INSTITUTION OF ENGINEERS, PNG

MONTHLY NEWSLETTER VOLUME 2 ISSUE 01 MARCH 01, 2014

1ST FLYOVER

An Engineering Strive: *Artist's impression of the country's first flyover to connect Jackson's International airport through the Kookaburra Street at Erima to Waigani City centre that which we can witness work to begin in March, 2014. Formal contractual details between National Capital District, the Government of PNG and the New Zealand developer, Hawkins were signed on Feb 26, 2014 in Port Moresby.*

NCD ROAD RECONSTRUCTION PROGRAM

The National Capital District Commission (NCDC) is responsible for the development, upgrade, operations and maintenance of municipal services in the National Capital District. With increased development and the mammoth task of providing adequate municipal services to meet increasing demand from the city residents, NCDC needs to enter into Partnerships with Government and private sector to address the issue.

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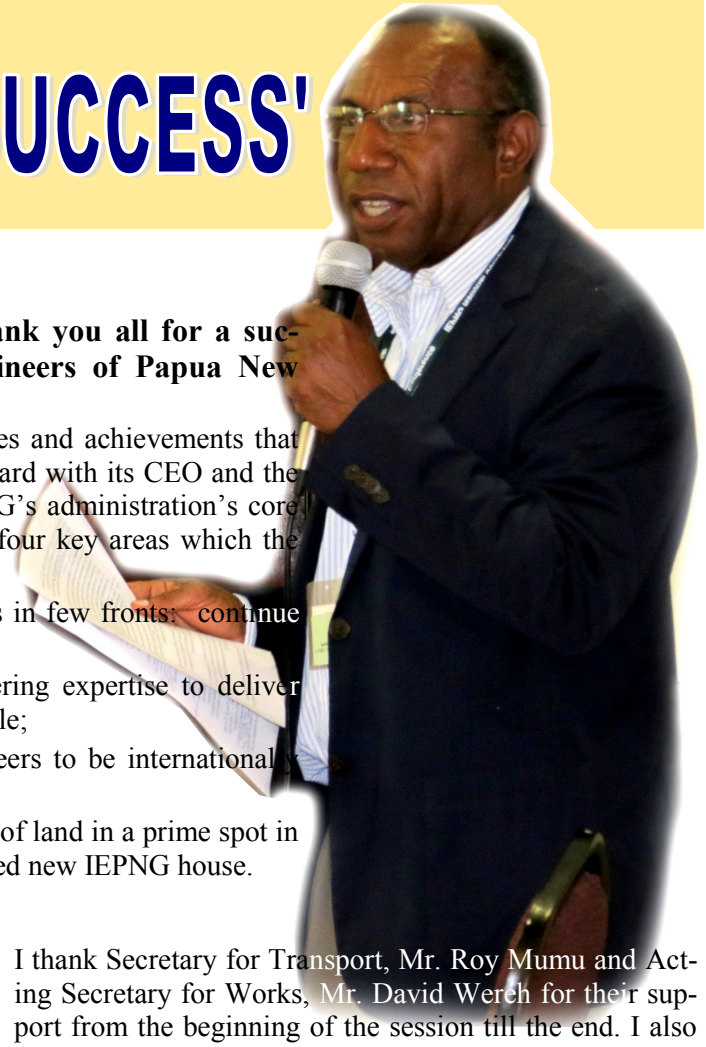
2013 Reviewed

'IT'S BEEN A SUCCESS'



By MOSES GURRA—PRESIDENT IEPNG

Fellow colleague engineers and readers, I thank you all for a successful 2013 year as an Institution of Engineers of Papua New Guinea (IEPNG).

I take this opportunity to recount on some key challenges and achievements that IEPNG faced and accomplished in 2013. The IEPNG Board with its CEO and the admin staff while continuing to efficiently deliver IEPNG's administration's core functions and values, also made noticeable progress on four key areas which the Board in April has set as focus areas:

- To begin a process to return benefits to its Members in few fronts: continue subsidised training courses facilitated by IEPNG;
- To interface with Government using sound engineering expertise to deliver 'value for money' projects and outcomes for our people;
- To begin a process to accredit our practicing engineers to be internationally recognised; and
- To continue the drive for IEPNG to acquire a portion of land in a prime spot in Waigani and solicit resource financing for our proposed new IEPNG house.

IEPNG continues to maintain a successful subsidised training courses provision program, GPDP, as well as facilitating the process to engage student for industrial training (IT).

