Smart Suitcases

Considering that the last major innovation in luggage was a four-wheeled suitcase patented in 1972, it’s understandable that luggage will continue to be developed and innovated, albeit it has been much slower than one would have expected. Over the recent past, luggage makers have developed so-called ‘smart luggage’ - suitcases with anything from a USB charging port to motorized wheels. There have been major recent developments on the new ‘Smart Luggage.’ Here is a ‘heads up’ for all our readers who may be considering the purchase of this so-called Smart Luggage.

So, what is ‘Smart Luggage’? They are regular wheeled suitcases powered by lithium batteries and have inbuilt capability:

- Global tracker to locate and track your suitcase anywhere in the world;
- Supercharger to charge all your devices;
- Digital auto locking to remotely lock your suitcase through your mobile phone; and
- Smart Weight System that shows the weight of your suitcase once packed.

The International Air Transport Association’s (IATA’s) Dangerous Goods Board has now decided to restrict the carriage of so-called “smart luggage” on passenger aircraft operated by its 275 member airlines around the world.

So, effective Jan. 15, 2018, bags equipped with a lithium battery will only be accepted for carriage if it is possible to remove the battery from the bag. “Baggage, where the lithium battery cannot be removed, is prohibited for carriage” on IATA member airlines, according to an IATA spokesman.

Bags with the battery installed must be transported as carry-on luggage. If a smart bag is to fly as checked baggage, the battery must be removed and carried in the passenger cabin.
Increased Probability

The airlines also have serious concerns as should a lithium-ion battery ignite in a cargo hold, the plane’s automatic fire suppression system might not activate until too late. That issue becomes less problematic if something explodes in the cabin—it’d be noticeable right away, most likely—but with ever-increasing baggage fees, there’s the ever-increasing requirement of having to gate-check bags.

One of the factors driving the emergence of lithium batteries as a risk is the growing number of devices that are powered by these energy cells and carried by passengers and crewmembers. Currently, there are no limits on how many PEDs and batteries passengers can carry, as long as the batteries do not exceed 2 g (0.07 oz) for lithium metal batteries and 100 Watt-hours for lithium ion.

The U.S. government, which early in 2017 forced passenger-carried large PEDs into checked luggage on selected U.S.-bound international flights for security reasons, have found that these new security measures created an unexpected and significant increase in the number of lithium battery-powered devices being carried in the passenger aircraft cargo compartment as they were now transported as checked baggage. Most passengers who fly have a laptop, tablet, a phone, even two phones, which is reasonable, but what IATA and the airlines were seeing more regularly, was people flying to different parts of the world — where they bought PEDs very cheaply — and tended to purchase 20 or more devices. Some passengers were even found flying to Hong Kong and buying about 100 phones and packing them in their checked baggage.
Tests were carried out by the FAA to see what risks might be when these greater amounts of lithium-ion batteries (L-ion) in the cargo compartment should experience a thermal runaway in any checked baggage load.

In five tests, common but potentially flammable items (hairspray aerosol cans, nail polish remover, hand sanitizer and ethyl rubbing alcohol) were added to the contents of the suitcase. It was found that in situations where a PED is packed in a suitcase with any of these items, there is a potential for an explosion if the battery goes into thermal runaway. The explosion itself may or may not be strong enough to structurally damage the aircraft, but in a Class C cargo compartment, it will most likely compromise the Halon fire suppression system by dislodging blow panels or cargo liners, rendering the compartment unable to contain the Halon. The tests showed that, given the rapid progression of the fire, a Halon fire suppression system could not dispense Halon quickly enough to reach a sufficient concentration to suppress the fire and prevent the explosion.

The fire suppression system of the aircraft is then compromised, which could lead to the loss of the aircraft. [These tests were conducted by the FAA’s Technical Centre].

To address the threat from the volume of batteries carried onto an aircraft, IATA has limited the number of PEDs and spare lithium batteries that passengers and crew can carry and have changed their minds and now require that PEDs larger than a smartphone is restricted to carry-on baggage for safety reasons. So, also effective from Jan. 1, 2018, passengers and crew will now be restricted from traveling with more than 15 PEDs and 20 spare batteries and these are to be carried in cabin baggage. This is according to information available on IATA’s website.

