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# Publishing Information



## **The newsletter of**

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SIG Listings and up to date calendar are available on our homepage

# From The Editor October 2022

**Hugh Macdonald**

Welcome to the October 2022 edition of PC Update.

This month our two main feature articles are about buying a new PC and using Flatpaks in Linux.

It's always fun buying a new PC, whether it's a laptop or a desktop PC. I like deciding things like how much RAM I want, what size hard drive, what sort of hard drive (NVMe being the most popular choice these days) and then things like graphics card and screen size. The article takes you through a lot of the considerations you might have, so if it is time to upgrade, then it'll be a handy article to read.

If you're a Linux user, and particularly if you are new to Linux then you might find the fairly recent development of Flatpaks (and the similar Snaps) a useful addition. As the article explains, Linux software is usually obtained from a repository. For long term releases like Ubuntu that is only updated every two years, the software can be fairly up to date at times, Flatpaks provide a way to access much more current software in a relatively easy to use way. If you've never used them and you are a Linux user, or you're thinking about making the switch, then check out the article.

Otherwise, as usual we have Interesting Internet Finds and the East SIG Report.

Enjoy, and see you next month,



# Buying A New Computer

**David Kretchmar**

From time to time, every computer specialist is asked, “What computer should I buy?” The answer is usually, “What do you intend to do with it, and how much can you afford?” This article addresses the major decisions required if you are buying a new computer.

## Apple or PC?

They will both do what you want, which is probably doing things on the internet.

Both systems run popular software, such as Office or Photoshop.

It can simplify life if you stick to one device operating system. For instance, an iPhone might be good if you have a Mac computer or an iPad with iOS. On the other hand, if you have a PC running a Windows operating system, then an Android phone will be the most compatible.

I use an iPhone and a PC together and have not had issues. I mostly transfer photos between my devices, usually using email, which allows me to transfer 8 - 10 pictures at a time. For mass transfers of photos, I use the Apple USB charger to connect my iPhone to my PC.

If you plan to do any action gaming, most games are at least initially written for a PC running Windows.

It's likely any PC you buy today will come with Windows 11, the latest manifestation of the Windows long-running operating system. A few vendors might still be selling old stock of Windows 10 computers, but it is a free and easy upgrade to Windows 11. Windows 11 is very similar to Windows 10; most users will notice that it now appears more like an Apple interface, and Windows 11 is more closely integrated with Microsoft's OneDrive.

Apple Macs are generally a little to a lot more expensive than comparable PCs. Still, they're less susceptible to viruses and other malware, mainly because 75% of all computers run Windows, making them a potentially more profitable target for hackers. The latest macOS version is 12.3 (Monterey), released in March 2022.

## Desktop Computer or Laptop?

Desktops, aka tower computers, generally offer more performance for the same money as laptop or notebook computers and are easier and cheaper to repair or upgrade. However, desktop computers'

price/performance advantage is not nearly as dramatic today as in the past, as computer designers and manufacturers devote more resources to miniaturizing components. In addition, desktops provide a more ergonomically correct working position, let you use a larger screen, and usually have better sound.

## **All-in-One Desktop**

All-in-one desktop computers, also known as AIO systems, combine a computer and monitor into one slick-looking package. These AIO systems have become increasingly popular as people want to eliminate as many parts and wires as possible. However, the major downside of AIOs is that their components are tightly packed in the display, making them difficult to upgrade or repair.

## **Laptops**

Naturally, laptop computers are infinitely more mobile than desktops since they are smaller and utilize a battery for power rather than requiring a wall socket. A laptop is a way to go if you plan on using your computer while traveling. Some users combine the best of both worlds by using a desktop system at home and taking a tablet-style computer, such as an iPad or Kindle Fire, on the road.

Another laptop option is using a “docking station” in your home. You can easily attach a full-sized monitor, keyboard, mouse, and even speakers to a laptop to gain the ergonomic advantages of a desktop.

No matter what PC format you choose, some component options exist.

## **The Processor**

Apple now manufactures its processors, and its weakest offering is the equivalent of an Intel core i5 processor. Multiple cores can process more data simultaneously, and most computers today come with multiple-core CPUs.

In a PC, you have multiple processors from which to choose. For a system that will perform well today and into the foreseeable future, I recommend Intel’s 11<sup>th</sup> generation Core i5 CPU, an actual six-core processor alternately known as the Rocket Lake series. You will still see manufacturers selling 10th-generation Intel chips, but without your budget, the 11<sup>th</sup> generation is 20% faster, making it a better value. In recent years the other major manufacturer of CPUs, AMD, has provided an excellent cost-effective alternative to Intel. Still, it appears that Intel has decided to compete in the personal PC space. The AMD Ryzen 5 series, at least 2600 speed, should be comparable to Intel’s i5.

Any processor available today will be sufficient if you’re shopping for a budget computer to browse the web, email, and maybe just work on documents.

## Memory

Generally, the more memory a computer has, the faster it is, at least when you have multiple windows open. In 2022 8GB has become the standard, with 16GB or more found on more high-performance and future-proof devices.

## Hard Drive

Go with an SSD (solid-state) drive. SSDs are a relatively new technology using flash memory that's 4 - 10 times faster than mechanical hard drives; there are no moving parts. As a result, an SSD is the single largest performance boost you can give a computer compared to one with a mechanical hard drive.

## Optical Drives (CDs and DVDs)

Optical drives are going away from the ancient 3½-inch floppy disk. Virtually any software support needed is available online, and most users are now streaming music and other entertainment. If you need one, for instance, to install an old program or watch a DVD, you can buy an external USB optical drive that plugs into a USB port for around \$25.

## Graphics Card

The graphics processing unit (GPU), or graphics card, is the hardware responsible for producing what appears on the screen. The GPUs can be integrated into the CPU or run on a separate, discrete piece of equipment.

Most computers sold today have integrated graphics, the cheaper, lower-performance option. Integrated graphics are OK for most of what you will be doing but not for things such as action gaming and video editing. On the other hand, photo editing and playing games such as Microsoft Solitaire work fine with integrated graphics.

## Conclusions

If you talk to 5 different computer geeks, you can get ten or more opinions on any computer issue, such as those discussed above. I have provided my opinions on things you should consider when buying a new computer system, hopefully, to make this less confusing. Buying a computer will ultimately be based on your needs and your budget.