One area that IEPNG needs support from its Member Engineers and the industry is the need for continuous feedback on what different training areas that our engineers need. The Institution is there to facilitate and provide growth opportunities for its Engineers to be kept competent with developing technologies.

IEPNG has begun to take on the challenge and a mandate by the government and the people of our country, for IEPNG to assist the government to deliver government sanctioned projects for our people's direct benefit. IEPNG has to be the neutral player, IEPNG has the correct engineering mindset with its association with Industry and the government and by virtue of the code of ethics the Members live by are able to evaluate and audit the processes and procedures of projects feasibility works, scoping, contractual arrangements, design, construction, handover and monitoring via engagement with the community at large if required.

Nonetheless, any projects need to be delivered by competent personnel with sound engineering knowledge and on agreed terms and conditions if there is to be 'value for money' outcomes. On this token, the Government and the Industry leaned on IEPNG to hold a Technical auditing workshop held in Lae on October 25, 2013.

I thank Secretary for Transport, Mr. Roy Mumu and Acting Secretary for Works, Mr. David Wereh for their support from the beginning of the session till the end. I also acknowledged the Morobe Governor, Hon. Kelly Naru for his time and challenges he lashed out during his keynote address. I recognised our long serving engineers; Mr. Pai Gure and Mr. Stocks who also made time to be at the workshop to provide practical leanings in engineering construction experiences. The workshop would not have been a success without all of you who attended from Works Department, and our industry contractors; we had a total of 124 who attended the daylong session. Thank you all.

Next step for IEPNG from this workshop is to take the actions agenda and make a submission to our government to have a formal interface protocol in place for IEPNG to be recognised as the neutral body to be carrying out technical audits on government sanctioned major projects in the country thereon.

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☺ From p2… **'IT'S BEEN A SUCCESS'**

I am pleased that IEPNG was engaged by the Government and has completed audit on a sector of the Lae to Nadzab road upgrade. The audit is currently with the Chief Secretary.

IEPNG will be starting with the POM based citizen engineers on the new Competency Based Assessment (CBA) format of renewing of membership with PERB for the 2014 year renewal. With the awareness campaigns that have been held during the year, POM based engineers renewals will be a test case and any observations on areas for improvements will be identified and those necessary corrections put in place during 2014 year. All the other areas are expected to renew their memberships under the CBA format in 2015 and onwards.

IEPNG will continue to have its Corporate Plan aligned with GoPNG's Vision 2050. A key area also is our interface with Unitech's efforts to have its departmental syllabuses, and Unitech as an entity accreditation. We will maintain our dialogue and partnership with IPENZ, IEAust, and Federation of Engineers Asia and Pacific. Partnership with these sister organisations greatly assist with our efforts to provide IEPNG's independent opinions to the Government.

I make mention about the POM and Lae branches. Their existence must be a challenge to engineers in other localities to also start branches. I trust that this newsletter will be an instrument for engineers to write articles for the newsletter to publish to provide constructive views on how we as engineering community can better learn from each other and also share ideas.

I commend the IEPNG Board for its wisdom and endorsement of the Women in Engineering (WIE) group within the IEPNG structure. I welcome on board its new executives led by Ms. Finkewe Zurecnuoc and wish them well in their endeavours.

Naturally, one of the key challenges of the IEPNG Board is to continually look ahead and ensure long term sustainability of the Institution hence, 2014 will remain challenging as ever as IEPNG strives to maintain its efforts to carry the interest of its Members and that of the Engineering community always.

IEPNG needs to effectively maintain its partnership with its Asia – Pacific sister organisations to critically align its long term objectives that are on course with the Government's development aspirations. By which IEPNG shall always serve its purpose and objectives to which it exit.

We have done well in 2013 and am ever confident the right path has been set for better things to come.

Thank you all and have a prosperous 2014.

Moses Gurra

UNITECH STUDENTS ON INDUSTRIAL TRAINING

More than 40 students studying in various fields of Engineering at the PNG University of Technology took a three months' Industrial Training (IT) with various companies during Christmas vacation.

These students are Members of the Institution of Engineers PNG.

"IEPNG was happy to assist IEPNG student member engineers secured job placements in organizations for their 3months on job training," said Ms. Anita Bagi, Training & Development officer with IEPNG.

Part of the 41 IEPNG Member engineering students on Industrial Training in Port Moresby. Pic courtesy of Ms. Anita Bagi, IEPNG.

