

Technologists Keep The World Working.

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No 1.



The World's greatest engineering achievement!

This month marks the anniversary of a landmark achievement in human history. When in 1961 President John F. Kennedy announced his goal of sending a man to the moon, the United States had accomplished only 15 minutes of human spaceflight. America's space program had already absorbed several high-profile embarrassments and the Soviet Union was winning the "space race." Many thought that the president's incredibly challenging deadline of a decade was setting America up for another humbling loss.

America's political/Cold War fortunes were now in the hands of its top engineering practitioners. At the time of Kennedy's announcement, the technology, infrastructure, hardware, and technical workforce needed to achieve this goal did not yet exist!



The Apollo 11 crew relaxes during training

May 24, 1969

The Apollo space program was a tremendous success—thanks to the 400,000 engineers, scientists, and technicians from more than 20,000 companies and universities who worked on the program. They collectively and co-operatively overcame enormous technological challenges with creativity, innovation, and persistence. Their decisions and designs were sometimes risky, but always well-conceived and, on occasion, elegantly simple. Apollo stimulated many areas of technology, leading to over 1,800 spinoff products as of 2015 and more followed. Together with the US Military it was the driving force behind early research and production of integrated circuits which are today used in virtually everything electronic.

On board Apollo 11 was a computer called the Apollo Guidance Computer. It had only 2048 words of memory which could be used to store “temporary results” – data that is lost when there is no power. This type of memory is referred to as RAM (random-access memory). Each word comprised 16 binary digits (bits), with a bit being a zero or a one. This means that the Apollo computer had only 32,768 bits of RAM memory. In addition, it had 72KB of read-only memory (ROM), which is equivalent to 589,824 bits. This memory is programmed and cannot be changed once it has been set. By today's standards that is miniscule!

Developing a rocket powerful enough to propel the mother ship and lunar landing craft to the moon was a problem tackled by rocket engineer Wernher von Braun at the Marshall Spaceflight Center in Huntsville, Alabama. Over the next five years von Braun and his team designed, manufactured, and tested the Saturn V.

The Saturn V was a technological leap over anything the U.S. had previously designed. Consisting of three stages with more than 3 million parts, the Saturn V towered 363 feet when fully stacked and produced 7.5 million pounds of thrust.



Apollo 11 Lift-off

Many disciplines of engineering were intimately involved in the Apollo program, from structural, aeronautical, chemical, electrical, medical and metallurgical. All were working to achieve one goal! It all goes to show what the engineering profession can do when it pulls together!



Lunar Module 5 ascent stage in Final Assembly area on overhead hoist.

Even the space suits were an engineering challenge. Each Apollo suit was custom-tailored for its astronaut crew of three people. The suits were designed to be fully operational in the vacuum of space and also to walk around on the moon. NASA states that each mission required 15 suits. The main crew had nine between them, one for training and one for back up besides the flight suit. The construction of the spacesuit changed over the missions as the requirements of astronauts became more complex. There were several layers to the suit. The inside was a sort of "long john" fabric that included cooling water tubes sewed to the material, to keep the astronauts cool while working on the lunar surface. After that were several layers of nylon, Kapton, glass-fibre cloth, Mylar and Teflon to maintain pressure and protect the astronauts from radiation and micrometeoroids.



Aldrin and Solar Wind Experiment.

Lunar gloves and boots were included to walk around the moon's surface and pick up rocks. To help the astronauts "feel" things as they pick up, the glove digits included silicone rubber. Attached to the suit was a polycarbonate helmet, which attached using a neck ring that stayed in place as the astronaut moved his head. Another important supplement to the suit was the portable life support system, a backpack that allowed astronauts to breathe and maintain suit pressure for up to seven hours on the surface.

Designing the space hardware was only one part of the overall Apollo team. Thousands of engineering practitioners were involved in launch processing and monitoring the flights. In an era when computer systems were primitive compared to what exists today, constant communication between the astronauts and an army of engineers in Houston was critical to ensure the incredible success of the Apollo 11 mission.



Aldrin's boot and footprint in lunar soil.

