POLYTECHNIC OF NAMIBIA

OPENING REMARKS

BY

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ON THE OCCASION OF THE 2ND EOSA-RTC SYMPOSIUM TITLED "TOWARDS A VISION FOR SPACE SCIENCE, TECHNOLOGY AND APPLICATIONS IN NAMIBIA"

24 JULY 2013

9H00

AT

HILTON HOTEL

WINDHOEK

Director of Ceremonies
CEO of the National Commission on Research Science and Technology, Dr Eino Mvula
Representative of the South African Space Agency (SANSA), Dr Imraan Saloojee
Professor Robert van Zyl, F'SATI at the Cape Peninsula University of Technology
Professor Hinori Sahara, School of Design at the Tokyo Metropolitan University
Distinguished Colleagues and Participants in the Symposium
Esteemed Invited Guests
Ladies and Gentlemen

I'm truly delighted and honoured to welcome you all at this important occasion, the 2nd EOSA-RTC Symposium titled ***"Towards a vision for space science, technology and applications in Namibia."*** The Symposium marks an important step in our **roadmap towards developing the critical human resource skills** to drive scientific and technological innovation necessary for **knowledge creation and management and thus economic development for our country.**

Please allow me to preface my remarks by going back to the 17th century. In **1687 Sir Isaac Newton published his "Mathematical Principles of Natural Science"**[1], which included his laws of motion and Keplers laws on planetary motion. Newton's laws are **fundamental principles in physics** (**the three laws of motion**) and Kepler's laws describe the orbits of planetary bodies, while **William Moores in his "Treatise on the Motion of Rockets"**[2] published in 1813 derived the **"rocket equation"**, which was based on Newton's 3rd law of motion. Incidentally, this equation was first used at the Royal Military Academy at Woolwich in England, whose workers at the military arsenal also founded the Woolwich Arsenal Football Club[3] in 1886, but by 1914 they had dropped the name Woolwich to become known simply as Arsenal FC.

In any event, the motion of planets and rockets had fired up the imagination of the broader public and made space travel seem possible, even though not yet probable at that time. Maybe this inspired the famed **author Jules Verne** to write his novel on travel **"From the Earth to the Moon"** describing the attempts of the Baltimare Gun Club to land on the moon **in 1865**.[4] Either way, we know that **Jules Verne**, in turn, **inspired the Russian, Konstantin Tsiolkovsky to publish "The Exploration of Cosmic Space by Means of Reaction**

Devices" in 1903[5], which was the first serious work on the theoretical possibilities of space exploration. From this point on space exploration activities quickly escalated from the theoretical to the practical with space flights, earth imaging and space research being conducted by the end of the Second World War. By 1957, satellites, dogs and Intercontinental Ballistic Missiles were all launched into space. To cut a long story short, **in 1961 the first human, the Russian Yuri Gagarin was in space and five years later the first soft moon landing took place, which was followed by the epoch-making landing of the first humans on the moon 44 years ago on 20 July 1969**. Since those seminal events, space science has continued to develop at an ever increasing rate.

In as much as Namibia has not led in these developments scientifically or economically, we have all experienced the benefits of the scientific and technological developments. Thus, we are currently **at a critical juncture with a number of space science activities taking place and others being initiated**. These activities include the **already established HESS Project, the CTA project and the SKA Project**. These **mega multinational projects have a huge potential to stimulate and drive the development of capacity, knowledge and skills in Namibia** and the region. However, **it is only an opportunity**, and it is up to us to take advantage of this moment. It therefore becomes urgent that we articulate a vision and strategy in order to participate in these **enormous scientific developments and opportunities in our own backyard**. To this end the **Polytechnic of Namibia established an Earth Observation and Satellite Applications Research and Training Centre (EOSA-RTC) in 2011 and lately has been selected by the Ministry of Education to host the Namibia Institute for Space Technology (NIST).**

Space science has not only provided fantastic opportunities for scientific and technological developments but also increasingly constitutes part of global commerce and industry. The **space industry accounted for US 304 billion in 2012**[6] **and showed growth rates of 5%**, while the **global satellite industry accounted for US$ 189.5 billion and grew by 7% in 2012**, compared to the average worldwide economic growth rate of 2.3%. **As of last year there were fifty countries operating at least one or more satellites accounting for a total of more than 1 000 operational satellites**. The **satellite services industry** constitutes the **bulk of the generated satellite industry revenue which stands at 60% of the total revenue** as a result of continued growth for more than a **decade at an average rate of 10%**.