She added: "We would like to thank the following organization and their management who has seen the need of the students and have come forward to engage students for job placements in their organizations. Our heartfelt gratitude goes out to Chiyoda JGC Joint Venture, Octagon Communications Sales and Services, Canam Construction Ltd, Curtain Bros PNG Ltd and Water PNG for your continuous support to the Institution".

For companies/organizations who would like to take in student engineers in the areas of Civil, Mechanical, Mining and Electrical & Communication for the 2014 On Job Training, please register your interest by calling the Training & Development Officer, Ms. Anita Bagi on 325 8765/325 8763 or email: AnitaBagi@iepng.org.pg. For engineering students and those interested who would like to join the Institution, please contact member services Coordinator-Mrs Toksy Tanabi on 325 8765/ 325 8763 or email ToksyTanabi @iepng.org.pg .

Road Needs Study: The city of Port Moresby is now overgrowing the limits of adequate services as a result of the city's rapid physical developments. Road Resealing/ Rehabilitations and the Upgrading of existing Roads over the past three years had dramatically changed the face of Port Moresby. These major road developments were based on a report ***'Port Moresby Roads Needs Study, Ove Arup, 1991'*** to upgrade major roads and a four year master plan approved by the NCDC Board to rehabilitate existing collector and local access roads within the city. There are approximately 700 kilometres of sealed road network within the city. Out of this, 65 kilometres of roads were listed as National Roads while the rest were NCDC roads. The road network has not increased since the 'Port Moresby Roads Needs Study' was undertaken in 1990. The report highlighted the need for road upgrading of most major roads including the construction of Poreporena Highway and Kookaburra Street.

Funding Constraints: It is evident that as cities grow, the demand on the municipal services will proportionally increase as a growth factor. As a result, NCDC is unable to adequately cater for the transport needs and requires a concise partnership approach to fund some of the demands from the Government and development partners. NCDC lacks the financial capacity to improve the road network and operations as its revenue generation sources are limited and relies heavily on the GST component that constitutes about 90 percent of its annual Budget. With the Government's decision to exempt the LNG and its direct participating businesses from the GST's purview, NCDC has been deprived of its sole revenue source. Unable to seek adequate external Road Financing sources, NCDC is again relying on financial support from the National Government to improve the level of road services that NCDC provides to meet resident expectations for better roadway quality, repair frequency, and overall road operations.

Traffic Congestion: There has been significant increase in traffic volumes as evidenced by over saturation at intersections (traffic signals and roundabouts) and capacity limits exceeded on most major roads. Additional road lanes and alternative roads or links are now necessary and will definitely distribute traffic volumes evenly. These roads are now congested due to increased traffic flow. The reasons for increase in traffic volumes are: (a) increase of imported second hand vehicles that are now affordable for city residents; (b) lack of improved or alternative road network system in the city; (c) non-disposal of vehicle models that date back to 10 years and are still serviceable and operational; and (d) unreliable and inconsistent public transport system.

Government's Intervention: Considering the facts that NCDC has insufficient resources to carryout major upgrade of roads in the Capital city; the traffic congestion in the city is creating a gridlock in the vehicular movements and its impact it will have on the city's economic activities, the Prime Minister has directed NCDC to submit priority roads in order to create circular ring roads. The submission from NCDC identified missing links, and proposed new roads to connect the populated suburbs besides suggesting overpasses in vital intersections. As a result of this exercise, the roads specified here under are approved for Government funding:

- **GEREHU TO POREPORENA HIGHWAY (HANUABADA) & GEREHU TO 9 MILE ARTERIAL LINK ROAD.** The 2015 Urban Development Plan of Port Moresby captures the Gerehu to Hanuabada and Gerehu to 9 Mile as

part of the western and northern outer ring roads of the capital city respectively. The Western Ring acts as main access to the local development plan for Napanapa which covers all land uses for industrial, commercial and residential purposes; it also accommodates development issues and challenges that constantly confront the local coastal villages. The Baruni Road also links Gerehu to Hanuabada via Baruni village. It provides road access to the current Baruni Dump site, Motukea Dockyard, Napanapa Oil refinery and the north bound Motuan villages. It is the major link for the LNG project. This road is also crucial for the main wharf relocation program that is currently facilitated by IBPC and PNG Ports; the relocation of the port to a new location will divert heavy goods vehicles from using the Poreporena Freeway to the proposed Baruni upgrade road which has claimed so many innocent people's lives at