Keep your eyes and ears open for further news from the airlines you regularly fly on, so you will be aware when the new restrictions apply.

All NEXUS managed aircraft owners will be immediately notified, should there be further changes to these regulations.
In this issue let’s look at Loss of Control In-Flight

Loss of control in flight (LOC-I), has been identified by ICAO as one of the high-risk accident occurrences and has been one of the most significant causes of fatal accidents for many years. LOC-I usually occurs because the aircraft enters a flight regime that is outside its normal operating envelope, usually at a high rate, thereby catching the crew by surprise. It also includes control during low speeds, high pitch and high bank angles as well as weight and balance issues.

THE ‘SIGNIFICANT 7’

Just a few years ago the UK CAA developed a Safety List called ‘The Significant Seven’ which were the 7 most concerning areas that tended to cause serious incidents and accidents. These were determined to be:

- Loss of Control
- Runway Excursion
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- CFIT (Controlled Flight into Terrain)
- Airborne Conflict
- Ground Handling
- Fire
The causes of in-flight Loss of Control by the UK CAA, include:

- Loss of Situational Awareness (especially through Distraction but also through Complacency),
- Low level wind shear or higher level Clear Air Turbulence,
- Structural or multiple power plant damage caused by, for example, a Bird Strike, exposure to severe Turbulence, or collision with another aircraft.
- Intended or unintended mishandling of the aircraft,
- Attempted flight with total load or load distribution outside of safe limits
- Unintentional mismanagement of Aircraft Pressurization Systems,
- An attempt to take off without ensuring that critical parts of the airframe are (or will be at rotation) free of both frozen deposits and previously applied ground de/anti-icing fluids
- The effects of high levels of airframe ice accumulation or a significant loss of power on all engines attributable to engine icing,
- Attempting to manoeuvre an aircraft outside its capabilities to resolve a prior problem (including mis-navigation).

- In-Flight Fire
- Fuel exhaustion or starvation
- False instrument readings displayed to the flight crew
- Wake turbulence, especially if recommended spacing is not maintained
- Pilot Induced Oscillation
- Malicious interference

In Flight Loss of Control is one of the biggest causes of transport aircraft fatal accidents and hull losses.

Between 2011 and 2015, 45% of all fatal accidents were caused by LOC-I. (source: IATA Environmental Factors Affecting Loss of Control In-Flight, First Edition).

More attention to recovery from unusual attitudes for aircraft operating without a visual horizon reference is also needed, since a significant proportion of airborne loss of control accidents still occur when, if recognition of an abnormal aircraft attitude had been followed promptly by the optimum recovery action, a fatal outcome could have been avoided.
The pilots recovered the aircraft at FL240 and diverted to Muscat, Oman. Two passengers were severely injured while the 2 cabin attendants suffered minor injuries. Thankfully, the aircraft landed safely.

EASA lists 3 causes of this type of very serious incident:

1. Crossing traffic - climbing or descending in proximity to another aircraft;
2. Heavy aircraft generating stronger vortices;
3. The rising tropopause – due to climate change, the tropical regions are expanding both towards the north and south poles, which means this instability in the troposphere provides favorable conditions for generating wake vortices as wake turbulence is more likely to occur just below the tropopause. (at the poles the tropopause is generally at 30,000 feet and at the Equator it is generally around 56,000 feet).

All that being said, the risk of encountering wake vortices at cruising altitudes remains low. All NEXUS pilots are aware of this phenomenon for the
reasons stated above, and as a proactive
measure, NEXUS issued a safety
memorandum to all our pilots advising
them of procedures to follow when
flying near other aircraft.

Consider the use of SLOPs (Strategic
Lateral Offsets) where permitted, and do
not forget that the A380 aircraft is
hugely prevalent within the GCC
(Emirates operate approximately 100 of
them with a further 45 to be delivered in
the next few years).

