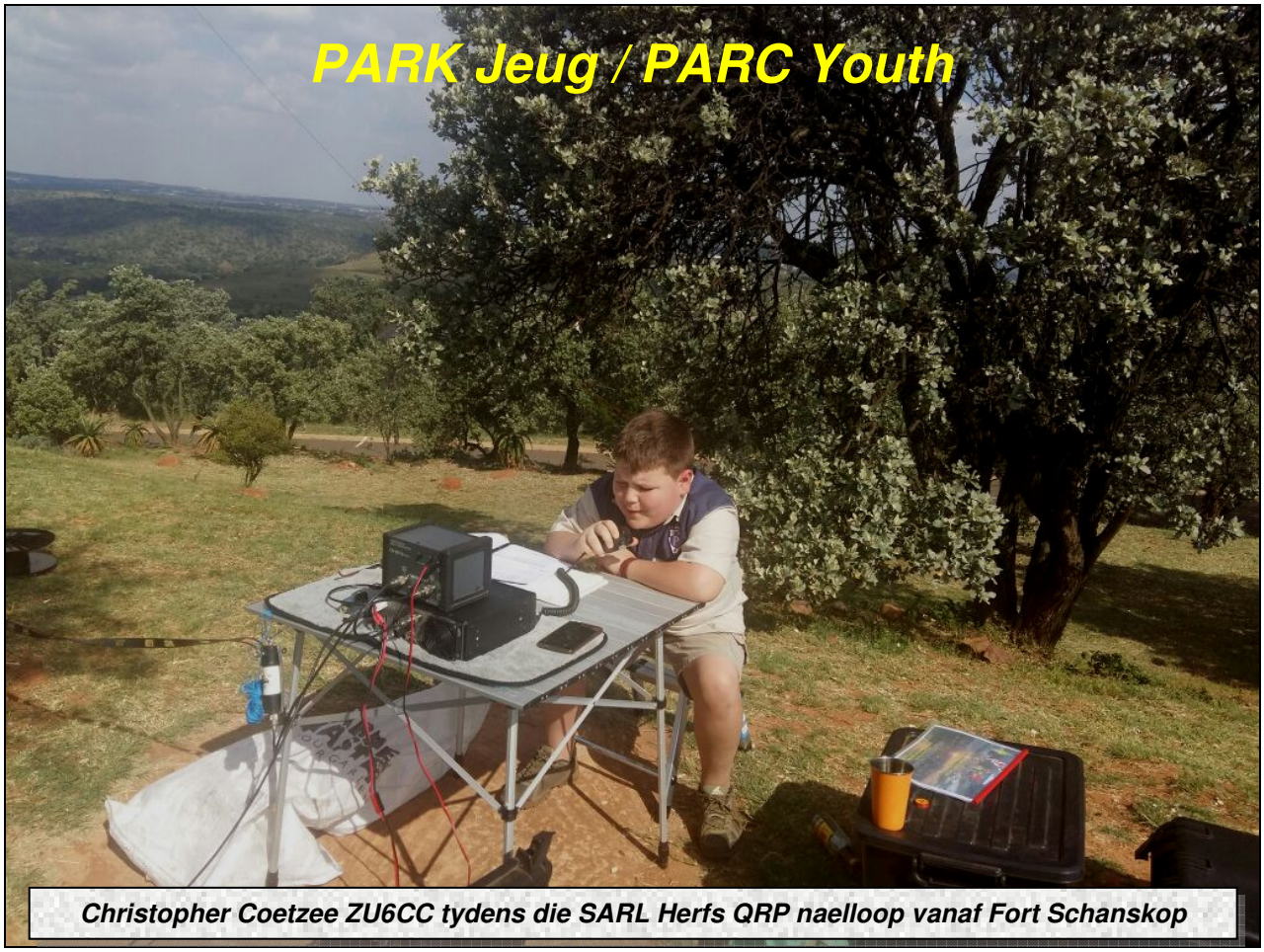
WATTS

05-2016
Year 86 + 5m

Monthly Newsletter of the Pretoria Amateur Radio Club
Maandelikse Nuusbrief van die Pretoria Amateur Radio Klub

PARC, PO Box 73696, Lynnwood Ridge 0040, RSA
http://www.parc.org.za@ zs6pta@zs6pta.org.za

Bulletins : 145.725 MHz on Sundays / Sondae at 08:45
Relays: 1.840, 3.700, 7.066, 10.135, 14.235, 51.400, 438.825, 1297 MHz
Activated frequencies are announced prior to bulletins
Swopshop : 2m and 7.066 MHz live on-air after bulletins
Bulletin repeats on Mondays / herhalings op Maandae : 2m 19:45



Christopher Coetzee ZU6CC tydens die SARL Herfs QRP naelloop vanaf Fort Schanskop

In This Issue / In Hierdie Uitgawe

Club Meetings / Klub Vergaderings

Club Social Meeting :

Saturday 7th of May 2016 from 13h00 at the TUKS Clubhouse.

