PROFESSIONAL PILOT

OUR 51st YEAR

MARCH 2017

Stellar Architecture, Engineering and Construction flies this Citation Excel to remote job sites to design and build food processing plants and other commercial facilities. (L–R) On the ramp at JAX (Jacksonville FL) are President and COO Mike Santarone, Divisional VP Bob Owens, Chief Pilot Paul Petraglia, Captain Zach Lautzenheiser, Director of Marketing Justin Bridegan and Corporate Business Developer Zach Norris.

International Operations

Can't leave home without the phone

USB charging systems are an important element for the office aloft.

SmartSky 4G brings bidirectional, high bandwidth and extremely low latency to inflight connectivity. For the 1st time, business aircraft can seamlessly stream high resolution data without the buffering and data rate limitations experienced on other systems. SmartSky's technology and spectrum enables 2-way, live, high-definition (HD) video conferencing. Users can stream, chat, text, call, game and videoconference just as they do on the ground. The only thing that is different is their altitude.

Shannon Forrest
President, Turbine Mentor
ATP/CFII. Challenger 604/605
Gulfstream IV, MU2B

Several decades ago the admonition of "Don't leave home without it" was introduced as a clever marketing ploy by American Express. Although the phrase is no longer used to lure customers to financial services, the slogan is now relevant in another way: It explains how the typical person feels about their smart phone, tablet or laptop computer. It's become the rule, rather than the exception, that a portable electronic device (PED) with access to voice and data is always kept close at hand, even when on an airplane. Proof is just a glance away; right now there's a good chance someone nearby is heads down attending to a digital interaction.

However, owning a capable device is only the 1st step when it comes to connectivity. The product is no more than an expensive paperweight if the owner fails to consider 2 operational variables.

The 1st is to find a wireless signal of sufficient strength to achieve efficacy. All airborne systems require a service provider (eg GoGo or ViaSat) and a modem and router. The modem allows devices to connect to the Internet and the router combines them within a network and is responsible for resource sharing. More advanced units combine a modem and router within the same housing and incorporate a system architecture that can deliver wireless connectivity to multiple users simultaneously. Seamlessly switching between cellular and satellite delivery methods as a function of location and permitting preferential allocation of bandwidth to specific users is a characteristic of the latest generation of "smart" routers. Rockwell-Collins' eRouter is an excellent example.

Outright loss of a signal or degradation in Wi-Fi strength is anxiety provoking for those accustomed to constant connectivity, but there's a worse problem to have.

Charging the PED battery with DC

The 2nd variable is the battery. Maintaining a charged battery is a simple requirement, and yet it's commonly violated by scores of people every day. Fortunately, the solution is simple: Recharge the device. But that's easier said than done because of the logistics of travel. PEDs operate within a very specific range of direct current (DC), so a standard alternating current (AC) electrical outlet

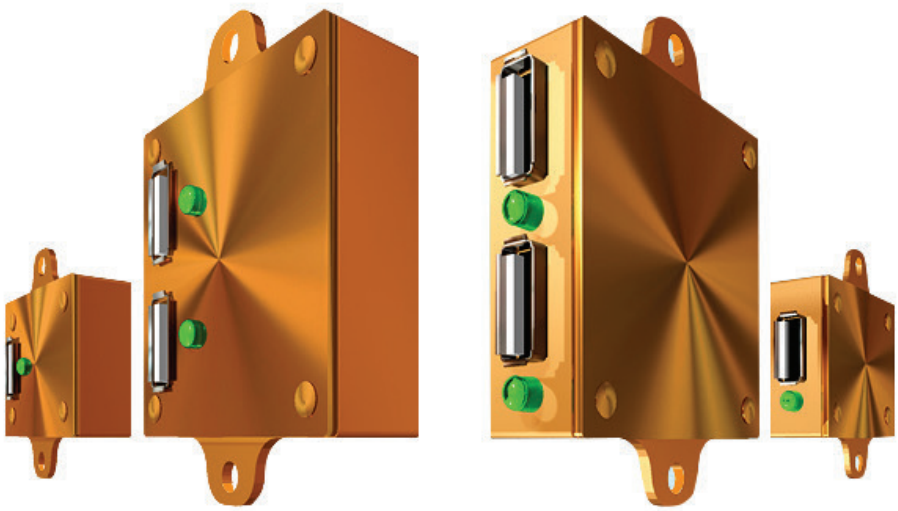
requires a rectifier (to convert from AC to DC) and a transformer (to step down the voltage). When the components are combined within the same housing and paired with a cord that runs to the PED, the setup is colloquially referred to as a charger. It's common for manufacturers to use proprietary chargers that only work with their device. This means that travelers with more than one PED are further inconvenienced because they need to carry a bundle of different wires if they want full utility.

