore Amazing Flying Machine Competition (SAFMC) – a nationwide challenge, targeting students from early primary school levels onwards, that requires teams to design and build innovative flying machines. DSO’s Deputy Director of the People Division, Tan Soo Kee, said, “The best part is seeing the participants validating aerodynamics theories learned from workshops and site visits – organised as part of the programme – by combining these with their creative ideas.” For leading aircraft manufacturer, Airbus, encouraging fresh and creative perspectives to address environmental challenges for the aviation industry takes precedence. Its biennial international Airbus Fly Your Ideas competition, unlike SSTA and DSO’s initiatives, challenges youths at the tertiary level to explore ways of further reducing the impact of aviation activities on the environment. Benjamin Lindenberger, a member of the winning team in 2008/2009 and now an employee in Airbus’ Materials and Processes department, said Airbus Fly Your Ideas motivates participants to seriously think out of the box, and it’s difficult to come up with an entirely new concept as the aviation industry is highly optimised and the professionals continue to make technological advances. Understanding real-world constraints while developing innovative concepts on making aeronautics more eco-efficient is also a key part of the creative learning process. “Even if you only want to improve a small aspect of the system, you may need to devise highly creative ideas that will take into account strict aviation requirements,” Lindenberger said.

Dale King, Head of Airbus International Research Network, pointed out: “The students are encouraged to explore not only how to make our aircraft more eco-efficient, but also areas like manufacturing, supply chain process, aircraft operations and end-of-life disposal. These aspects of the aviation business model also affect eco-efficiency.” The students’ ideas for the competition will not be applied immediately on an aeroplane, but King affirmed that some have the potential to be further developed: “We followed up on the concepts by two of the finalists in the 2008/2009 competition and we’re keen to see the patent potential of the ideas by the 2010/2011 teams. So far, it looks promising.”

PROGRAMMES EXPANDING DUE TO POSITIVE RESPONSE

The youth outreach activities planned by the three organisations have garnered keen interest and highly enthusiastic responses and all have registered growing participation annually. The 2010/2011 Airbus Fly Your Ideas challenge drew 287 teams from universities around the world – an over 20 per cent increase from 2008/2009. Nearly two-fifths of the teams were from Asia Pacific, including six from Singapore. SSTA's SSC has seen some 400 participants since it began in 2007, while demand has been very high for SAS 2011 with four camps planned for June alone – double the total number of sessions in 2010. Regional countries have also registered interest in SAS. In June 2011, the first intake of Indian students will participate in the rigorous course. SAS graduates have even formed a youth wing and requested a more advanced programme.

Meanwhile, the 2011 SAFMC by DSO was more hotly contested than the inaugural competition in 2009, with over 1,000 students in 380 teams vied for top accolades for the most creative and unique flying machines. Within the next few years, DSO is planning to take SAFMC global in order to expose local students to international competition and spur them to even greater heights in aerospace technological innovation.

BUILDING UP THE FUTURE TALENT POOL

The industry's ever-evolving scene is significantly driven by breakthroughs and technological developments born of the creativity and inventiveness of industry professionals, including aerospace engineers. Through their outreach activities, DSO and SSTA hope that providing youths with a hands-on aviation experience will fire their passion for the industry so that they will go on to become the next generation of well-trained, self-driven aerospace engineers whose efforts will contribute to Singapore's civil and military aviation sectors.

For instance, DSO operates in a niche area in Singapore and needs highly-trained research engineers with technical expertise and knowledge in the field of aerodynamics to undertake the development of guided systems. These are researchers who have a passion for discovery and the creativity to pursue unconventional ideas. Tan said, "We are competing with other industries for an already small talent pool so it is important that we get in early as a potential career choice for youths here." Hung further noted the importance of motivating the next generation enough for them to remain in aviation long-term, especially with the recent trend of aerospace engineers leaving for other industries.

For Airbus, King stated that not only specialists or those with good grounding in technical expertise are required: "We also need professionals with a broad, multi-disciplinary background, who have hard skills as well as soft skills, such as being able to think creatively." The technology-driven aviation community needs to constantly reinvent itself, particularly with the possibility of space tourism looming in the future, which will affect people's perceptions of time and distance. A key factor that will determine if Singapore can remain afloat in the murky waters of competition in aviation is how innovative the future workforce is in its solutions to

problems along the way and how it drives the industry going forward. Industry organisations, government agencies and private companies have all begun creating platforms for youths today to participate in developing fresh ideas to advance aerospace science and technology, which will go a long way in fostering creative and forward-thinking aviation professionals for the future.