Consumer services such as radio, TV and broadband account for the bulk of the revenues at US$ 93 billion, while **remote sensing services amount to only US$ 1.3 billion**. However, the latter revenues have been growing at a phenomenal rate of 20% while the other services clocked average growth rates of 5%.

In a report to **President Harry Truman**, **Dr Vannevar Bush**[7] stated "*Advances in Science mean more jobs, higher wages, shorter hours, more abundant crops, more leisure for recreation, for study and for learning to live without deadening drudgery, which has been the burden of the common man for ages past. But to achieve these objectives... to secure a high level of employment... the flow of scientific knowledge must be continuous and substantial". He continued* to say, *"without scientific progress, no amount of achievement in other directions can insure our health, prosperity and security as a nation in the modern world".*

Burton Richter[8] tells a story about **Michael Farraday** (considered amongst the greatest scientists in history and largely responsible for electricity being a commercially useful product) that occurred in 1850 when he was carrying out his seminal work on electricity and magnetism. It is said that the soon-to-be Prime Minister, Gladstone, visited Farraday in his laboratory and said rather sarcastically, "*This is all very interesting but what good is it for?*" And Farraday is said to have replied, "*Sir, I do not know yet, but someday you will tax it.*"

This conversation tells a story of where we are today in Namibia. The increasing pace of scientific development and discovery and how they have impacted our lives make this statement even more pertinent today than ever before. **Space science, technology and applications have a huge potential to deliver on a wide range of national development priorities such as urban and rural development, logistics, agriculture, land and resource management and unemployment**. Consequently, if as a country we want to lift our people out of poverty and misery that characterise so much of citizens' daily existence, then we need to invest heavily in science.

I am not proclaiming that **science on its own will be a panacea for our problems**. But I am **professing that we need to convert science into useful technologies for application by industry and the citizens**. New technologies are sometimes anticipated and planned for, but equally often **flow from fundamental research, where the potential benefits and**

applications are often not foreseen. Investing in space science, technology and applications will allow the **development of the critical skills needed to liberate us** from the developmental shortcomings confronting many of our nations. Science and technology are inextricably linked strands of development, and one cannot advance very far without one or the other.

Director of Ceremonies, Distinguished Scientists, Esteemed Audience

The opportunities presented to us at this juncture by international developments in space science provide a fertile breeding ground for the development, testing and deployment of new and existing technologies. For example, **ground stations with their data storage and transfer facilities** present opportunities for significantly increasing **bandwidth to universities** way **beyond the minuscule currently available in Namibia**. Maintenance of the ground stations will require technical staff trained in the areas of electronics and mechanics for example. These initiatives present **opportunities for universities and research institutions** to be involved in **fundamental and applied research, to create opportunities for knowledge creation and management, technological development, innovation and thereby produce a highly skilled workforce.**

For us as the **Polytechnic of Namibia** these developments could not have come at an opportune time when the institution is transforming into a **university of science and technology**. This transformation was **conscientously and purposefully driven**, knowing that the **national development paradigms demand new institutions such as a UST**. Part of this transformation process means **greater focus on science and technology programmes and strengthening our applied research** agenda. To this end the Polytechnic has a range of **undergraduate programmes in fields such as geomatics, land management, engineering, information technology and satellite remote sensing**, and we have recently approved a **Master's degree in Spatial Science for implementation in 2014**.

The Polytechnic therefore boasts a **formidable capacity and group of partners that include the Cape Peninsula University of Technology (CPUT) and the Faculty for Geo-information Science and Earth Observation (ITC) in the Netherlands,** all which have

provided valuable input and support at various stages. In addition, the Polytechnic is **the lead partner in the SASSCAL funded project to develop a Regional Master's degree in Earth Observation and Remote Sensing**. It is clear that while we have started the space science initiatives nationally, we however need to be mindful of the fact that we cannot achieve much progress alone, but only through cooperation with multiple partners and multiple nations can we succeed. Therefore, the new partnership with the **Tokyo Metropolitan University** in Japan which agreement will be signed later today is another milestone in international collaboration in space science.