Committee Meeting :

Tuesday 10th of May 2016 from 19h00 at SAM

The next PARC Fleamarket is scheduled for Saturday 28 May 2016 from 7h00

Please do contact Almero du Pisani ZS6LDP (almero.dupisani@up.ac.za or 083-938-8955) for more information or to book a table, or if you wish to donate any old equipment to PARC

PARC Committee Members / Komiteelede : 2015 - 2016

Elected Members					
Chairman, Social & Rallies	Johan de Bruyn	ZS6JHB	zs6jhb@gmail.com	012-803-7385	079-333-4107
Vice Chairman, Contests	Pierre Holtzhausen	ZS6PJH	zs6pjh@telkomsa.net	012-655-0726	082-575-5799
Treasurer	Andre van Tonder	ZS6BRC	andreh.vtonder@absamail.co.za	012-361-3292	082-467-0287
Secretary, Bulletin Coordinator	Jean de Villiers	ZS6ARA	zs6ara@webmail.co.za		083-627-2506
Public Relations, RAE, Bulletins	Etienne Naude	ZS6EFN	etienne@afrigrid.com		082-553-0542
Web co-ordination	Graham Reid	ZR6GJR	greid@wol.co.za		083-701-0511
Competitions	Jaco Cronje	ZR6CMG	jacocronje@yahoo.com		081-474-2220
Clubhouse & Contests	Whitey Joubert	ZS6JJJ	zs6jjj@gmail.com		072-120-4516
Technical, Web & Repeaters	Gawie Marais	ZS6GJM	zs6gjm@gmail.com		083-663-2222
WATTS, RAE & Clubhouse	Louis de Wet	ZS6SK	louis.zs6sk@gmail.com	012-349-1044	072-140-9893
Co-Opted Members					
Fleamarkets	Alméro Dupisani	ZS6LDP	almero.dupisani@up.ac.za		083-938-8955
Auditor	Tony Crowder	ZS6CRO	tcrowder@telkomsa.net	011-672-3311	
Historian, Archives, Awards	Tjerk Lammers	ZS6P	zs6p@iafrica.com	012-809-0006	083-976-4387

Birthdays – May / Verjaarsdae – Mei

01 Amanda, dogter van Martie en Johann "JB" ZR6YV
03 Andries Schoombee ZS6SCH
06 Christopher Coetzee ZU6CC
06 Lourens Erasmus ZS6KRT
14 Johan Momberg ZS6BPB
17 Vincent Harrison ZS6BTY
21 Lukas (Outie) Dorfling ZS6LMD
25 Tjerk Lammers ZS6P (Hon. Member)
31 David Botha ZS6DBB
31 Gawie Basson ZS6GJJ
31 Ian (Dave) ZS6JW

Spouse's Birthdays – May / Mei

11 Zdena, sw of Ivo Chladek ZS6AXT

Anniversaries / Herdenkings – May / Mei

01 Peter ZS6PJ and Ria Smith

Lief en Leed / Joys and Sorrows

Ons het met leedwese kennis geneem van die afsterwe van Gawie ZS6GJM se Moeder. Graag wil die lede van PARC hul innige meegevoel aan Gawie en sy Gade en Familie oordra.

May Birthstone: Emerald

As the birthstone for May, the emerald, a symbol of rebirth, is believed to grant the owner foresight, good fortune, and youth.

Contests and Diary of Events – May 2016 / Kompetisies en Dagboek van Gebeure – Mei 2016 (UTC Times)	
07	**HF Assessment for prospective RAE candidates at Waterlab offices : 09h00 – 12h00)**
07 - 08	10 – 10 International Spring Contest, CW : 00h01 – 23h59
07 - 08	ARI International DX Contest : 12h00 – 11h59
14 - 15	VOLTA WW RTTY Contest : 12h00 – 12h00
14 - 15	CQ-M International DX Contest : 12h00 – 11h59
19	**Radio Amateur Examination (RAE)**
20 - 21	**Secunda Motor Rally : Contact Johan ZS6JHB for more details**
21 - 22	His Majesty King of Spain Contest, CW : 12h00 – 12h00
21 - 22	EU PSK DX Contest : 12h01 – 12h00
28	**PARC Fleamarket : 07h00 – 12h00**
28 - 29	CQ WW WPX Contest, CW : 00h00 – 23h59

PARC SUBS / LEDEGELD FROM / VAN 31-10-2015

Bank	First National Bank	Ordinary Members / Gewone Lede : R150 Spouses / Pensioners : R50	**Your call sign must appear as statement text!**
Branch Code	25 20 45		
Account No	546 000 426 73		

Please remit your subs in time to our Treasurer, or pay per transfer into the PARC account
Betaal asb. u ledegelde betyds aan ons Tesourier, of betaal per oorplasing in die PARC rekening

Please Note : If your Club fees are not paid up to date, birthday details cannot be displayed in Watts