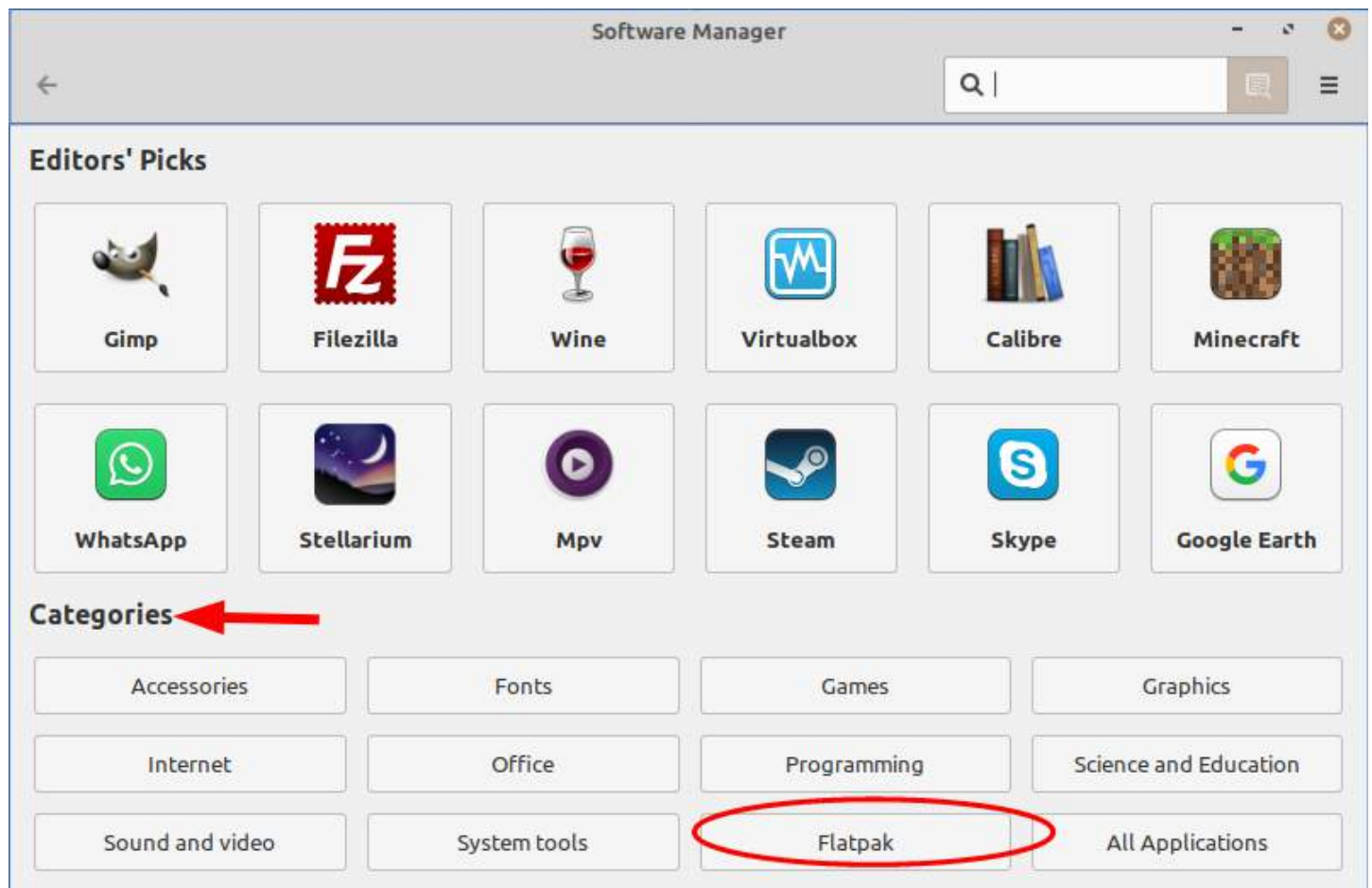
*Reproduced with permission from the Sun City Summerlin Computer Club.*

# Flatpaks with Linux Mint

Cal Esneault

Linux software is installed using pre-compiled “packages.” The traditional method, called dynamic packaging, separately installs the main application and additional supporting sub-components (“dependencies”). Mint uses the Debian package management system and provides a graphical Software Manager program to help users install new software. To minimize developer efforts, new software versions usually only appear at two-year intervals (note: security and bug fixes appear as soon as they are available).

Recently, Mint has included the ability to get more recent software using the Flatpak container method. A “container” packages the main program and dependencies as a single unit. Flatpak applications are universally available from [flathub.org](https://flathub.org) and are maintained by software developers. The Linux Mint software manager has a special section for Flatpak programs (see below). Installation is analogous to the standard method. About 200 Flatpak applications are available at this time.



When installed in this manner, the application will be “integrated” into the menu system (it appears just like any other app). It can also be removed using the software manager.

While it may be rare that you urgently need a brand new version of standard programs (such as LibreOffice, GIMP, Inkscape, etc.), Flatpaks are very useful in obtaining apps typically unavailable



through legacy packaging. A short list of some of these programs is given below.



Although Flatpak packages come from outside sources and are not compiled by normal reputable groups (Debian, Ubuntu, Mint, etc.), security is enhanced by isolating them from the main OS and from other programs (known as “sandboxing”). Also, developers are helped by writing their interfaces to comply with Flatpak runtime code versus standard Linux OS methods. Finally, some available programs usually run on Windows or Mac OS.

Flatpak apps are a way to augment your standard Linux Mint packaging system, not replace it. Flatpak and other container systems (Snap, AppImage) are established but still developing protocols to address issues raised by the Linux community. Try one out to see how you like the new way.

*Reproduced with permission from Cajun Clickers Computer Club.*

# Why are there so many data breaches: A growing industry of criminals is brokering in stolen data

**James Martin, *Deakin University* and Chad Whelan, *Deakin University***

New details have emerged on the severity of the Medibank hack, which has now affected all users. Optus, Medibank, Woolworths, and, last Friday, electricity provider Energy Australia are all now among the household names that have fallen victim to a data breach.

If it seems like barely a week goes by without news of another incident like this, you would be right. Cybercrime is on the rise – seven major Australian businesses were affected by data breaches in the past month alone.

But why now? And who is responsible for this latest wave of cyber attacks?

In large part, the increasing number of data breaches is being driven by the growth of a global illicit industry that trades in your data. In particular, hackers known as “initial access brokers” specialise in illegally gaining access to victim networks and then selling this access to other cyber criminals.

## The cyber crime ecosystem

Hackers and initial access brokers are just one part of a complex and diversifying cyber crime ecosystem. This ecosystem contains various cyber criminal groups who increasingly specialise in one particular aspect of online crime and then work together to carry out the attacks.

For example, one of the fastest-growing and most damaging forms of cyber crime – ransomware attacks – involves malicious software that paralyses a victim’s device or system until a decryption key is provided following payment of a ransom.

Ransomware attacks are big business. In 2021 alone, they earned cyber criminals more than US\$600 million. The huge amounts of money to be made in ransomware, and the rich abundance of targets from all around the world are fostering the development of a vast ransomware industry.

Ransomware attacks are complex, involving up to nine different stages. These include gaining access to a victim’s network, stealing data, encrypting a victim’s network, and issuing a ransom demand.