Because of this combination of engineering foresight, fortitude, and teamwork, Neil Armstrong and Buzz Aldrin walked on the moon on July 20, 1969.

Neil Armstrong's famous quote was incorrectly transmitted. Instead of "That's one small step for man," the astronaut claims he said "That's one small step for a man, one giant leap for mankind." Not only was it a giant leap for mankind, it also established the U.S. as the world's most technologically advanced country. The missing "a" is generally thought to be due to his accent and the noisy transmission of the time.



Earthrise viewed from lunar orbit prior to landing.



Crater 308 viewed from orbit.

In total, Neil and Buzz were on the lunar surface (both inside their Eagle lunar module and walking on the Moon) for only 21 hours, 36 minutes and 21 seconds and were outside walking in the Sea of Tranquility for just 2 hours, 31 minutes and 40 seconds. During their EVA, they collected rocks, planted the US flag, and deployed a seismograph and an experiment called the Lunar Ranging Retroreflector – a reflective device that measures the distance between the Earth and the Moon using lasers from Earth — which is still in use today.

On entering the lunar module to begin their journey home, Buzz Aldrin and Neil Armstrong discovered that a switch on a crucial circuit breaker was broken, leaving them without a way to ignite the engine. They tried to sleep while NASA's mission control worked out a solution, but Aldrin eventually decided to jam his felt-tip pen into the mechanism to use as a make-shift switch, and it worked.

Among the unseen problems they faced, and there were quite a few, was gross flatulence. According to Collins himself, this was as a result of excess bubbles in their beverages. "The drinking water is laced with hydrogen bubbles," he wrote in his 1974 autobiography "Carrying the Fire: An Astronaut's Journeys." "These bubbles produced gross flatulence in the lower bowel, resulting in a not-so-subtle and pervasive aroma which reminds me of a mixture of wet dog and marsh gas."

The Apollo 11 moon landing reportedly cost America \$25.4 billion but the technological spinoffs gained were far, far more than what they spent. In total the whole Apollo program landed 12 people on the moon with 6 landings.

All photographs are courtesy of the

National Aeronautics and Space Administration, specifically the

NASA History Office and the NASA JSC Media Services Center.

Sources; Google, NASA etc. <https://history.nasa.gov/ap11ann/kippsphotos/apollo.html>

<https://www.foxnews.com/lifestyle/10-things-you-didnt-know-about-the-first-moon-landing>.

Information sourced from "The Most Hazardous and Dangerous and Greatest Adventure on Which Man Has Ever Embarked" by Burton Dicht, Managing Director, ASME's Knowledge and Community Sector, for Mechanical Engineering, July 2009.] And NASA.

No 2.



IPET is a member of SAFE.

The SAFE forum is a non-profit voluntary, non-statutory Engineering body with a membership consisting of Voluntary Associations, Learned Societies, Academic Institutions and Industry Associations. No other such non-statutory body exists representing the engineering disciplines, and that the interests of all parties are not effectively represented by any statutory body which will inherently be in a position of conflicting interests when dealing with any matters, which from time to time may be deemed to be contentious between the private and public sectors as they relate to the Engineering Profession.

SAFE's aim is primarily to develop and foster effective synergies between SAFE members as a collective Forum of interested and affected parties in all matters relating to the Engineering Profession in South Africa in such a manner to present a united front in liaising more effectively with all parties, public and private sector, on matters and issues affecting the sustainability of the Engineering Profession in the Country.

SAFE recently sent a petition to the President of South Africa requesting intervention in saving the Construction industry. It seems nothing will happen until after the elections. The country's declining infrastructure and cancellation of projects due to violence and lawlessness is an area of great concern. No positive response has yet been received.

No 3.

Winners of the 2018/2019 NSTF-South32 Awards

#NSTFawards2019

The [NSTF-South32 Awards](#) were held at a prestigious [Gala Dinner](#) in Gauteng on Thursday, 27 June 2019. It is the 21st celebration of South African excellence through this flagship project of the [National Science and Technology Forum \(NSTF\)](#).

