



AIRCRAFT ACCIDENT REPORT

PICOMSS/07/05/2012/F

Accident Investigation Bureau

**Report on the Serious Incident involving
Presidential Implementation Committee on
Maritime Safety and Security (PICOMSS) with
Registration 5N-BKS at Benin Airport Edo
State Nigeria on 5th July, 2012**



This Report is produced by the Accident Investigation Bureau (AIB), Murtala Muhammed International Airport, Ikeja, Lagos.

The Report is based upon the investigation carried out by Accident Investigation Bureau, in accordance with Annex 13 to the Convention on International Civil Aviation, Nigerian Civil Aviation Act 2006, and Civil Aviation (Investigation of Air Accidents and Incidents) Regulations.

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Recommendations in this report are addressed to the regulatory Authorities of the state (NCAA). It is for this authority to ensure enforcement.

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

A & C	Airframe & Engines (A type of Aircraft Maintenance Engineers' Licence)
AIB	Accident Investigation Bureau
AMO	Approved Maintenance Organisation
ATC	Air Traffic Controller
ATO	Approved Training Organisation
CPL	Commercial Pilot Licence
CRM	Crew Resource Management
FAAN	Federal Airport Authority of Nigeria
FM	Flight Manual
ILS	Instrument Landing System
MIPM	Maintenance Inspection Program Manual
NAF	Nigerian Air Force
NAMA	Nigeria Airspace Management Agency
NCAA	Nigerian Civil Aviation Authority
Nig.CAR	Nigerian Civil Aviation Regulation
NDB	Non Directional Beacon
NIMET	Nigerian Meteorological Agency
NM	Nautical Miles
NOTAM	Notice to Air Men



PIC	Pilot-in-Command
PICOMSS	Presidential Implementation Committee on Maritime Safety and Security
PF	Pilot Flying
PM	Pilot Monitoring
QNH	Altimeter Setting That Causes Altimeter To Indicate Altitude Above Sea Level
SOP	Standard Operating Procedure
TSN	Time Since New
TSO	Time Since Overhaul
UTC	Universal Time Coordinated

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Aircraft Accident Report No.	PICOMSS/07/05/2012/F
Name of Operator:	Federal Government of Nigeria. Presidential Implementation Committee On Maritime Safety and Security (PICOMSS)
Aircraft Type and Model:	Diamond DA-42
Registration:	5N-BKS
Location:	Benin airport, Edo State. N 06°.19'.0; E 005°.37'.0 Elevation 258ft
Date and Time:	5 th July, 2012 @ about 1059hrs. <i>All times in this report are local time (Equivalent to UTC+1) unless otherwise stated.</i>

SYNOPSIS

The Accident Investigation Bureau (AIB) was notified of the serious incident at about 1200hrs on 5th July, 2012. Investigators were dispatched to the crash site same day. All relevant authorities were notified.

The aircraft departed Benin airport for a low level range navigation south of the airfield with two crew members on board and was airborne at 1002hrs with endurance of 04hrs. At about 10NM the crew was asked to confirm whether they wanted to maintain Benin frequency or go to Osubi frequency, the crew replied that they will remain with Benin and was advised to report 'ops normal' at 1020hrs. The crew reported 'ops normal' and requested rejoining for some touch and go. After the fourth touch and go at 1054hrs, the crew called Benin at 1058hrs for a full stop landing.



The crew stated that during the final approach for a full stop landing in a glide approach exercise, they were preoccupied with the procedures and failed to recognize and heed landing gear warning. However, as they made last minute attempt to select the gear down it was too late for the gear to lock down before the aircraft touched down. The aircraft touched down with the gears in transit and the gears collapsed under the weight of the aircraft.

The aircraft first point of touchdown was at about 3,609ft (1,100m) from the threshold of runway 05. The aircraft belly rolled for another 656ft (200m) before veering-off the runway into the grass area.

The Federal Airports Authority of Nigeria (FAAN) and the Nigerian Air Force (NAF) Fire Services responded immediately by sending their Rapid Response Vehicles to the crash site, in readiness to combat any fire outbreak.

The investigation identified the following:

Causal Factor:

The decision of the crew to continue the glide approach despite repeated landing gear warnings with the power lever below 25% rather than initiating a Go-around.

Contributory Factors:

- The failure of the crew to recognize the landing gear warnings.
- No Standard Operating Procedure/Training Policy in place.
- The crew low hours and experience, coupled with the rostering of two pilots with same capability on a training flight.
- Lack of Crew Resource Management (CRM) training.

Two safety recommendations were made.



1.0 FACTUAL INFORMATION

1.1 History of the Flight

5N-BKS, DA-42 aircraft requested for an engine start for low level Range navigation south of the airfield. Startup was granted with two crew members on board and was airborne at 1002hrs with endurance of four hours. At about 10NM, the crew was asked to confirm whether they want to maintain Benin frequency or go to Osubi frequency. The crew replied that they will remain with Benin and was advised to report 'ops normal' at 1020hrs.

At 1024hrs, the crew reported checking 'ops normal' and requested rejoining for some touch and go. The aircraft was cleared for the first touch and go on runway 05 at 1033hrs. After the fourth touch and go at 1054hrs, the crew called Benin at 1058hrs for a full stop landing.