## Specialist criminals

Increasingly, these attacks are carried out not by lone cyber criminal groups, but rather by networks of different cyber crime groups, each of which specialises in a different stage of the attack.

Initial access brokers will often carry out the first stage of a ransomware attack. Described by Google’s Threat Analysis Group as “the opportunistic locksmiths of the security world”, it’s their job to gain access to a victim’s network.

Once they have compromised a victim’s network, they typically sell this access to other groups who will then steal data and deploy the ransomware that paralyses the victim’s computer systems.

There is a massive and growing underground market for this type of crime. Dozens of online marketplaces on both the dark web and surface web offer services from initial access brokers.

Their access to companies can be purchased for as little as US\$10, although more privileged, administrator-level access to larger companies often commands prices of several thousands of dollars or more.

## **Responding to the growing cyber threat**

Over the past month, we have seen several instances of cyber criminals forgoing actual ransomware. Instead, they sought to directly extort companies by threatening to publicly release any data they have stolen.

While not as devastating as a ransomware attack, data breaches can cause serious financial and reputational damage to an organisation (just ask Optus chief executive Kelly Bayer Rosmarin), not to mention major problems for any customers or clients who now have their private information released online.

In the final six months of 2021, more than 460 data breaches were reported to government authorities. Even more worryingly, this number is almost certainly an underestimate.

While companies with a turnover of more than AU\$3 million are required by law to report data breaches involving personal information, most small businesses are not subject to mandatory reporting laws. Therefore, they have little incentive to report a data breach that could scare off customers and damage their brand.

## **Taking action against cyber crime**

So what can we do about it? In the first instance, companies need to rethink their approach to data. Data should be treated not simply as an asset that can be freely held and traded in, but also as a liability that needs to be carefully protected.

Some experts are calling for Australia to follow the European Union's approach and to introduce stricter corporate regulations that better protect consumer data.

This week the federal government also introduced plans to fine companies that do not maintain sufficient cyber security and suffer repeated data breaches.

Reforms like this could help, particularly in preventing relatively unsophisticated data breaches, like the one that recently affected Optus.

On the other hand, punitive fines towards victims could further strengthen the hand of entrepreneurial cyber criminals – they could try to leverage these fines to further extort their victims.

There is no silver bullet to solving the threats posed by cyber criminals. At a minimum, both government and industry must continue to work together to improve our cyber defences and resilience. Through research, we must also work to better understand the global cyber crime ecosystem as it continues to evolve.

James Martin, Senior Lecturer in Criminology, *Deakin University* and Chad Whelan, Professor of Criminology, *Deakin University*

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# In disasters, people are abandoning official info for social media. Here's how to know what to trust

**Stan Karanasios, *The University of Queensland* and Peter Hayes, *CQUniversity Australia***

In an emergency, where do you turn to find out what's going on and what you should do to stay safe?

Traditionally, government agencies have been the “go-to” sources of information in events such as floods and bushfires, as well as health emergencies such as the COVID-19 pandemic.

However, the rise of social media has seen community groups, volunteers and non-government organisations nudging out official channels. While these informal sources often provide faster, more local information, they may also be less reliable than government sources.

So what should you do in an emergency? Here are some tips for how to prepare – and how to decide who to trust when the need arises.

## Information overload

The number of sources of information we can access is growing all the time. This leads to higher information load and lower quality of shared information.

With so many sources of information there is also the possibility of contradictory social media messaging by government and other actors, as we have seen during COVID-19. For emergency planners, this increases complexity and can lead to unpredictable behaviours by citizens who may not be responding to relevant advice or even accurate warnings.

For their part, citizens are demanding more and more information that matches their needs. Citizens clearly find value from local information sources.

## Getting warnings right?

Our research shows citizens rely heavily on social media information. During an emergency or extreme weather event 55% of surveyed social media users reported they would spend more time on social media, and 88% expected to use social media more for future emergencies.

Many people are switching off from official warnings because they find them hard to understand, or may feel there are too many of them. It may be that they have seen too many situations where the warnings do not affect them – “the boy who cried wolf”. The bottom line is people want answers to immediate questions such as “How does this affect me right now?”

## Eroding control

On the flip side, government agencies also find social media hard to manage. In an emergency, they may not have the resources to keep up with the influx of comments and posts.

These shifts have raised concerns that greater use of social media erodes the established command-and-control information approach that has traditionally been vital to ensuring consistency in emergencies.

The information space is likely to become even more cluttered as extreme weather events become more frequent and begin to overlap.

## **What can citizens do?**

Compounded by misinformation, fake news, disinformation and the plethora of social media and other media, it is no wonder that citizens may be confused and retreating to local or other “go to” social media sources.

It is not a matter of government information versus other sources of information. Often official advice is the starting point for outlining what is going on and encouraging local dialogue. This creates the opportunity for the local community to crowdsource information and offer further insights from locals on the ground.

The first step to being information-ready is to be mindful that there is a whole ecosystem of information sources and channels.

Your basic, trusted source of information should still be government agencies. Trusted local sources can then amplify that information or add context. Likewise, individuals may provide reports from the ground, share their experiences and contribute to how a community makes sense of what’s happening.

## **Don’t believe everything you read**

While community social media sources can be excellent sources of local information, you shouldn’t accept everything you see there at face value.

Local Facebook and WhatsApp groups, for example, can have very fluid membership and their own biases – meaning the quality of information they provide may vary. What’s more, the most visible and engaging posts on social media are often the most controversial ones, not necessarily the most accurate ones.

As well as biases and limited reliability, social media are also vulnerable to organised attempts at disinformation. During Australia’s 2019-20 bushfires, for example, the hashtag #arsonemergency pushed the narrative that arsonists (rather than climate change) were the main cause of the fires.

However, the hashtag turned out to be a concerted effort to change the narrative and even media agencies were fooled.

This highlights the need to crosscheck information obtained from social media.

Emergencies are emotional and volatile events, so you should make yourself familiar with government social media and warning channels before events like bushfires or floods occur. If you know in advance where to go and what sources to trust, it will take some stress out of the situation.

At the same time, educate yourself on how to evaluate information.

Most platforms are trying to counter misinformation. Keep an eye out for tags on content that is harmfully misleading, or indicating official trusted sources.

Debunking popular misinformation is another common tactic, and fact-checkers operating at a local level could reassure the public. So-called “prebunking” – pre-emptive debunking before misinformation has spread – is also effective at reducing susceptibility to misinformation at scale.

Like all approaches, these have their drawbacks. People have to actively choose to engage with them. And, perhaps more significantly, in the volatile situation of an emergency people often simply revert to familiar sources of information.

Stan Karanasios, Associate professor, *The University of Queensland* and Peter Hayes, Research Fellow, *CQUniversity Australia*

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# Interesting Internet Finds

Steve Costello

While going through more than 300 RSS feeds, I often encounter things I think might interest other user group members. The following are some items I found interesting during May 2022.