ZS6PTA neem deel aan die SARL VHF/UHF naelloop : Jaco ZR6CMG

Lede van PARK het op die 9de April aan die SARL VHF/UHF QRP naelloop deelgeneem. Die groep, bestaande uit Jaco ZR6CMG, Ryan ZS6GGR, Pierre ZS6JHB en Christoper ZU6CC het soos oudergewoonte hul stasie by die pragtige Fort Schanskop opgerig. Dit was ‘n heerlike somersdag wat ideaal was vir ‘n veldstasie, en om die dag buite saam met vriende en familie en vriende te geniet. Die span het ook ‘n paar gaste gehad, onder andere Juanita, die LV van Ryan en Louisa, die LV van Jaco. Nadat die antennas opgerig is, was daar oudergewoonte ‘n braai voordat daar ernstig begin is met die roep na “see koeie”. ZS6PTA het die beperkte kategorie gewen gedurende Maart 2016, en het tydens hierdie kompetisie die verste afstand bereik van 25km op 4 meter FM tydens ‘n kontak met Jean de Villiers ZS6ARA.

Jaco, Ryan en Pierre in diep gesprek…

ZS6PTA se opstelling vir VHF/UHF

Louisa, LV van Jaco geniet die heerlike rustigheid

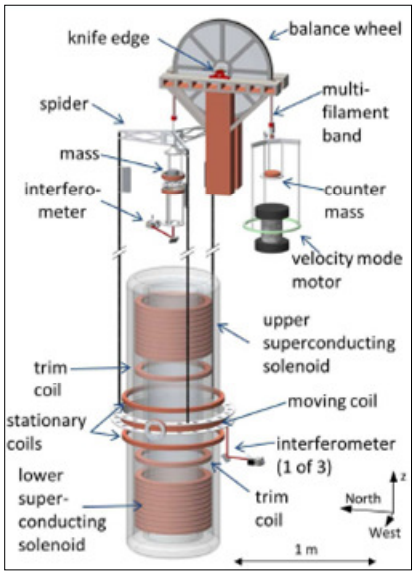
Jaco ernstig aan die werk.. “CQ Kompetisie… ZS6PTA”

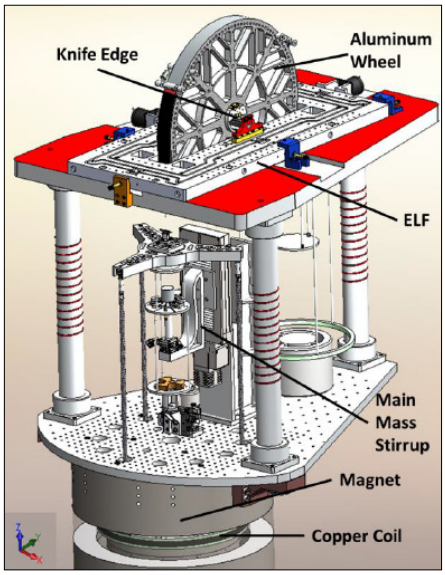
Braai is harde werk, soos gedemonstreer Ryan en Jaco

Pierre geniet sy braaivleis voor die ernstige werk begin

Redefining the Kilogram : The Watt Balance

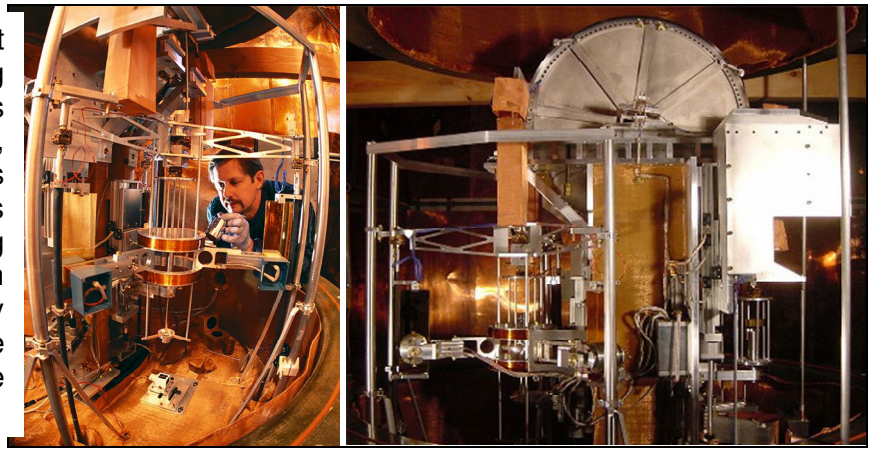
In the previous edition of Watts (04-2016) a discussion was presented illustrating the difficulties encountered over the past two century with regards to the mass stability of the SI kilogram artefact. Intensive research and a number of attempts have been conducted since 1901 in order to eliminate the problems associated with an artifact based definition, and redefine the kilogram relative to a natural constant. Currently, two independent experiments are leading the efforts to redefine the kilogram. These two experiments are known as the Watt Balance, which will be dicussed in this article, and the Avogadro experiment.