- Scientific research
- Innovation
- Management and related activities
- Capacity development in engineering research
- Environmental sustainability and biodiversity conservation
- Water research and innovation
- Data management
- Science Communication

This year the Special Annual Theme Award is made for an outstanding contribution to SET and innovation, through work on materials for inclusive economic development. (The annual theme for 2019 is the Periodic Table of Chemical Elements, as declared by the United Nations.)

About the NSTF and the awards: The NSTF is the most representative multi-stakeholder non-profit forum in South Africa promoting SET and innovation. The [NSTF-South32 Awards](#) showcase the research and development capacity of our nation. The excellent output of the winners supports South Africa's advancement, economic growth and the social upliftment of our people.

Why are these awards different? The national NSTF-South32 Awards are the largest SET and innovation awards in South Africa. They are known as the 'Science Oscars' and were the first science awards in the country. The focus is on spreading information about SET to the public, which includes the year-long engagement programme with students and learners called the '[Share 'n Dare Programme](#)'.

No 4.



WHAT IS THE ECSA?

The Engineering Council of South Africa (ECSA) is a statutory body established in terms of the Engineering Profession Act (EPA), 46 of 2000. The ECSA's primary role is the regulation of the engineering profession in terms of this Act. Its core functions are the accreditation of engineering programmes, registration of persons as professionals in specified categories, and the regulation of the practice of registered persons.

Consequently, the ECSA is the only body in South Africa that is authorised to register engineering professionals and bestow the use of engineering titles, such as Pr Eng, Pr Tech Eng, Pr Techni Eng, Pr Cert Eng, on persons who have met the requisite professional registration criteria.



IPET is an ECSA recognised Voluntary Association. (VA A008).

One of the benefits is that IPET members who are registered with ECSA can get a discount on their annual ECSA fess. The discount usually is more that the IPET fee so members get two for less than the price of one!!

News from ECSA

Dear Stakeholders,

The Engineering Council of South Africa (ECSA) is a Statutory Council, established in terms of the Engineering Profession Act, 46 of 2000 with a mandate to, inter alia, accredit engineering programmes at Higher Education Institutions, register persons in the prescribed categories of registration, and regulate the professional conduct of registered persons. In order to fulfil its mandate, ECSA develops/reviews and conducts feasibility studies on policy and qualification standards and undertakes research for regulating the engineering profession. The development, review and/or update of policies and supporting documents for a number of engineering standards is a continuous process as they seek to be relevant for both its current registration categories and future categories.

The multiple functions of ECSA require sourcing of expertise from different stakeholders. A framework that guides the engagement and contribution of stakeholders and delineation of the contribution has been developed.

ECSA is presenting the Stakeholder Contribution Framework for comments. The purpose of such consultation is to solicit comments and views on how stakeholders may contribute to the business of ECSA.

Stakeholders are hereby invited to send their comments on the Stakeholder Contribution Framework to ecs@rpsdservices.co.za on or before 28 June 2019.

The Stakeholder Contribution framework is attached, you can also find the framework on this link : [Stakeholder Contribution Framework](#).

Kind Regards,

Mbalenhle Dlamini

Public Relations Officer

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IPET has answered ECSA as below.

Thank you for the opportunity to comment on this new policy.

We have and will always be available to assist with policy formulation and revisions when requested.

This very comprehensive policy has been briefly studied in the limited time allowed and seems to cover all eventualities so we have no comment at this stage.

We will refer it to our members and advise you of any meaningful feedback received.

IPET Admin.

The Court Case Against ECSA – Update.

ECSA was approached some years back on what seems to have been a flawed process of appointment of individuals onto ECSA's then new council which may render the new council illegal. This was a concern raised by various Voluntary Associations (VA) as it impacts on the validity of the work of ECSA's committees and the VA's.

Due process was followed after ECSA did not respond to the concern and the matter was taken to the Council for the Built Environment (CBE) for investigation. Legal advice indicated that there is sufficient evidence that the process was flawed. This concurs with the legal finding of the CBE.