## ***Amazon Dropping MOBI Support On Send To Kindle Apps***

**<https://blog.the-ebook-reader.com/2022/05/03/amazon-dropping-mobi-support-on-send-to-kindle-apps/>**

Kindle users do not panic! MOBI files on your Kindle will still be readable. All this means is that you will no longer be able to use 'send to Kindle' apps to send MOBI files to your Kindle.

## ***I Lost My Phone With My Second Factor For Authentication. How Do I Recover?***

**<https://askleo.com/i-lost-my-phone-with-my-second-factor-for-authentication-how-do-i-recover/>**

I know some people are hesitant to use two factor authentication for this reason. Leo explains how he would recover from that scenario. (Note: I use 2FA everywhere I can, and have not had a problem. The key is to think about how to handle this and prepare for it before it ever happens.

## ***Android Cellular Data Not Working? 8 Ways To Fix***

**<https://helpdeskgeek.com/help-desk/android-cellular-data-not-working-8-ways-to-fix/>**

It is not a question of if, but when your android cellular data will stop working. When it does, refer to this post for cures most likely to work. (Note: I lose my android cellular data at least once a month for some reason but usually get it back in minutes using one of these fixes.)

## ***Is It Dangerous To Use Free Stock Photo Websites?***

**<https://www.plagiarismtoday.com/2022/05/18/is-it-dangerous-to-use-free-stock-photo-websites/>**

This is an interesting article for the editors and bloggers that use photos from stock photo websites. Just because it is free from a stock photo website does not mean it is safe to use. Check out the advice in this post before using just any stock photo website photo.

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# East SIG Report September 2022

Host Frank Maher welcomed members to the September Zoom meeting of the East SIG. Frank then outlined the nights agenda below:

Presentation 1: **Q&A** with Georg Skarbek

Presentation 2: **Tuning Windows 11** – Personalisation and Privacy issues

Main presentation: **Electric Commercial Aircraft** by Viv Ellison

The first presentation of the night was Q&A by George Skarbek.

Question 1 – I want a program like the Windows clipboard, but also a second clipboard. I've searched the internet but haven't been able to find what I'm after. Currently I copy data, but I also want to copy the tag data (i.e. Date & time) attached to it, as this would save me a lot of typing. For example, earlier today I was capturing some share price data and saving it into files. I want to save each capture as BHP08September.txt, CBA08September.txt, ANZ08September.txt etc, so that's why I need 2 clipboards.

Answer 1 – I haven't used OneNote for about a year, but I suspect that has a date stamp. OneNote is part of Windows, so you may already have what you need.

[Audience suggestion] You could use the Windows "Snipping" tool (WinKey + Shift + S) and use its meta data (date & time) to sort your files.

[Stuart Gruneklee from iHelp] If you need multiple items on a clipboard, it's already there in Windows 10 or 11 under Clipboard History. Press WinKey + V and you have a selection of items copied to the clipboard that you can use. You would do this by saving the date as one item on the clipboard and then save the BHP, CBA etc. as other items on the same clipboard and choose whichever one you want to paste from Windows Clipboard History.

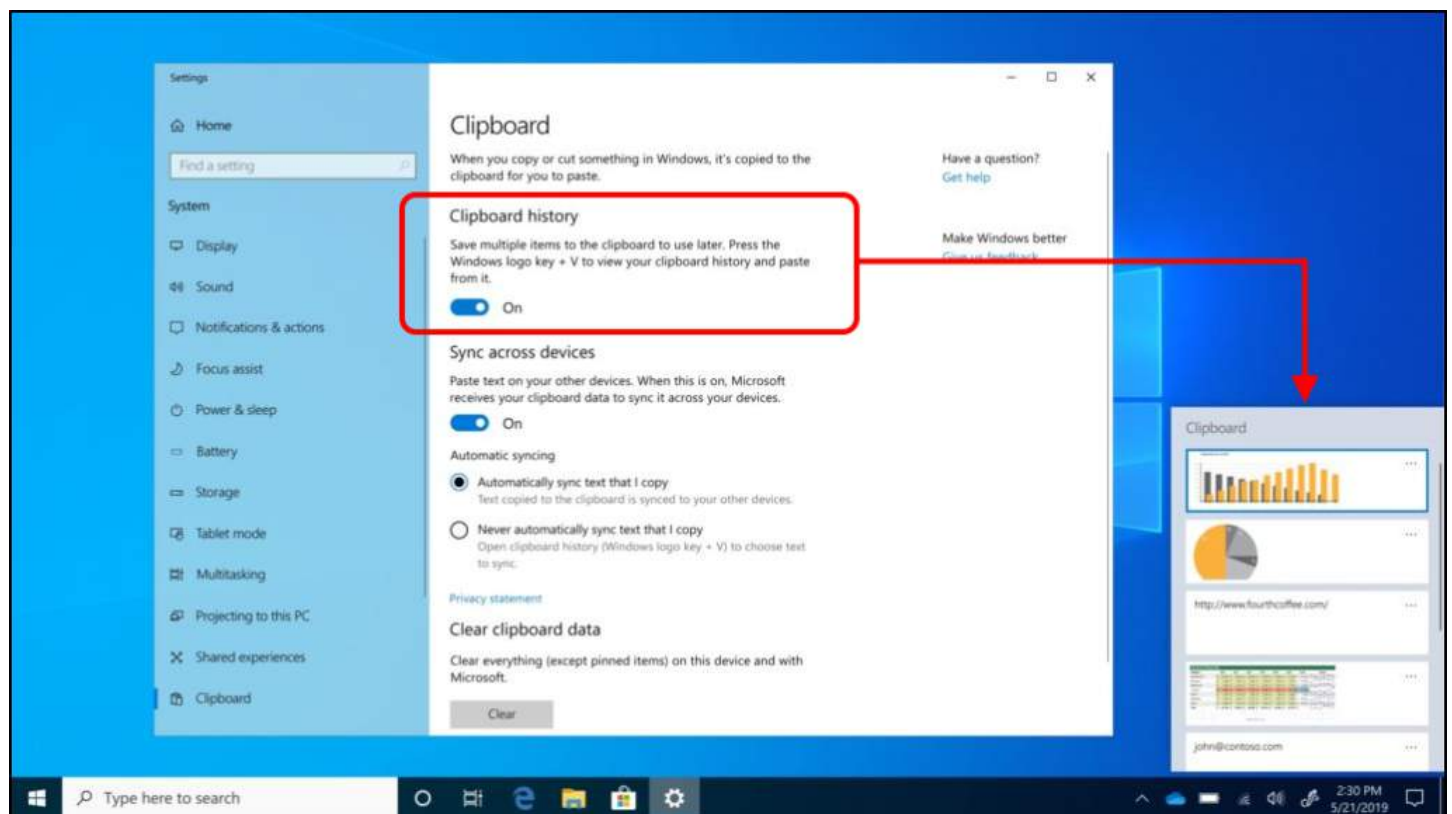


Figure 1 – Windows Clipboard History

Question 2 - I've had trouble shutting down my PC on a fairly regular basis. A message flashes up that a program is still running and the computer can't shut down. After many months I think I've tracked down which programs exe file is the cause of my problem. It appears to be part of Zoom Apps, but I haven't downloaded any Zoom Apps. After a lot of research, I can't determine whether I can delete this file (zCefAgent.exe) or not. My question is can I afford to move or delete it?