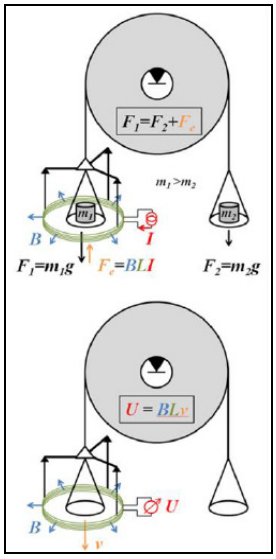




The Watt balance, or electronic kilogram, relates the kilogram to Planck's Constant. The NIST-4 (National Institute of Standards and Technology) consists of a copper wire coil suspended from one side of a precision made aluminium wheel balanced on a knife edge along the axle of the wheel. The hanging coil is immersed in a 0.55 Tesla magnetic field (x10 000 greater than Earth's magnetic field), which is generated by a 1 ton SmCo permanent magnet.

Functionally, the Watt Balance operates by linking the unit of mass to Planck's constant, while functionally, the instrument achieves this linkage to quantum physics via in directly comparing electrical power with mechanical power by switching between either the Velocity Mode or the Force Mode during measurement.





Force Mode: An upward electro-magnetic force is generated by the coil to balance the wheel

Velocity Mode: A voltage is induced by moving the coil through a 0.55 Tesla magnetic field

When in Velocity Mode, the coil (wire Length *L*) moves at a vertical speed, *v*, through the magnetic field (flux density B) so that a voltage, *U*, is induced. The voltage is then measured in relation to Planck's constant by comparison to a quantum voltage standard.
When in Force Mode, the gravitational force of the counter-mass, m_2g, offsets the weight of the coil and mass m_1g. To achieve a balanced state, an upward (or downward if the main mass is unloaded) electromagnetic force, generated by sending an electric current, *I*, through the coil, levitates the main mass stirrup. Measuring the main mass on the same side as the coil ensures equality in the torque generated by a common lever arm, as long as their centers of mass are vertically aligned to gravity. The current, *I*, is measured in terms of Planck's constant by monitoring the voltage drop across a known resistor, making use of both quantum voltage and resistance standards.

Jabbour, Z.J. 2009. Getting closer to redefining the kilogram. W&M. October 2009. 24 ; 26
Steiner, R.L. et al., 2005. Towards and electronic kilogram. Metrologia. 42: 431-441.

SASOL 2016 Tydren : Sabie

Die SASOL 2016 tydren het plaasgevind gedurende die naweek van 22-23 April in die pragtige omgewing van Sabie, Graskop, Witrivier en Nelspruit. Lede van Pretoria-, Magalies en plaaslike Radio Klubs het bygestaan met radio-beheer tydens die 14 trajekte wat oor twee dae gestrek het. Radiobeheer was behartig deur Johann de Beer ZR6YV, terwyl Tony Cowder ZS6CRO en Andre van Tonder ZS6BRC Mobiel 1 en 2 beman het. Menno Havelaar ZS6AGC (Kar 00) en Louis de Wet ZS6SK (Kar 0) het natuurlik groot pret gehad met die opening van die trajekte teen hoë spoed. Beamptes 1 en 2 was Pierre Holtzhausen ZS6PJH en Ben van den Berg ZR6BVB onderskeidelik, terwyl Ronel Jansen van Rensburg ZS6SBV die taak van Van1 behartig het.

Veldstasies is behartig deur Johan de Bruyn ZS6JHB en sw Doreen ZR6DDB, en Graham Reid ZS6GJR en sw Joey (SSS1,6,7 &11), Pieter Fourie ZS6CN en sw Annatjie, en Pieter Muyburgh ZS6PAM en sw Irene (SSS2,4,9 & 12), Brian Jacobs ZS6YZ en sw Anette ZR6D, en Willie Greyling ZR6WGR en sw Sarina (SSS3,5,10 &13). Die voorafgaande donderdag aand het die groepie in Sabie oorgeslaap en heerlik gekuier en vleis gebraai. Ons het heerlik gesmul aan Pieter ZS6CN se legendariese roomkerrie tamatie en uie sous saam met die ete.

Pieter, Irene, Annatjie, Doreen, Johan en Pieter

Pieter, Irene, Johan, Annatjie, Pieter en Brian

Kar 0 : Frans Jooste en Thilo von Westerhagen

Joey Reid in ligte luim by veldstasie SSS1

Kar 00 : Danie Venter en Menno Havelaar

Louis ZS6SK se uitsig agter in Kar 0

Pieter ZS6CN beman SSS2

Gedurende dae 1 en 2 wat oor vrydag en saterdag gestrek het, het ons heelwat aksie gesien met ‘n groot aantal nasionale en streeks inskrywings. Talle interessante motors, veral op die streeksvlak het deelgeneem, soos onder gesien, met die BMW van Nick Theunissen en die alombekende Chev Ranger van Karl du Plessis. Die veldstasies van PARK en onder moeilike omstandighede, veral op 145.675 MHz, hul uitstekend van hul taak gekwyt. Die laaste trajekte van beide dae was besonder, met die aand trajek in Sabie, asook die laaste van saterdag op die York Sport Grounds, wat vir baie aksie en stof gesorg het.