Some airlines are leveraging widespread PED use by delivering entertainment and Internet content directly to a passenger's personal equipment instead of the more traditional LCD screens mounted on seat backs. In theory it's a good idea in that it saves weight and maintenance costs. But there's a caveat: What happens when the PED battery needs charging? Not all aircraft are equipped with seat-mounted power outlets. Having the capability to live stream a movie to a tablet but the inability to watch the movie because of a dead battery is no doubt frustrating. Another flaw is that older generation airframes often have a single AC receptacle for an entire row of seats or place the port in such an awkward location that it requires a mastery of yoga to use it.

Switching to a paperless cockpit necessitates a source of power for charging tablets and smartphones. A USB system is a simple, low cost solution.

What's being plugged in by pax?

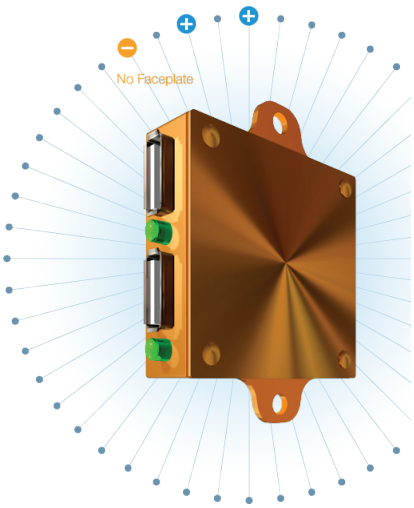
For pilots, there's a safety consideration when providing passengers with access to a source of 110V AC power. It's difficult – if not impossible – to monitor what's being plugged in during the flight. It's not uncommon for chargers to malfunction or start a chain reaction that leads to a runaway lithium battery fire. The Samsung Galaxy Note 7 received a lot of attention lately as a result of the FAA ban, but similar incidents are becoming more common. In 2016, a camera battery charger became wedged between 2 airline seats on an international flight, overheated, and began smoking. Fortunately, a flight attendant used a fire extinguisher to remedy the situation. The quality, age and suitability of commercial off-the-shelf AC chargers are cause for concern, so switching to a USB charging system to power ancillary devices in the cockpit and the cabin is a better solution that's becoming popular in corporate aviation.

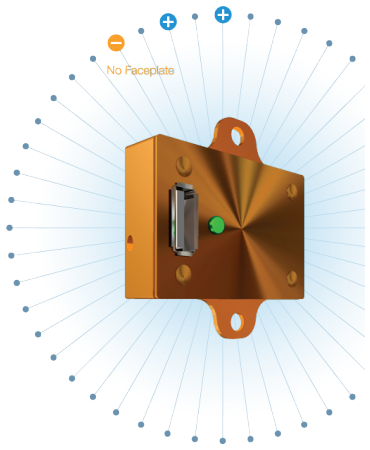


Aerospace Devices, **Esoteric SkyDocks provides full current output for any PED using the Apple's lightning connec-tor cable. They are also compatible with consumer-grade USB-charged devices such as Android smartphones and tablets and digital music players and cameras, and may be installed in seats, cabin side ledges and monuments.**

What is a universal serial bus and what can it do?

Anyone familiar with a modern computer likely has experience with a universal serial bus (USB). The abbreviation USB defines both a standard and a piece of hardware. Until the late 1990s, computer peripherals like printers and keyboards were connected using parallel or serial ports. But by eliminating the older technology and standardizing the smaller and lighter USB, manufacturers reduced the size and weight of PEDs and achieved a faster rate of data transfer. USB devices are most recognizable in the form of small portable memory devices called





flash drives. Ironically, version 1.0 of the USB was developed in 1996 but flash drives didn't come along until version 2.0 in 2000.