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what is known as the death trap at Harbour City SVS corner. The 4 lane 14.4 km divided road will be constructed to an international arterial road standards with improved sight distances, asphalt seal, street lights, proper and adequate drainage system, well designed pavement that can carry not only commercial traffic load but also industrial traffic load. Some sections may require land reclamation and associated Marine Engineering structures as per the design. The northern outer ring road from Gerehu to 9 Mile is a new road of the city that links Gerehu to 9 mile as planned under the Urban Development Plan, it is believed that more development will be properly initiated after this road is built so that land zoned for commercial, industrial, residential and intuitional are developed under the guidance and development strategies. This road is essentially important; as it will relieve the current traffic congestion experienced at the intersection of Koura way and Waigani Drive and at Erima roundabout. The 4 lane 8.7 km divided road will be constructed to an international arterial road standard with improved sight distances, asphalt seal, street lights, proper and adequate drainage system, well designed pavement that can carry not only commercial traffic load but also industrial traffic load. The road has been fully designed and documented by Cardno for construction. These two roads western and northern outer ring roads were separately tendered, nevertheless combined into one; as the funding source for these roads will be sourced from the Exim Bank of China. The contract is still conditional and commencement is to be announced.

- **GORDONS INDUSTRIAL ROADS II. Valued at K84 million, Global is currently building.** The Gordons Industrial Roads provide access to part of about 30% industrial, commercial and business activities in the National Capital District. Gordons Industrial area is divided by the Poreporena Highway. Gordons Industrial Area is the hub of the National Capital District and therefore, its position as the business centre is ideal for creating a vibrant and industrial activity. The highlight of this project is that this allows connection between the west (Phase I) with the east (Phase II) of the Gordon Industrial Roads. Progress so far: 19.37%
- **KOOKABURRA ROAD: K160 million flyover to be built by Hawkins in early 2014. The Kookaburra Flyover will be the masterpiece in Road Engineering in PNG for the first time and there is no other better place to place this project other than a road that links to the international airport, it should be the face lift road infrastructure projects for the visitor to see at the country's gateway. Progress so far: 10%.** Port Moresby Road Need Study done by Arup in 1991 highlighted the need to connect Sir John Guise Drive to Hubert Murray Highway through Kookaburra Street and this is long overdue. This vital road proposal satisfies all Engineering technical and Financial and economical requirements for construction. Currently the Erima roundabout is over saturated and needs an upgrade, the grade separation intersection or the flyover will be the direct link without interruption from Waigani to the Jacksons International Airport. Kookaburra

Street is an eastward extension of Sir John Guise Drive starting from Godwit road-Independence Drive-Sir john Guise Drive roundabout to join Hubert Murray Highway at Erima Junction with an overpass or a flyover at Erima Junction. Though no road link has been established, the road link will ease traffic flow between Waigani City Centre area including Parliament Haus to the Airport and Erima to 9 Mile.

- **Other Road data includes:** Proper asphalt sealed 4 lane roads and becomes 6 lane near Erima junction to link up with the Freeway; 5km road length (one lane); 7m carriageway width; Piped drainage and associated works; street lights, Road reserve widths of 20m and 40m respectively.
- **HUBERT MURRAY HIGHWAY (ERIMA- 9 MILE). Valued at K77 million, Dekenai is working on it.** Hubert Murray Highway commences from intersection of Scratchley road/Healy parade/HMH and ends at Laloki Bridge. Five sections of this highway were designed where stages 2 and 3 were constructed and stages 4 and 5 are currently under construction while the rest are yet to be upgraded. The upgrade of this road section begins at Erima roundabout and ends at 9 mile area. Combined with the finishing of Kookaburra Street and this section of HMH, the flow of traffic in that area will be smooth and this will also uplift the image of the city at the gateway. This road will be upgraded to a 4 lane divided asphalt sealed road with pipe drainage system and a four lane bridge at 8 mile, complete with streetlights and road and the features include: 4.3 km road length (one lane); 14.8m carriageway width; Piped drainage and associated works; Road reserve widths of 40m. Progress so far: 15.32%.