Kar 233 : Nick en dogter Yvonne Theunissen

Kar 251 : Karl en Simon du Plessis

Laaste trajek : Sabie – York Sport Grounds. Baie stof was die orde van die dag

Aksieskote deur Louis ZS6SK tydens die laaste trajek

Giniel de Villiers en Leeroy Poulter

Alles verloop nie altyd vlot nie..

Die laaste dag het tot ‘n einde gekom en die skaduwees het lank begin word. Na afhandeling van die formaliteite het die sjampanje gevloei met die aankondiging van die Wenspan, Leeroy Poulter & Elvene Coetzee en Naaswenners, Giniel de Villiers & Caroline Swan

Agter: David Brown ZU6DB en sw Margaret. Voor: Tony Crowder ZS6CRO en Johann de Beer ZR6YV

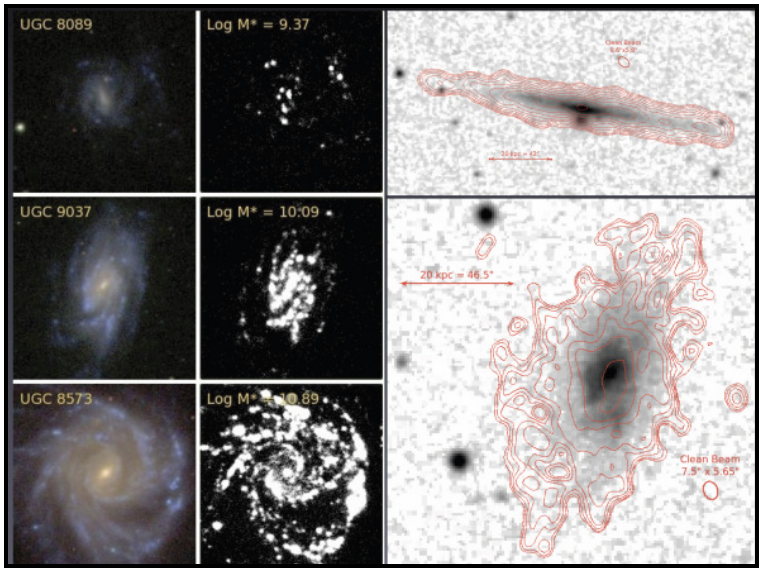
Die lang dag is paslik afgesluit met ‘n heerlike ete saam die veterane van tydren radiobeheer. Die heerlike staaltjies van Tony en Johann “JB” asook David en Margaret Brown (Sweep) is terdee geniet.

Radio-Astronomy : Arecibo Observatory Research Projects

In the previous issue of Watts (04-2106) an overview and description of the Arecibo Radio Observatory was presented. This article will discuss some of the research projects the Arecibo team is involved with in conjuction with other Institutions and Universities. Short discussions of some of the major projects are presented next:

Observational Cosmology with ALFALFA : Martha Haynes (Cornell University)

By utilizing the Arecibo L-band Feed Array (ALFA) and the sensitivity of of the telescope's large collecting area, the Arecibo Legacy Fast ALFA (ALFALFA) extragalactic survey was designed to survey and detect gas-bearing (neutral atomic hydrogen – HI) galaxies.

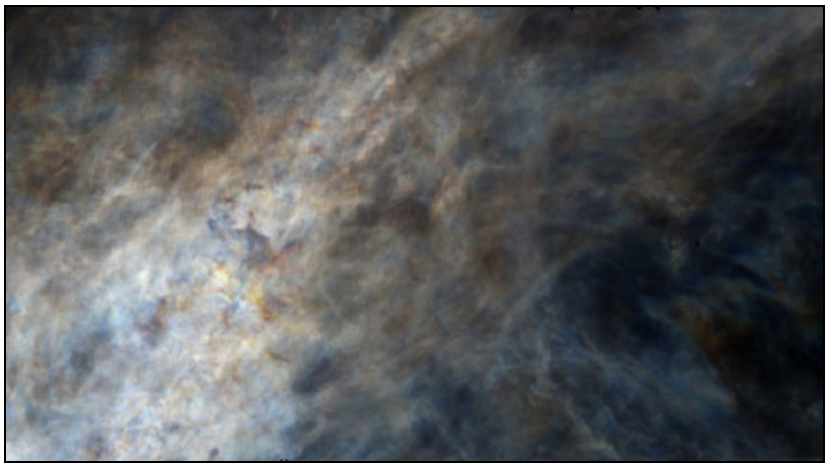


ALFALFA detected 29 times more HI mass galaxies than the HIPASS survey conducted by the Parkes telescope in Australia. Due to the combination of sensitivity, spectral and angular resolutions and bandwith, the first robust census of the HI-population was produced. This also has positive implications for the Square Kilometer Array (SKA) in South Africa to conduct further research in this field. A detailed multi-wavelength is being undertaken to investigate gas content and distributions, stellar populations, star formation histories and dark matter properties of a set of 30 very high mass high gas fraction galaxies.