Most people plug in a USB connector without giving it a thought, but there's a little more to know because 4 versions of USB exist: 1.0, 2.0, 3.0 and 3.1. Each iteration transfers data faster than the predecessor. In 2016, the most common specification to see was 3.0, with 2.0 being a close second. The 3.0 is considered "super speed USB" and has no problem quickly backing up an entire hard drive or handling high-definition media. Version 1.0 devices are still out there but might require a concentrated search to find. They will still work if you plug it into a higher version receiver, albeit it'll run at a much slower pace.

An important characteristic of a USB is the ability to deliver DC power and, hence, charge batteries or power devices. This transmission is 1 directional and always flows from the host device to the receiver, meaning you can charge a phone from a USB port on a computer but not vice versa. When considering only the ability to deliver power, not all USB chargers are equal. Identical looking hardware can deliver disparate amperage levels and for that reason it's important to denote it in some way. Charging ports on a computer typically range from 0.5 to 3 amps and those with the highest amperage dedicated to charging are identified with a lightning bolt icon. For comparison, the average wall outlet 110V USB adapter (technically a transformer/rectifier) delivers from 1 to 2.4 amps; the exact specifications should be printed on the unit.

In terms of how fast a battery charges, one would think higher numbers are better. In most cases yes, but other variables can play a role. The "more must be better" theory became popular among Apple owners when they suggested that attaching an iPad charger to an iPhone could shorten charging time. It's true that the former produces greater amperage than the later. However, earlier models of the phone are only capable of accepting 1 amp of current, so anything more than that is superfluous and won't help the cause. The takeaway is that sometimes the device receiving the charge has known design limits. A far more serious situation is one in which the limitations are unknown or untested. Charging devices are frequently counterfeited or not manufactured to standards suitable for airborne use. It's one thing to make an impulse purchase of a replacement charger at a store checkout and have it burst into flames on the drive home, but it's far different when the failure happens at FL390 somewhere near 30W longitude on the North Atlantic tracks.

USB charging ports are a safe, cost-effective solution to charging PEDs in the air

Surveys indicate that passengers prefer to use their own PEDs when traveling by air. It's a given that those devices will eventually need to be recharged. Flight departments were quick to realize that lack of Wi-Fi to support PED connectivity was a significant disadvantage, and the same holds true when it comes to USB charging capability. The reliance on PEDs is so important that it's influencing design decisions on production aircraft and inducing owners of classic airframes to retrofit. Demand rapidly spiked in the last decade and a little history can explain why. The 1st dedicated USB charging system for corporate aircraft dates back to1999. At that time, Esoteric LLC developed a single slot charger for the Bombardier Global 6000. It was known as the SmartDock. The irony was that there were few portable devices to charge using the USB format at the time.

Aerospace Devices sells 9 USB charging products branded under the name SkyDock and SmartDock. Robert Pecanic, director of operations for the technology division at Aerospace Devices and one of the original designers of USB for the aerospace industry – offers cogent arguments for using DC voltage charging stations in lieu of 110V AC: convenience, smaller footprint, reduced weight, and safety. He points out that wiring a DC system in an aircraft cabin is less logistically complex than AC and reminds users that, "As technology continues to advance, so will the amperage requirements. Increased output comes with flight safety issues."

The SkyDock FJ is sole sourced at Dassault Falcon Jet for all base models.

Dassault released its specifications for a USB charging device 6 years ago in a 145-page document. It included QTP sectional testing in excess of the DO160G – the standard for environmental conditions and test procedures for airborne equipment. One of the most challenging was a voltage spike test. As described by Pecanic, the testing process involved shocking the USB chargers with 3 successive 600 volt bursts. To be successful, the unit had to resist smoke, fire, and terminate power at the input source (not the end the user interacts with) within a microsecond. The Esoteric design passed all the tests and now the company is the sole source provider of USB charging systems for the Falcon jet series, although they also sell across the industry from props to