Answer 2 - I'm not familiar with that file but there are a couple of things you can try. Open Task Manager (Ctrl + Shift + Escape) and select the Start Up tab on the top. See if that program is in StartUp, and if it is, disable it. That's not uninstalling it, it's still there but means it won't be in memory all the time. As you've identified the problem file, another way is to rename the .exe file to .exe.old. That way the file can't be found by whatever is using it, but you haven't deleted it. If changing the file extension doesn't cause any problem, your issue is solved. On the other hand, if it does cause a problem, you can rename the file back by removing the .old extension. I think changing the extension is a better option than renaming the file, as it would be more obvious in a few months' time if you need to change it back again.

Following Q&A, Dave Botherway played a video by Leila Gharani titled "Windows 11 Settings You Should Change NOW!", at <https://www.youtube.com/watch?v=Kx3H8BolgaI>

The video details 7 settings, some of which are Windows 11 default settings, that you should change right now. The changes have an impact on your privacy and improves the overall Microsoft Windows 11 user experience. This video is clear and precise and highly recommended for navigating the Windows Settings menus.

The settings Leila suggests you change are:

1. Delete the recommended items in the Start menu and Jump list, then add shortcuts to the vacant area between the profile picture and power button.
2. Disable annoying Notifications and Ads
3. Change Privacy settings, such as speech, diagnostics and feedback, activity history & others.
4. Change App Permissions for Apps that don't need access to your physical location, camera, microphone and other devices.
5. For added security limit where Apps can be installed from Eg MicroSoft Store
6. Disable Programs at StartUp not on your VIP list
7. Sign in with a Local Account if you want greater privacy

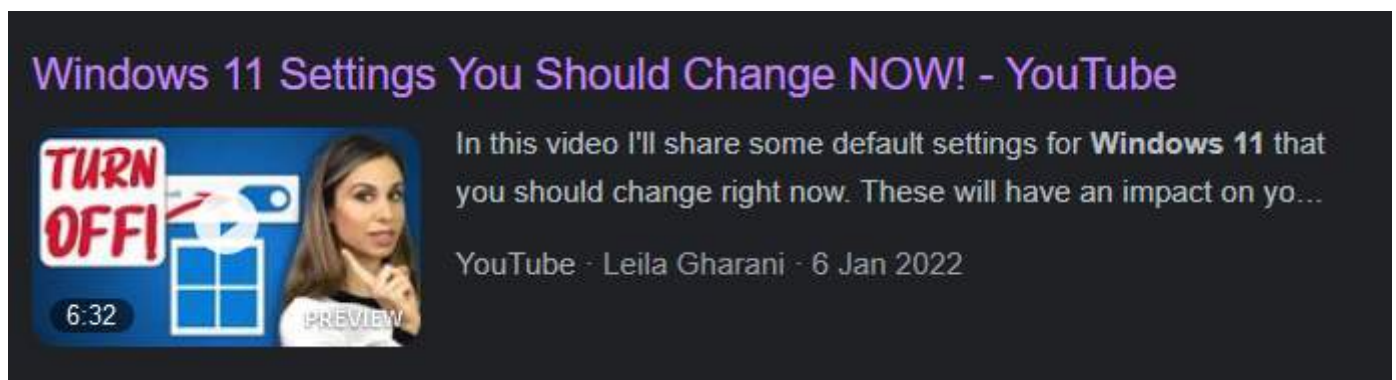


Figure 2 - Windows 11 Settings You Should Change NOW!

The main presentation was by Viv Ellison on Electric Commercial Aircraft. This was different to our normal computer related topics but one that the audience found very interesting and voted with a show of hands for more technology topics like Viv's in future.

To avoid becoming too technical, Viv presented electric aircraft projects he felt would be of most interest. Ten years ago, most people would have felt electric aircraft were impractical. At that time, batteries and

electric motors were very heavy and the motors weren't very powerful. However, since that time things have changed. There are hundreds of electric aircraft companies now in existence, all vying for future business.

The rapid pace of development of electric aircraft is analogous to the early manned flights. The first (photographed) powered flight was by the Wright brothers in 1903, or arguably a year or so earlier by others. In 1907 aircraft development had progressed considerably with the Wright Flier, which was able to take off unassisted and with the pilot sitting upright rather than lying down.

In the short time period from 1907 to 1917, the Vickers Vimy was one of hundreds of aircraft developed. In 1917, Alcock and Brown made a 16-hour non-stop flight across the Atlantic in the Vickers Vimy. In the same year, Australians Keith and Ross Smith flew from London to Darwin in the same aircraft. What the past shows is how quick aircraft technology progressed and the current electric aircraft are following the same trajectory.

Viv's followed by presenting a number of different electric aircraft projects by way of videos from YouTube, followed by commentary and audience discussion after each video. In this report I have listed the title and URL for each video for those who would like to know more.

### **Solar Impulse**

In 2016, the Solar Impulse was a proof-of-concept project to fly around the world without using any fuel, using a fully solar powered aircraft. The technology behind this achievement is quite amazing. To circumvent the world, the Solar Impulse had to travel across the Pacific and Atlantic Oceans. The longest flight was 116 hours while crossing the Pacific Ocean. This required the Solar Impulse to fly through the night for 3 or 4 nights. During those night flights, the pilot would have had to stay awake for most of that time. Viv felt most people probably didn't appreciate the risks involved.



Figure 3 – Solar Impulse

The 2 adventurers involved were Bertrand Piccard & Andre Borschberg. The aircraft had batteries on

board and during the day there was enough energy generated from the aircrafts solar panels to fly the aircraft and charge the batteries. During the day, the Solar Impulse flew as high as it could, at between 20 to 30 thousand feet, so that during the night when it ran on batteries, it could afford to gradually lose height. No external energy was used at all.

This concept has been taken further by another aircraft called the Solar Stratus. This aircraft is capable of reaching 80 thousand feet to the fringes of space, just with solar energy. Boeing is thinking of building aircraft like the Solar Stratus that can stay in orbit indefinitely, as satellite replacements. Viv said there are many spinoffs that are coming from those who felt the Solar Impulse was a so-called impractical project.