What is reassuring for us and our
Customers is that besides having very
experienced crew as we do, we also have
a regular crew and staff training program
which is effective and in line with the
changing operational environment and
regulatory requirements.

AIRCRAFT
TEST FLIGHTS

Many of our flight crew will have been
involved, and some still are, in conducting
Test Flights, particularly after a major
unserviceability or major inspection.

1. First thing is to know exactly what
servicing has been carried out and which
systems have been disturbed.

2. He/She will also need to know if
repairs, modifications and upgrades have
been undertaken and if so, what impact
they may have on the intended flight.

3. Some notice of the flight is therefore
required because a visit to the hangar is
essential to get to the bottom of most of
these aircraft questions. Talk to the
servicing manager and look at the log
books in depth.

4. Do not take on a request “can you just
come down this afternoon and carry out
a quick test/check flight” type of request.

5. Try and develop a trustful working
relationship with the mechanics in the
hangar. It is amazing what they will tell
you once that trust is established. Humor
tends to help a lot here. If the situation
does not allow that due to the use of an
outstation or remote facility, try to gauge
the quality of the hangar staff (and their
management), and the level of pressure
they have all been working under.
6. If the aircraft has been cleaned or painted, pay careful attention as these activities can give rise to numerous “knock on” technical issues such as pitot or angle-of-attack (AOA) sensor damage.

7. Always do a detailed walk around before such a test flight and take time over it. There have been many examples of jacking pads left on aircraft, masking tape covering elevator hinges and over spring tabs, not to mention paint on static plates and vents being blocked by FOD following deep servicing or painting. Remember that all those systems may have been put into the ground test position to allow certain ground checks to be completed prior to flight clearance. Know what they are and make sure that they are all correctly re-positioned to the flight position prior to flight. Apply the principle that if it can happen, it will happen, and your job as a Test Pilot is to ensure that there is no adverse effect on the flight.

8. Think very carefully about weight and center of gravity (C of G) for the check flight. Loading ballast in an aircraft may sometimes be required and is not always an easy thing as unusual C of Gs are not so common in business jets. So try to put the aircraft into a weight and loading situation with which you feel comfortable and use it as a standard for all subsequent similar flights. Set up a mid C of G if possible, avoid being on the limits and do consider the effect of the weight and C of G on the expected “feel” of the controls.

9. Expect that the aircraft will inevitably be much lighter than the aircraft on the line. No big problem there, but think about it and consider the speeds to be used in relation to stall speed and Minimum control speed in free air (also known as Vmca). It may be that whilst you would normally be stall speed limited, you may now be on or near the Vmca limits. It may also be that to fully test the fuel system a specific fuel load is needed and this may drive the C of G.

10. So the main messages here are to know the aircraft, take control of the way the aircraft is presented for check flight and always check the C of G calculation and loading and ensure the weather is suitable for a test flight and that the test area and its altitude limits are reviewed so that the test flight can be conducted with minimal distractions.
Employee Wellness

The purpose of an occupational and environmental health awareness program is to protect and promote employee Health and Safety within the workplace.

NEXUS’ biggest asset is its workforce and a healthy workforce can contribute to the rapid growth of the company; while on the other hand illness and lack of exercise can severely reduce productivity.

Because Safety is the cornerstone of NEXUS, we are committed to the well-being of all our valued employees. NEXUS offers all employees health insurance plans through various healthcare providers across the globe.

Recently, NEXUS employees in Jeddah were offered the opportunity to voluntarily have their Blood Glucose and Blood Pressure Levels checked. These checks were conducted in the Jeddah office during working hours and we expect to broaden the tests to include height, weight, and Body Mass Index (BMI).

In the long term, we would like to develop a unique new approach to workplace healthcare monitoring, using IT systems to monitor health and well-being, which we hope will result in less sick-leave, and more productivity per employee.

NEXUS believes that a proactive and preventive approach is the most efficient way to ensure that our employees’ overall well-being is maintained and all our employees around the world enjoy Good Health and Happiness.