Gas, stars, star formation and dark matter in the high HI mass, high gas fraction HighMass galaxies. Left: (left) images from GALEX and narrow-band Hα (right) images from the KPNO 2.1m telescope of three systems spanning a range of star forming activity. All of the HighMass galaxies are activeky forming stars but they are under-luminous for the HI mass; they appear to be inefficient in converting their gas into stars. Right: Contours of HI column density superimposed on the optical images of the first two HighMass galaxies mapped.

The Galactic Arecibo L-Band Feed Array HI (GALFA-HI) Survey: Mary Putman & Josh Peek

Hydrogen is the basic baryonic building block of galaxies. Hydrogen gas flows into the dark matter potential well of a galaxy, condenses in the disk in atomic form, and subsequently forms molecular material, and then stars. The GALFA-HI survey mapped the atomic hydrogen distribution in the Galaxy and provided significant insight into how these processes occur. The detail shown the Figure right was not possible with other large scale surveys.

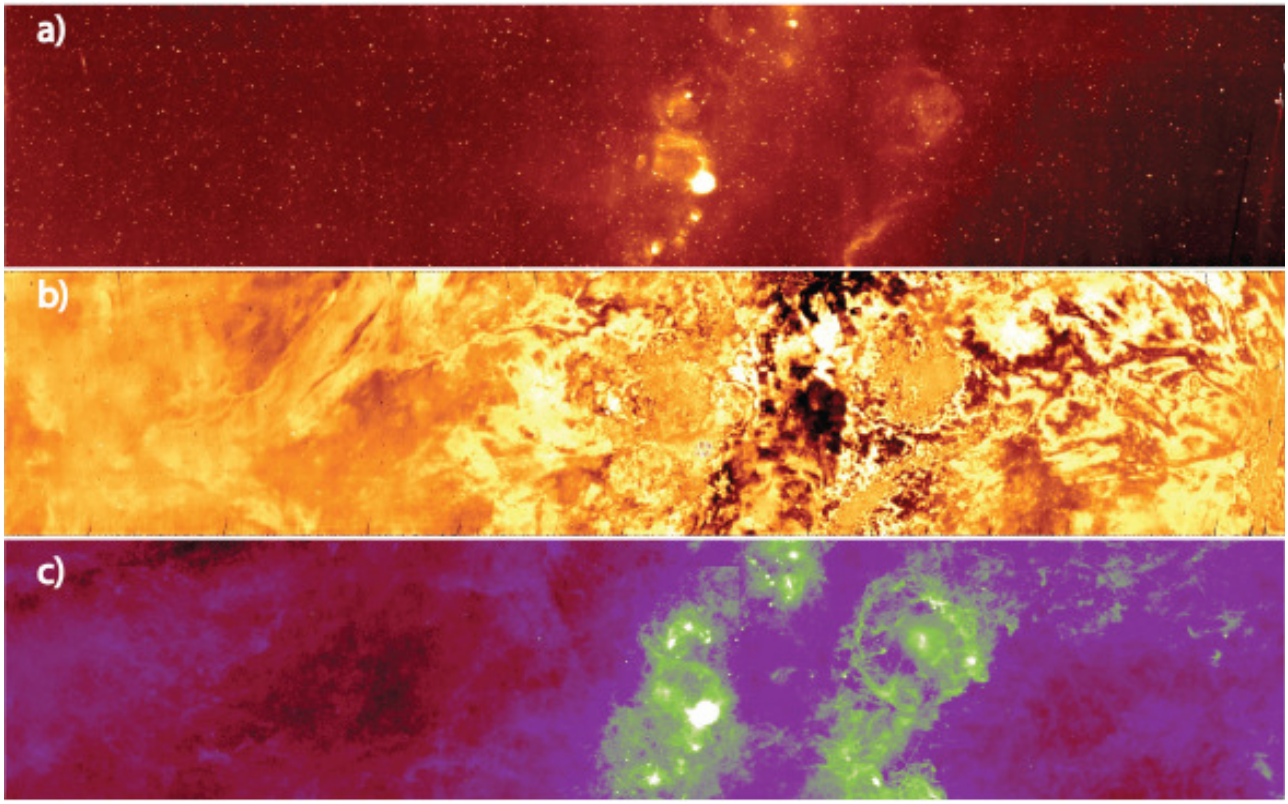


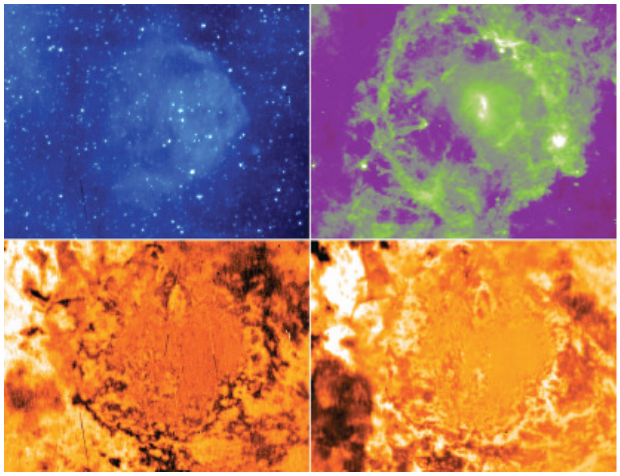
Galactic HI structure revealed by the GALFA-HI survey. Colors represent intensities in different GALFA-HI velocity channels