“On 9 March 2015, Piccard and Borschberg began to circumnavigate the globe with Solar Impulse 2, departing from Abu Dhabi in the United Arab Emirates. The aircraft was scheduled to return to Abu Dhabi in August 2015 after a multi-stage journey around the world. By June 2015, the plane had traversed Asia, and in July 2015, it completed the longest leg of its journey, from Japan to Hawaii. During that leg, the aircraft’s batteries sustained thermal damage and took months to replace. A battery cooling system was installed and Solar Impulse 2 resumed the circumnavigation in April 2016, when it flew on to California. It continued across the US until it reached New York City in June 2016. Later that month, the aircraft crossed the Atlantic Ocean to the city of Seville. It stopped in Egypt before returning to Abu Dhabi on 26 July 2016, more than 16 months after it had left, completing the approximately 42,000-kilometre (26,000-mile) first circumnavigation of the Earth by a piloted fixed-wing aircraft using only solar power.”  
[Wikipedia]

Video 1 - “Solar Impulse” <https://www.youtube.com/watch?v=brjJmmjeJnQ>

Additional video <https://www.youtube.com/watch?v=dnhL8fiTYoY>

## **Spirit of Innovation**

The Spirit of Innovation was a very different project to the Solar Impulse. It was designed to be the world’s fastest all-electric aircraft, with the aim to set three new world speed records for an electric aeroplane. The two firms involved in the project were Rolls Royce and Electroflight. Rolls Royce had extensive experience in jet aircraft engines and the aerospace industry, while Electroflight specialises in battery systems for aerospace and defence.

Rolls-Royce were pivotal in achieving the speed records, through the development of the electric power train. This pioneering technology delivered clean, safe electric power for the planes vital power needs. The development of the electric power train has set Rolls Royce up for the future as a leader of this technology.

The main design challenges were to create a power train that was capable of delivering 500 horse power and to design a battery that can hold enough energy to break the speed records. These records were, to break the 3km record, the 15km record and the time to climb record.

The video details the design process and how the 3 speed records were broken, all by significant margins. Over 3km, the Spirit of Innovation reached a top speed of 345.4 mph. Pilot Steve Jones later went on to break the other records, reaching 330 mph over 15km and climbed 3000 metres in 202 seconds, beating the current time to climb by 60 seconds.



Figure 4 & 5 - Spirit of Innovation

Viv believes Rolls Royce were involved, in what would have been a very expensive project, as they could see it as an opportunity to develop technology for the future. Rolls Royce is now offering electric compulsion conversions of existing fossil fuel aircraft to electric.

Due to the risk of fire, aviation batteries have cooling systems in place to reduce this risk, but otherwise are lithium-ion batteries. Current battery technology is likely to change in the future as further developments occur. As the weight of batteries is significant, Viv believes where there is a need, innovation and significant R&D will occur, due to the prize to be won.

The engines of fossil fuel aircraft are complex, require costly maintenance and the cost of fuel is significant, whereas electric aircraft are significantly cheaper to run and have fewer moving parts requiring maintenance.

Video 2 - Spirit of Innovation break speed record

<https://www.youtube.com/watch?v=4hapBP-Cdis> .

### **P-Volt**

The third video Viv played features the P-Volt. Development of this aircraft involved the original Italian aircraft manufacturer Tecnam, and Rolls Royce.

The P-Volt is based on Tecnam's existing piston P20-12 aircraft, and is a 11-seat twin engine fully electric commercial aircraft. It uses a Rolls Royce electric propulsion engine with an automated battery swapping system for quick turnaround.





Figure 6 – Tecnam P-Volt

When certified by the FAA, the P-Volt will provide environmentally friendly flying, with zero emissions and low noise. The aim of this aircraft is to save travel times by connecting communities currently not being served. At the time of his presentation, Viv believes the P-Volt is still awaiting certification by the FAA.

Rolls Royce was again involved due to their ground breaking power train technology. This technology opens up the market to sell its electric power train for both new aircraft or for those wishing to convert their existing planes. Viv believes smaller aircraft conversions will become fairly common in future.

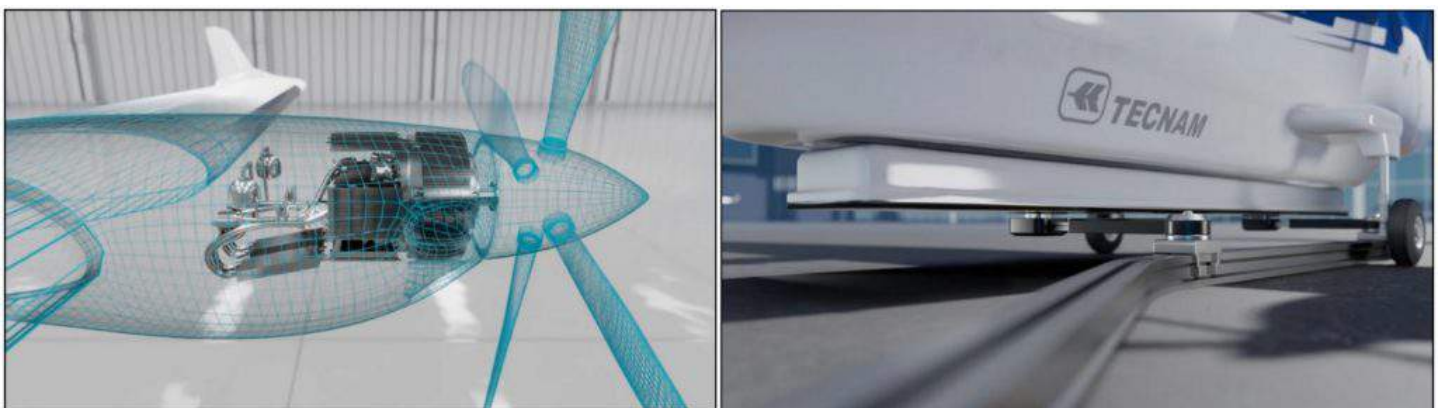


Figure 7 – P-Volt fitted with Rolls Royce electric propulsion engine

Figure 8 – P-Volt Battery swapping system

In the last few months, an aircraft company that fly Otters in Canada has received FAA certification for the conversion to remove the turbine engines and replace them with electric motors. This company operate sea planes for relatively short-range passenger flights in Canada, landing on lakes.

The price of fuel is currently the biggest cost for aircraft companies. Viv believes we will see the fossil fuel

aircraft disappear fairly quickly because of the complexity of the engine, the amount of maintenance required and high fuel costs compared to electric powered aircraft.

The prize for better battery technology is enormous, so considerable R&D is taking place in this area at present. An audience member mentioned an Australian company is developing a Lithium Sulphide battery which claims a 2 to 1 weight to power improvement over standard Lithium-Ion batteries.