Before going to court these individuals followed all available processes to resolve the matter amicably and in a collaborative manner with ECSA.

ECSA and the CBE were approached, then the Minister of Public Works. The team met with the Minister, deputy minister, the DG and their advisors. The Minister and his deputy both confirmed that they were not aware of the details of the issues regarding the ECSA case apparently promised to get back to the VA's. It's been more than two years since this meeting was held and the team has not received any response.

Due to no response from these bodies, the only option available was to go to court. Some 16 Voluntary Associations are indirectly part of this litigation process. Papers were lodged in high court in October 2016. The court date for this case has not yet been finalised as far as we are aware.

During the past few months ECSA has indicated that it may be willing to discuss this matter, but at the time of writing no positive steps have been agreed on.

No 5.

Good to Know.

IPET Social Media.

Please follow us on Facebook (<https://web.facebook.com/ipet.technologists>) and Linked-In (<https://www.linkedin.com/company/ipet-engineering-technologists/>). Become an active member and start sharing your great ideas with the technology family.

We would love to hear from you. Please give us feedback on these profiles and suggest what you think should be on it so that we can attract new members.

IPET, The Institute of Professional Engineering Technologists, speaks for all Engineering Technologists in South Africa.

Becoming an IPET member will mean you enjoy benefits such as discount on your ECSA annual registration fee. The money saved is more than your IPET membership fee! Which means cash-back in your pocket.

CPD courses and workshops and other communication will be communicated to you on these platforms.

See you soon!

If links don't work please type in the text into your internet browser.

#. Services Offered By Members.

(Free ad for members)

Please visit our Website

<http://engineersdirectory.co.za/>

For all details.

If links don't work please type in the text into your internet browser.

Wherever possible support your fellow members!

No 6.

Office News.

In June we had a week + with no telephones or internet as well as a power failure over two days. Thieves stole cables and also the standby batteries at a local Cell Phone tower. The good news is that the battery thieves were caught some days later with the goods.

We have now started July with a repeat of the above with no phones or internet for since 2nd July.

No 7.

Adverts of interest to members.

Get digital now with the Festo Automation Expo 2019!

Festo invites you to maximise your competitiveness in the industry. We are offering a course on an 'Introduction to Industry 4.0: Core elements and business opportunities'. This course appeals to management level, senior executives, technology enthusiasts and engineering professionals. Attending this half-day accredited course will earn you **0.5 CPD points**. The second half of the day will also include a seminar from four of our industry specialists.

The half-day morning session (CPD course) costs R1750.00.

The half-day afternoon session (seminar and function) costs R1250.00.

The full day session (CPD course, seminar and function) costs R2500.00.

A 5% discount will be given to customers that will be paying for the full day session, making the total R2375.00.

Dates and venues for the Automation Expo:

Gauteng: 6th June 2019 – Sandton Convention Centre

Eastern Cape: 4th July 2019 – Boardwalk Convention Centre

Western Cape: 19th July 2019 – Spier Wine Estate

KwaZulu Natal: 15th August 2019 – Durban ICC

Kindly direct all your enquiries to events.za@festo.com.

Click on this link to RSVP and secure your spot www.festo.co.za/expo2019!

Recruit a Graduate!!

South African businesses have a new platform to recruit skilled graduates, interns, and apprentices in a simple, low-cost format.

RecruitAGraduate.co.za is a new online recruitment platform. The new platform aims to pair young graduates, interns, and apprentices who have graduated from reputable higher learning institutions in the past five years,

or those who need work experience to complete their qualifications, with businesses and entrepreneurs looking for the energy and skills that young recruits can offer.

Recruitgraduate.co.za completed a successful trial phase in March 2019 and opened its doors for job listings and professional recruitment in April.

By offering an easy-to-use platform with low fees and a targeted approach, RecruitAGraduate will help forward-thinking businesses invest in hiring graduates, interns, and apprentices, addressing one of the challenges of youth unemployment in South Africa, which is the highest in the world. Graduate youth employment integrates with existing governmental tax and B-BBEE incentives and dovetails with foundational programmes such as [Youth Employment Services](#) (YES)

Ed. This may assist students, graduates and employers.