Arecibo probes the Cosmic Magnetic Fields : Russ Taylor (Univ. Calgary) & Chris Salter (NAIC)

Magnetic fields are ubiquitous in the universe and known to be an important factor in astrophysical phenomena over the full range of scales from pulsars to clusters of galaxies. However, understanding the origins of cosmic magnetic fields, and their role in galaxy evolution and processes within the interstellar medium, are hampered by the difficulty of detecting their presence and mapping their relationship to the matter content of the universe. The polarization of radio waves is a powerful tracer of magnetic fields. The commisioning of powerful spectrometers capable of multi-channel imaging over large bandwidths has opened up the possibility of using the propagation effect of Faraday rotation to measure the effects of fields within both our Milky Way Galaxy and extragalactic radio sources.

The Galactic ALFA Continuum Transit Survey (GALFACTS) project is a collaboration of over 40 researchers from the US, Canada, Europe, Australia and India, using a seven beam ALFA reciever system to perform a broad-band spectro-polarometric continuum survey of the entire Arecibo sky (Taylor & Salter, 2010). The GALFACTS survey consists of eight major subfields, each requiring 29 observing days.





The Figure above (a) shows an image of a subfield (S1) showing the very bright Rosetta Nebula, bright yellow in the center. The larger, faint, circular object to the right is the ionized hydrogen of the λ Orionis nebula at the “head” of Orion, while below is the top of Barnard’s loop that surrounds Orion’s belt. Figures (b) and (c) show different polarization modes of the same structures.

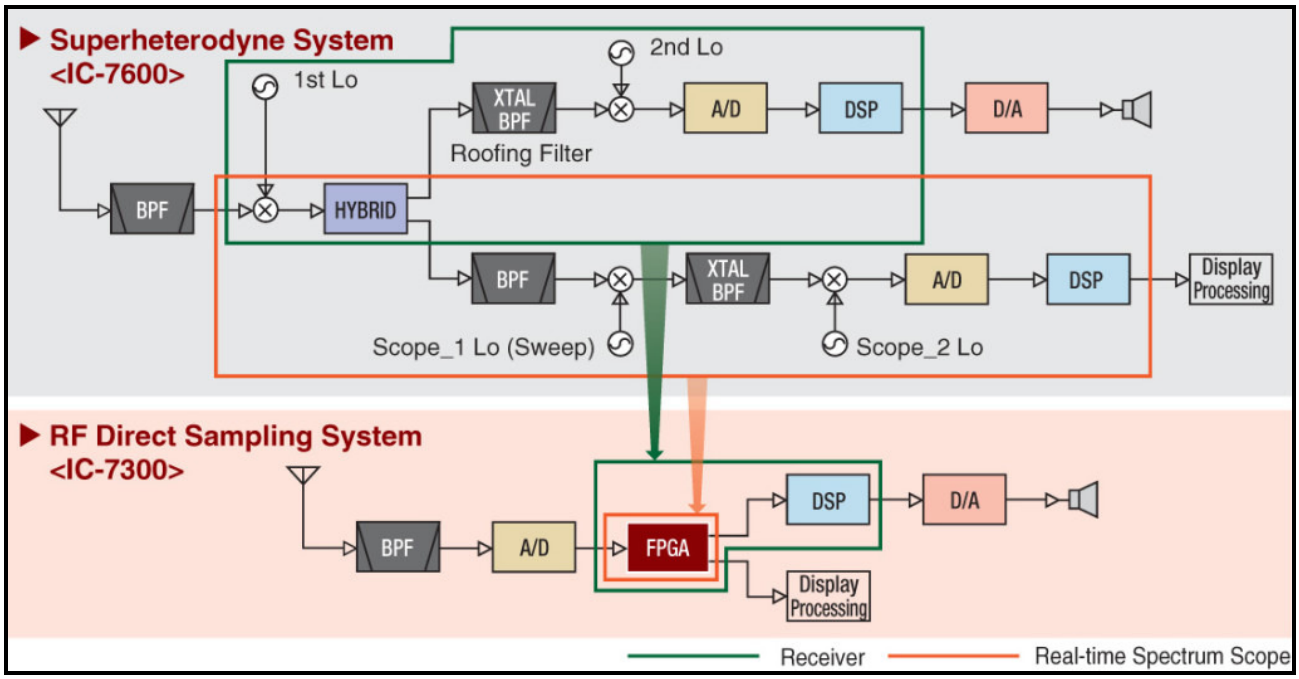
The Figure left shows a close up of the λ Orionis nebula, an HII region and bubble formed by the energetic radiation and winds from a central star cluster. For more information, please consult the references listed below.