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- **MOREA TOBO ROAD (6 MILE TO 7 MILE & ITS FEEDER LINK ROADS). Valued at K62 million, Hebou is working on it.** This involves design and construction of the main highway from 6 Mile junction, where the stage 4 of HMH ends and all the way to 7 Mile. The length of the road is approximately 5.9 kilo meters of which 1.2 km is four lane and the rest of the associated roads being 2 lanes. The significance of this road is to; enhance the development strategies and plans as per the Urban Development Plan; to provide sufficient and proper roads to meet the increasing travel demands for businesses, city residents in 6 – 7 mile; to complement the road upgrade program with Hubert Murray Highway and Morea Tobo

Road currently under construction so that all the major arterial roads in 6 – 7 mile area are in uniform with rest of the upgraded roads in the City; to revive the once busy route into the old Jacksons International Airport as an alternate route to the current Airport thus relieving the congested Erima roundabout; and potentially link 7 mile to Magi Hwy through the Jackson Parade. Progress so far: 14.22%.

- **PAGA POINT RING ROAD. Valued at K52 million, Curtain Brothers was awarded the contract.** This is a new link road that connects Stanley Esplanade with Ela Beach Road in the CBD. This link creates the CBD bypass and divert all incoming and outgoing commercial heavy goods vehicles from Ela Beach road into the Sea Port, so that the main CBD road network is left to private cars and the public transport to use at manageable congestion levels; and provide alternate route for motorists who intend to avoid the congestion at the main road intersections within the CBD and continue their trips further from the CBD.

TOTAL CITY ROAD PROJECTS AWARDED SO FAR IS WORTH AROUND K800 MILLION.

Accommodate walking and pedestrian facilities for pedestrians to enjoy morning or evening sea front walks from Ela Beach Road to Champion Parade without going through the busy streets of the CBD. The proposed 4 lane divided major arterial road will be designed and constructed within the road reserve with fully furnished with kerbs, footpaths, medians, drainage, street lights, road signs and furniture, asphalt surface, pavement and roundabouts. Designer may intend to reclaim land and apply cut respectively to allow for the road, in such instances retaining wall structures, sea walls or other Engineering solutions widely used and accepted internationally.

FUNDING FOR 21 AIRPORTS UPGRADE

Funding has been secured for the maintenance and upgrade of 21 national airports in the country.

The National Government sealed a $US 239 million (K698.83 million) loan deal with the Asian Development Bank (ADB) - Feb 25, 2014—for airports development, part of which will be used for the Highlands Regional Roads Improvement Programs (HRRIP).

The National Airports Corporation (NAC) will use its slice of $US 130 million (K380 million) to fund the maintenance of the 21 national airports while the remaining $US 109 million (K319 million) will be used for the HRRIP.

Minister for Works and Implementation, Francis Awesa was adamant that the money will be fairly shared "give balance by providing 50-50 % funding for both" roads and airports.

Minister for Treasury, Don Polye who presided over the signing on behalf of State said the loan was very good as it was not commercial but very concessional at 2 per cent interest rate.

To date, the Civil Aviation department investment program has upgraded airport facilities in three national airports.
At Jacksons international airport, the work has been completed which included an expanded domestic parking apron, installing an updated instrument landing system (ILS), and procurement of three (3) new fire safety trucks.

Hoskins airport, West New Britain province, got a spruce up on its pavement while Kagamuga airport, Western highlands saw work already began on its new terminal facility. See pictures.

Boram airport in Wewak (East Sepik), Gurney airport (Milne Bay), Kavieng airport (New Ireland), Goroka airport

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UNDERSTANDING CARBON CAPTURE AND STORAGE

What is CCS, how does it work and why is it important?

The climate change challenge

Research has shown that the level of carbon dioxide (CO_2) released into the atmosphere has increased significantly since the beginning of the industrial era. Unless we do something to reduce the amount of CO_2 entering the atmosphere, the world will continue to experience the effects of climate change.

What is CCS? Carbon capture and storage (CCS), sometimes called carbon capture and sequestration, prevents large amounts of CO_2 from being released into the atmosphere. The technology involves capturing CO_2 produced by large industrial plants, compressing it for transportation and then injecting it deep into a rock formation at a carefully selected and safe site, where it is permanently stored.

CCS involves three major steps:

1.Capture

The separation of CO_2 from other gases produced at large industrial process facilities such as coal and natural gas power plants, oil and gas plants, steel mills and cement plants.

2.Transport

Once separated, the CO_2 is compressed and transported via pipelines, trucks, ships or other methods to a suitable site for geological storage.

3.Storage

CO_2 is injected into deep underground rock formations, often at depths of one kilometer or more.