### Video 3 - Powering the P-Volt

<https://www.youtube.com/watch?v=Qx8DVpv6Khs>

## Alice

Eviation's Alice all electric aircraft features in the fourth video played. This aircraft is a 9 seat 1 pilot commuter aircraft aimed at short haul flights of less than an hour. The Alice features 2 rear 650 kilowatt electric engines, claiming quick turn arounds with only 30-minute charging needed after a 1-hour flight. Testing is proceeding with 2025 as the likely start date for passenger flights. Even at this stage of its development, the Alice has received orders from Cape Air for 75 aircraft, for use inside the United States and 12 orders from DHL.

Eviation aim for their planes is to tap into smaller underutilised airports across America. They believe new markets and destinations will evolve with the Alice. The economics of this smaller electric passenger aircraft means 2 planes and 2 pilots to make up capacity, is still cheaper and sustainable than a single larger piston powered aircraft. In addition, the Alice offers zero emissions and low noise. Viv believes this aircraft to be more practical than the P-Volt from the previous video.



Figure 9 - Eviation's Alice

Viv also feels hydrogen fuel cells are likely to be the future for larger aircraft of this type, but that technology is further away. Most of the electric powered aircraft are made of almost all carbon fibre, with very little aluminium. This seems to be a trend of where aircraft manufacturing is headed.

There are many other electric aircraft projects similar to the Alice that aim for about 1 to 1½ hour flight times, travelling at around 300 km/hour. This gives a range of about 300 to 400 kilometres. These aircraft are not aimed at Melbourne to Sydney type flights, but Melbourne to Ballarat or Melbourne to Albury range. Currently 75% of air travel is of shorter flights. Viv therefore believes electric aircraft are likely to gain a foothold in those markets. As technology develops, it's likely we'll see much larger electric aircraft than the Alice.

Video 4 - "Eviation's Alice Electric Aircraft Could Fly to Small Towns While Cutting Emissions - FutureFlight" at <https://www.youtube.com/watch?v=xCJlp4KiPRo>

### **Lilium Jet Technology**

**The Lilium is the most impressive aircraft Viv has come across. It's been developed by a start-up company setup by 4 individuals in various engineering fields. These are, Daniel Wiegand, CEO and Co-Founder (PhD in Aeronautical engineering), Matthias Meiner, Chief Engineer and Co-Founder (PhD in Robotics), Brian Phillipson, Deputy Chief Technology Officer (50 years' experience in design and development of fast Military aircraft and the Harrier Jet etc.), and Alastair McIntosh, Chief Technical Officer (30 years' experience in aviation with Rolls Royce).**

**The design of the Lilium is unusual because the designers started with an open mind and chose not to adopt conventional design concepts. The Lilium is again an electric aircraft using batteries but with a very unconventional design that allowed for vertical take-off and landing. The design was optimized for the dominant and longer cruise phase of the flight, rather than the take off and landing phase. It's still in the development stage and has seen 5 design changes since the first concept.**

**The video Viv played covers stage 5 of the Lilium's design. This design comprised 36 electrical ducted jet motors, incorporated into the aircraft wing flaps. Three ducted electric jet motors comprise each flap, and each flap is powered by its own battery pack, to give the craft more redundancy. As can be seen in Figures 10, 11 and 12, the Lilium features a small wing at the front and larger wing at the rear.**

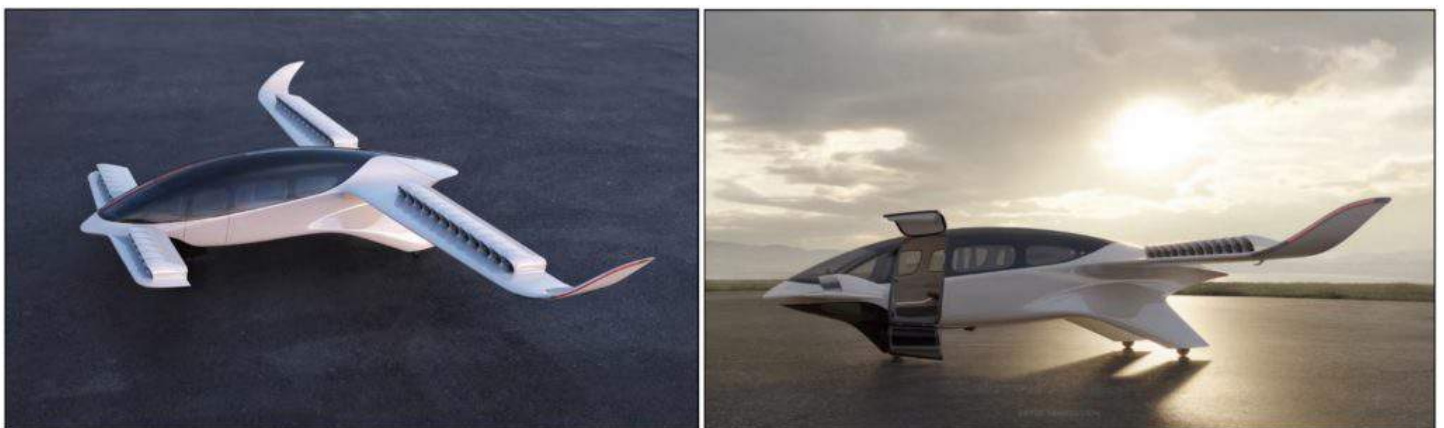


Figure 10 & 11 - Lilium





Figure 12 - The Lilium viewed from the back

The developers claim a significant reduction in engine noise due to the inclusion of acoustic linings in the ducted engines. As the electric engines are integrated into the wings, there is less weight and less drag. The design comprises 4 flaps at the front of the aircraft (i.e. 12 ducted electric jet engines) and 8 flaps on the rear wings (i.e. 24 ducted electric jet engines). As the engines are mounted in the flap, the plane is able to be controlled simply by the flap angle and engine RPM. This approach reduces the need for moving parts such as tails, ailerons, elevators and a rudder, all which are required for a conventional aircraft.