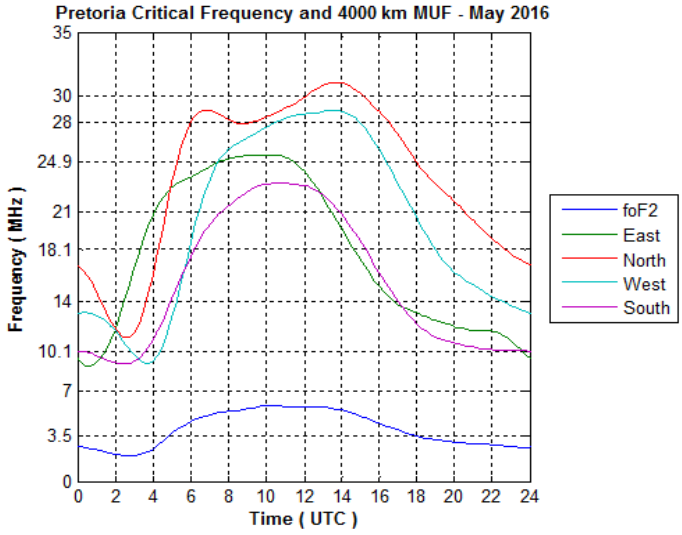
Taylor, A.R. & Salter, C.J. 2010. ASP Conference Series, 438, 402.
Arecibo Observatory. 2012. Annual Astronomy Report.

ICOM IC-7300 HF/50MHz Transceiver

The ICOM IC-7300 HF/50Mhz Transceiver advertized on the SARL website has been described as “revolutionary” and a “game changer”. With the advances in RF design, a new series of semiconductors are available that digitize segments of RF spectrum. In contrast to traditional receivers which utilize Local Oscillators, these Analog to Digital converter devices have become the heart of the IC-7300 receiver design.

Comparing the front ends of a conventional superheterodyne reciever to that of the RF direct sampling system, the simplification of the latter is clearly apparent. The IC-7300 represents and emerging class of high-performance RF-sampling data converters which set out to deliver on the promise of true Software-Defined Radio (SDR). In the next issue of Watts, direct RF conversion in receivers will be discussed in more detail. Please consult the SARL website (www.sarl.org.za) for details on where to obtain the ICOM IC-7300 transceiver.





Long Term HF Propagation for May 2016

DX Operating

The graph shows the 4000 km maximum useable frequency (MUF) to the East, North, West and South from Pretoria for the first hop using the F2 layer.

Local Operating

The F2 critical frequency (foF2) is the maximum F-layer frequency for short range communications.

See also the Propagation tab at http://www.parc.org.za/

Courtesy Vincent ZS6BTY

Rally driver admits he has no idea what co-driver is talking about

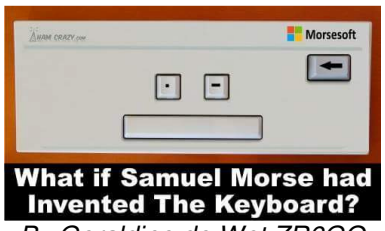
Top British rally driver, Mark Fischer, today found himself at the centre of a storm of controversy after confessing that he had absolutely no idea what his long-term co-driver, Gethyn Davis, was talking about during races.

It had been assumed that co-drivers were reading 'pace notes', a series of instructions describing how to negotiate the road layout ahead, but Fischer claims the notes are 'total nonsense' and that he has simply been humouring his co-driver all these years. 'It's just gibberish,' he said. 'But the regulations say that there must be two people in the car at all times during the race, and Gethyn was a good mate so I always just took him along for the ride.'

Davis is reported to be furious at Fischer's statement and maintains that they were equal partners in the team, but Fisher has been quick to dismiss this.

'Oh, come on,' he said. 'I mean, '50 5-left and stop 2-right half minus braking into K-right 90 maybe and absolute crest 500'. What the hell am I supposed to make of that when I'm flat out over a jump sideways at 90mph?'

This is not the first time Fischer has courted controversy over the role of co-drivers. In 2009, after finding himself without a co-driver for the Jyvaskyla Rally in Finland, he kidnapped a homeless man and forcibly strapped him into the passenger seat to ensure that the two-people-in-each-car rule was complied with. The stunt only came to light when onboard footage taken during the race revealed that rather than reading the 'pace notes', the Finnish co-driver was in fact screaming the words 'Oh shit!' over and over again, occasionally interspersed with other phrases including, 'Watch out for that house' and 'Slow down, you mad bastard'.



By Geraldine de Wet ZR6GQ

Top 100 Countries by Ham Radio Population

1	Japan	1296059
2	USA	679864
3	Thailand	141241
4	RO Korea	141000
5	Germany	79667
6	Chin. Taipei	68692
7	Spain	58700
8	UK	58426
9	Canada	44024
10	Russia	38000
21	India	10679
31	South Africa	6000

By Hans ZS6KR

http://www.n0hr.com/ham_radio_population.htm