Looking back to **August 01, 1996** when I was requested by the then Ministry of Lands, Resettlement and Rehabilitation and ITC in Holland to offer a one-year certificate programme in land management, I had some idea at that point how the future would unfold. In the following year we **offered certificates to 11 students in land measuring and 11 students in land use planning**. In reality, by **January 2014 we would enrol about 500 students in land and spatial programmes**. The aforementioned certificates will have transformed into **six undergraduate degree programmes, three honours programmes and two masters programmes** in a newly restructured **Faculty of Natural Resources and Spatial Science** of the **Namibia University of Science and Technology**. In the same way our space science programme is starting from humble beginnings, but this notwithstanding we are committed to the programme and **we have the track record of starting and succeeding in projects and programmes where others remain sceptical**.

In fact, the establishment of the **Earth Observation and Satellite Applications Research and Training Centre (EOSA-RTC)** and the **Namibian Institute for Space Technology (NIST)** indicate **the importance that we attach to these initiatives**. Not only has recognition been received nationally through the support from the Ministry of Education to NIST, but internationally as well **EOSA-RTC has been selected as a capacity building partner for the Monitoring of the Environment and Security for Africa (MESA) Project**. Through the use of earth observation tools we will be strongly **supporting environmental and climate objectives of the Joint Africa-Europe (JAE)'s 6th Partnership on Climate Change and Environment** and also **deploying technologies consistent with the JAE's 8th Partnership on Science, Information and Space. This programme is partially funded by the European Space Agency.**

Finally, my ambitious dreams for land management in 1996, are evolving 17 years later into aspirations for space science programme in Namibia. But for all our aspirations in this regard to be realised we need to have in place **clearly articulated and relevant strategies and policies, and will dedicate resources for the realisation of space science in Namibia**. I'm delighted that we have been able gather so many bright minds here this morning and I have no doubt that out of the deliberations and contributions that will take place, a vision for space science, technology and applications for Namibia will emerge. I want to wish you well in your fruitful deliberations. I thank you for your support and kind attention.

- ***Ends.***

REFERENCES

[1] See the Contents of Principia at Google Books.
http://books.google.com.na/books/about/The_Mathematical_Principles_of_Natural_P.htm

See also a brief description of Principia on the Britannica website.
http://www.britannica.com/blogs/2011/01/sir-isaac-newton-and-his-mathematical-principles-of-natural-philosophy-picture-essay-of-the-day/

[2] This equation is more commonly accredited to Konstantin Tsiolkovsky who also derived the equation independently much later. See http://en.wikipedia.org/wiki/Tsiolkovsky_rocket_equation

Also see the article "Contents and commentary on William Moore's *A treatise on the motion of rockets and an essay on naval gunnery" by W Johnson published in the International Journal of Impact Engineering, Volume 16, Issue 3 in 1995.*

For more general information on William Moore see the Oxford Dictionary of National Biography. http://www.oxforddnb.com/view/article/58180

[3] For a more complete history of Arsenal FC see http://www.arsenal.com/history/laying-the-foundations from the official club website.

[4]The book may be downloaded from http://www.booksshouldbefree.com/book/from-the-earth-to-the-moon-by-jules-verne and more background information can be accessed at http://en.wikipedia.org/wiki/From_the_Earth_to_the_Moon

[5] http://spacechronology.com/1900s.html

[6] For more detailed information on the statellite industry see the "State of the Satellite Industry Report June 2013" sponsored by SAI and prepared by the Tauri Group.
www.sia.org/wp-content/uploads/2013/06/2013_SSIR_Final.pdf

[7] See the report "Science, the endless frontier – A report to the President on a Program for Postwar Scientific Research by Vannevar Bush, Director of the Office of Scientific Research and Development, July 1945, Washington DC. The report may be downloaded from *www.cspo.org/products/conferences/**bush**/fulltexthighlights.pdf*

[8] Burton Richter is a Nobel Prize winning physicist at the Stanford Linear Accelerator Centre. He relates this story about Farraday in his paper on the "Role of Science in Our Society" presented at the Unity of Physics Day Joint Symposium of the American Physical Society and American Association of Physics Teachers in Washington DC in 2002.