If links don't work please type in the text into your internet browser.

8.
Snippets.

The following mini articles, notices and news follow the trend of interesting scientific, engineering developments and general interest items that we come across. Read and enjoy!

Please feel free to contribute by sending your items to share with our members!

Ed

South Africa Shortwave Transmission Dies!

Long Distance Radio Communication began with Shortwave. The once strong voice to tell the world about South Africa has now gone. Sentech closed down its shortwave transmitters at Bloemendal near Meyerton on the 30th March 2019. It closed down its analogue shortwave due to financial sustainability and technology obsolescence.

It started with Radio RSA in May 1966 and by 1976 transmitted 36 hours a week in twelve languages. In 1992 this service was closed down and only Channel Africa survived with Radio Sonder Grense aimed at the Northern Cape.

Now it's all closed down. Shortwave was and still is an essential means of reaching listeners in conflict areas, times of military intervention and political closure of the internet. Sadly these are not considered important anymore.

Medical Breakthrough!?!?!?

US regulators have given the green light to a new drug called Vyleesi, suggesting that they are both broadminded and GOT fans. It's designed to boost low sex drive in women. It's administered as a shot about 45 minutes before the "anticipation of intimacy". It's only the second FDA-approved medication to increase women's sex drives. The first bombed because you couldn't use it with alcohol.

"Drawing on my fine command of language, I said nothing."

Mark Twain.

No 9.



The Joke Column.

Warning / Disclaimer.

Sensitive readers are warned that the following may erroneously and unintentionally be taken to contain sex, violence, strong language, gender, race, ethics etc. Readers are warned not to read or have any of the following read to them. Recommended readers age is limited to 140 and 161 years of age. A further requirement is you must have a sense of humour. No Persons or animals are intended to be harmed in any way by this column.

How many South African politicians does it take to change a light bulb?
One – to hold the bulb steady while the world revolves around him/her!
A politician is sitting at his campaign headquarters when the phone rings.
He listens and he smiles. When he puts the phone down he phones his mother.
“Ma”, he says, “the results are in – I won in the election!”
“Honestly” exclaims his mother.
The politicians smile fades away and he says, “Ma, why do you bring that up at a time like this?”

In the court the judge asks the little boy; “would you like to live with your father?”
“No” says the little boy. “He beats me.”
So the judge asks “Will you live with your Mother?”
“No, she also beats me.”
So the judge asks, “so who would you like to live with?”
“With Bafana Bafana”, says the little boy, they never beat anybody!”

Scientists have discovered the heaviest element yet known to science.

The new element is Governmentium. It has one neutron, 25 assistant neutrons, 88 deputy neutrons and 198 assistant deputy neutrons, giving it an atomic mass of 312.

These 312 particles are held together by forces called morons, which are surrounded by vast quantities of lefton-like particles called peons.

Since Governmentium has no electrons or protons, it is inert. However, it can be detected, because it impedes every reaction with which it comes into contact.

A tiny amount of Governmentium can cause a reaction normally taking less than a second to take from four days to four years to complete.

Governmentium has a normal half-life of 2- 6 years. It does not decay but instead undergoes a reorganisation in which a portion of the assistant neutrons and deputy neutrons exchange places.

In fact, Governmentium's mass will actually increase over time, since each reorganisation will cause more morons to become neutrons, forming isodopes.

This characteristic of moron promotion leads some scientists to believe that Governmentium is formed whenever morons reach a critical concentration. This hypothetical quantity is referred to as critical morass.

When catalysed with money, Governmentium becomes Administratium, an element that radiates just as much energy as Governmentium since it has half as many peons but twice as many morons. All of the money is consumed in the exchange, and no other by-products are produced.

Part 10.

Unsubscribe Option.

As a member of IPET you should want to receive the E News. If however u do not want to receive the IPET E News as an E Mail then you have the option to unsubscribe.

To unsubscribe send an email with "IPET unsubscribe newsletter" in the text to engineer@netactive.co.za

Part 11.

O. & O. E.

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