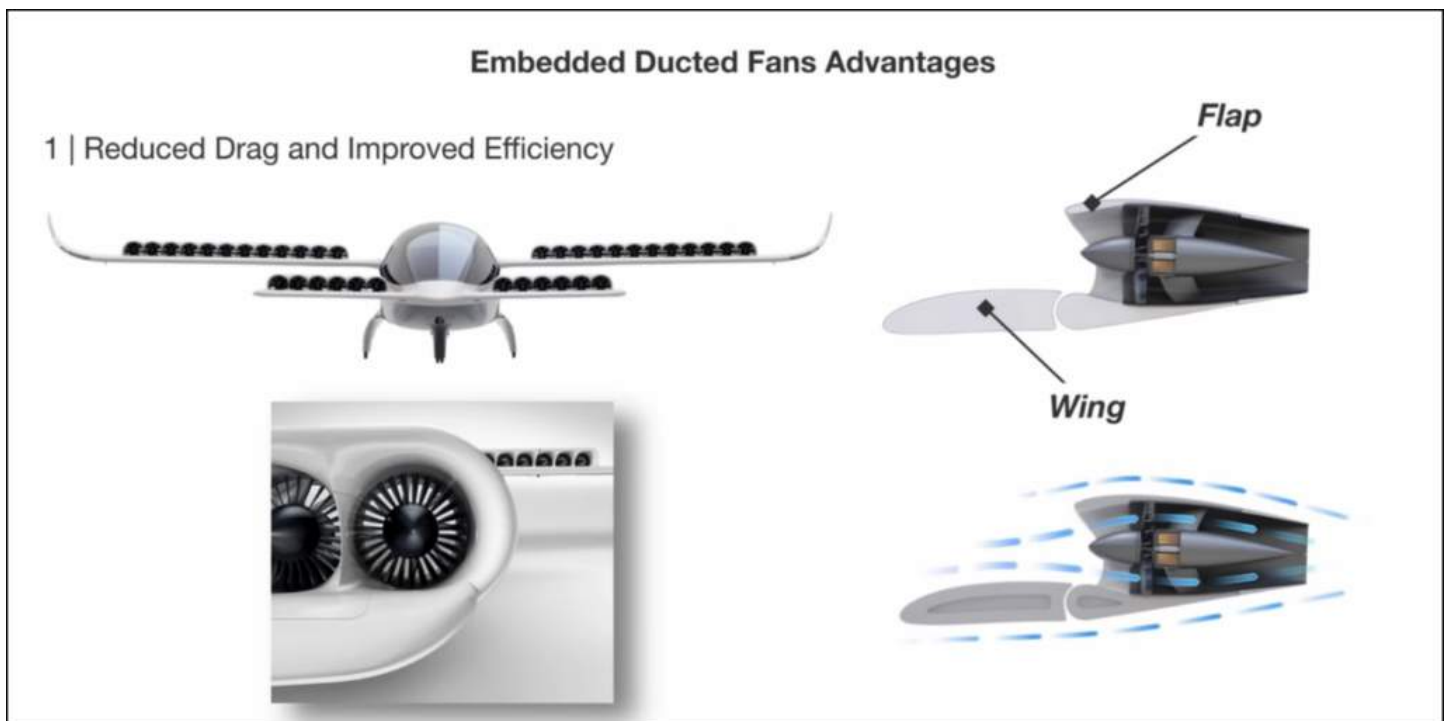


Figure 13 - Lilium ducted fan arrangement

A more recent video from June 2022 and not included in Viv presentation, shows slight

variations to the design mentioned. The most significant change reduces the engines from 36 to 30, while still maintaining a range of 250 km.

There are many other YouTube videos that can be found on the Lilium, all make interesting viewing.

#### **Video 5 - "The Insane Engineering behind The Lilium Jet | Part 1"**

<https://www.youtube.com/watch?v=ZpdDY2rDsLI>

#### **Update Video "The Insane Engineering behind The Lilium Jet | Part 2" June 2022**

<https://www.youtube.com/watch?v=Cn-5qqgEW6E>

Viv felt the Lilium was a very impressive development and sees the Lilium as a replacement for helicopters in cities, due to its vertical take-off and landing, and quieter operation. It is likely to develop new areas in the aviation market and may even replace taxis. The Lilium currently has a flight time of 1 hour and travels at 290 km per hour.

#### **Jetson One Commute**

The final video was on the Jetson One Commute. This "aircraft" has the appearance of a one-person drone and is shown in Figure 14. It has 8 electric motors mounted in pairs, and a flight time of 20 minutes. Under FAA rules this "aircraft" is classified as an ultra-light vehicle. It therefore does not require a licence to fly and can only be used for recreation. At the time of the video's recording, 400 Jetsons had been sold. Jetson Aero have plans for 2- and 4-seater versions, but are waiting for regulators to sort out regulatory requirements.



Figure 14 - Jetson One Commute

Viv believes this area of aviation needs greater regulation as these vehicles could be quite dangerous in

the wrong hands. With improvements in technology, the range of the Jetson One will improve. As the personal area of aerial mobility is an appealing one, markets for these types of craft are likely to develop further in the future.

Video 6 - "What It's Like to Commute in a Personal Flying Vehicle"

<https://www.youtube.com/watch?v=3fzYXqZateM>

## **Retro Fitting**

To conclude his presentation, Viv made the following observations on retro fitting existing aircraft.

- Retro-fitting is an economical way to transition to electric propulsion.
- Specialist aerospace companies (including Rolls Royce) already offer this technology.
- Many existing well proven aircraft are very suitable for retro-fitting.
- Electric motors are simpler, more reliable, and quieter.
- Operating and maintenance costs for electric aircraft is a fraction of that of "fossil fuel" aircraft.
- About 75% of airline flights are regional, many within current electric aircraft range.
- Often these flights are economically marginal - and frequently subsidised
- Conversion will mean lower prices, and new previously uneconomic services will open.
- Commuter airlines that don't convert are unlikely to remain competitive.
- Clean electrical energy can be produced locally, which is a big advantage in remote areas

## **Examples:**

### **Harbour Air**

- Harbour Air is the largest all seaplane airline in North America, flying 30 de Havilland Beaver 6 passenger aircraft.
- The company flies more than 500,000 passengers annually on its 30,000 commercial flights each year.
- Harbour Air's entire fleet of 30 aircraft are planned to be converted to all electric aircraft.

### **Rex Airlines**

- Rex Airlines operate Saab 340 aircraft and aims to convert these to electric.
- Rex aims to trial the technology on its 34-seat Saab 340 aircraft, that it uses on regional routes under one hour, such as its Mount Gambier to Adelaide route.
- Rex will initially trial both batteries and hydrogen fuel cell technology beginning in 2024
- While being cheaper to operate, the retrofitted aircraft are also expected to be safer and quieter
- Other smaller aviation companies have said they will be looking to do something similar.

## **Conclusion**

To conclude his presentation, Viv made the following observations. The first solar flight by the Solar Impulse was only in 2016. The videos shown in this presentation reveal how rapidly electric aircraft travel has developed. Electric engines have only one moving part, so maintenance savings will be significant, when compared to a piston engine and a jet engine, the latter which is quite complex. The electric motors used in these aircraft are completely different to those most would be familiar with. Their whole construction is completely different. They are extremely light and more like a disc brake in a car than the old squirrel case motor. As R&D on batteries develop, aircraft will become far more capable. A further development is to use solar coatings rather than solar panels, this has the potential to charge batteries while in flight.



Following Viv's presentation, the audience voted with a show of hands for more technology presentations like this main presentation.