UK is a step closer to the world's first CCS gas power plant

Taking the next step towards building low-carbon fossil fueled power plants, the UK Government has awarded funding for an advanced engineering study for the first full-scale carbon capture and storage (CCS) project on a gas-fired power station. Operated by Shell UK, the Peterhead CCS Project in Scotland aims to capture up to 10 million tonnes of carbon dioxide (CO_2) over the initial life of the project, which is anticipated to be 10 years. Europe has vast potential to store carbon dioxide, especially in depleted oil and gas fields and deep saline formations under the North Sea. Recently, Europe has struggled to progress large-scale CCS projects, with North America and China now taking the lead on project delivery. The UK's progress should inspire other European governments to revisit support for their proposed CCS projects, especially those ready to move into the construction phase. CCS is a proven technology that today securely stores 25 million tonnes of carbon emissions per year. There are 21 large-scale projects in operation or construction, all expected to be online by 2016. These will have the capacity to capture up to 40 million tonnes of CO_2 per annum, the equivalent to taking 8 million cars off the road.

☺ *From ...page 06* **AIRPORTS UPGRADE**

(Eastern Highlands), are next airports that will see upgrade and maintenance work in order to meet International Civil Aviation Organisation (ICAO) safety and security standards, more will follow suit.

One international and five local sub-contractors have been engaged, employing more than 150 nationals.

Work has already started at Kagamuga airport in Mt. Hagen, Western Highlands in 2013. CYRIL GARE file pics.

COMING EVENTS...

- **ALL ENGINEERS:** 2014 Registration is on now. Collect forms at IEPNG office.
- **Engineering Magazine** should come out in June 2014.
- **IEPNG Annual General Meeting (AGM):** 25th April, 2014, Lae, Melanesian Hotel.
- **AGM Dinner:** Evening of 25th April, 2014, Lae, Melanesian Hotel, 6-10pm.
- **Election of IEPNG Board:** 3rd March—11th April, 2014.
- **Manila, Philippines:** Combating Fraud in Construction Industry, 9-10th April, 2014.

ENGINEERING Vibes

'HEXACOPTER' MAKES BBC NEWS DEBUT

Engineers in Britain in conjunction with BBC News have developed a whole new way to make news. They created a machine called the Hexacopter (pictured right). The hexacopter is able to take video footage while soaring in the air and creeping across the ground.

This machine is unique in being able to go close to something then soar into the air in one smooth movement. It can creep along the ground, shimmy a fence, crawl through a tree then climb to 400ft (120m) for a spectacular panorama. The hexacopter could soon be flying over your head, spying.

"As television and online journalists, we are very excited about its scope to change the perspective of our films," said By Richard Westcott BBC transport correspondent. Hexacopter is run by a team from the Global Video Unit, part of BBC World Service Language Services. This was the first time everyone had used it so there were a few nerves fluttering around. "Our pilot, Owain, spent six months training for a special licence. There is another pilot, Tom Hannen, and between them they gave birth to the thing, building it before learning to fly it.

"This is not the kind of machine you pick up in a shop - the kind of thing I have bought in the past and then flown into a tree. "Owain has got his hands full with the flying so he is helped out by a camera operator, Rhian. They have to be in tune for the best results, like circling your stomach and patting your head at the same time. There are strict rules regulating where the hexacopter can fly and film.

"The first problem we had was the weather. There's no real point in flying if the wind is gusting above 20mph (32kph) and we were right on the limit. The camera is mounted on a gimbal, a pivoted support that allows it to rotate, that keeps it steady even when the chopper is dancing around.

"And there is another problem too. The noise of the rotors, the bee swarm problem. We have had to cheat the sound a bit to quieten it down.

"The BBC has established strict filming rules, and secondly, the hexacopter is regulated by the Civil Aviation Authority. That means we cannot fly within 50m of a road or building unless it's under our control.
"It also means we have to log a flight plan before every take-off. As an extra safety layer, there is a GPS-based system on board that ensures that if the radio link breaks down between the pilot and the machine it automatically flies back to where it took off from, and lands.
"I admit we all absolutely loved using this machine. Believe me, it will transform television and online news.
"The hexacopter is able to take a camera to places it has never been before, giving people a whole new view on the world. And we are very excited about that", Westcott said.

You are WELCOME to contribute comments, news stories, and pictures for publication. Email to Secretary@iepng.org.pg *or to the Editor* cyril.gare@gmail.com

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