The crew stated that during the final approach for a full stop landing in a glide approach exercise, they were preoccupied with the procedures and failed to recognize and heed landing gear warning. However, as they made last minute attempt to select the gear down it was too late for the gear to lock down before the aircraft touched down. The aircraft touched down with the gears in transit and the gears collapsed under the weight of the aircraft.

The aircraft touchdown point was about 3,609 feet (1,100m) from the threshold of runway 05. The aircraft belly rolled for another 656 feet (200m) before it veered-off the runway into the grass area.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor/None	2	0	

1.3 Damage to Aircraft

The aircraft was substantially damaged. See Figures 1.3a and 1.3b.



Figure 1.3a Aircraft Final Place of Rest



Figure 1.3b Aircraft Final Place of Rest

1.4 Other Damage

One runway edge light was damaged.

1.5 Personnel Information

1.5.1 Pilot Flying

Nationality:	Nigerian
Age:	46 years
Licence:	CPL 5145
Aircraft ratings:	DA-42, B300
Instrument Rating validity:	28th February, 2013
Proficiency Check:	1st March, 2012
Medical:	8th September, 2012
Total flying Experience:	500hrs



On type:	102:55hrs
Last 90 days:	31:55hrs
Last 28 days:	10:25hrs
Last 24 hrs:	01:30hrs

The total flying experience of the pilot is 500 hrs, 102:55hrs on type and 110:05hrs as Pilot-In-Command (PIC).

1.5.2 Pilot Monitoring

Nationality:	Nigerian
Age:	43 years
Licence:	CPL 5144
Aircraft Rating:	DA-42
Instrument Rating validity:	24th May, 2014
Proficiency check:	16th May, 2012
Medical:	05th September, 2012
Total flying Experience:	778hrs
On type:	309:15hrs
Last 90 days:	09:05hrs
Last 28 days:	07:00hrs
Last 24 hrs:	01:30hrs

The total flying experience of the pilot is 778hrs, 309:15hrs on type and 187:15hrs as Pilot-In-Command (PIC).



1.6 Aircraft Information

1.6.1 General Information

Aircraft Type:	Diamond DA-42
Manufacturer:	Diamond Aircraft Industries
Year of Manufacture:	2007
Serial Number:	42-247
Total Airframe time:	312:58hrs
Certificate of Airworthiness Validity:	27th May, 2013
Category:	Private
Certificate of Registration:	Issued 19th June, 2009
Insurance Validity:	29th April, 2013

1.6.2 Power Plant

Engine Type:	TAE 125-02 Centurion 2.0
Manufacturer:	Thielert Aircraft Engines Germany

These engines are piston engines and could use either Jet A1 or Diesel as fuel.

No. 1

Total Time Since New Cycles	312:58hrs Not Available
--------------------------------	----------------------------

No. 2

Total Time Since New Cycles	312:58hrs Not Available
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1.6.3 Propellers

Type: MTV- Propeller

No.1

Serial/Construction No	080375
TSN	Not Available
TSO	Not Available

The propeller was changed on the 22nd May, 2012. There was no record of any flight after the change except the incident flight.

No.2

Serial/Construction No	04328
TSN	317:02 hrs
TSO	05:20 hrs

Type of Fuel: Jet A1

1.7 Meteorological Information

Time	0830 UTC
Wind	CALM
Visibility	3900m
Weather	DUST HAZE
Cloud	BKN 240m
Temp.	24 ⁰ C
QNH	1015 hPa



Time	0900 UTC
Wind	CALM
Visibility	5000m
Weather	SLIGHT DUST HAZE
Cloud	SCT 270m
Temp.	25 ⁰ C
QNH	1015 hPa

Time	1000 UTC
Wind	290/06
Visibility	6km
Weather	Nil
Cloud	BKN 300m
Temp.	25 ⁰ C
QNH	1015 hPa

1.8 Aids to Navigation

The Instrument Landing System (ILS) and Non Directional Beacon (NDB) were unserviceable. However, the VOR/DME was serviceable on the day of the incident. The ILS has been NOTAM for a long time.

1.9 Communications

There was good communication between the crew and the Tower.



1.10 Aerodrome Information

Benin Airport is Government owned, is neither licensed nor certified by the appropriate authority. It has an elevation of 258ft and a single bi-directional runway 05/23 that is 7,874ft (2,400m) long. The NDB and ILS were unserviceable at the time of the incident. The aerodrome co-ordinates are N 06⁰. 19'.0; E 005⁰. 37'0.

1.11 Flight Recorders

The aircraft was not fitted with Flight Recorders neither was it required by Regulations.

1.12 Wreckage and Impact Information

The aircraft wreckage was in one place since the damage was limited to the propeller and the collapsed undercarriage.

1.13 Medical and Pathological Information

Nil.

1.14 Fire

There was no fire outbreak. However, FAAN and NAF Fire Services were promptly at the crash site.

1.15 Survival Aspects

The crash was survivable since there was a livable volume available to the crew as the cockpit section was intact. The crew exited the aircraft without injuries. The seat-belt attachments were intact without any damage.



1.16 Tests and Research

Not Applicable.

1.17 Organizational and Management Information

The Organization involved in the operation and administration of this aircraft does not have any written procedure or policy of how the aircraft is to be flown. The National Security Adviser (Owner of the aircraft) or the Presidential Implementation Committee on Maritime Safety and Security (Operator) does not have their own operations policy or procedures.

Nigeria Air Force who provided the operational support with their pilots did not also provide the pilots with any Standard Operating Procedures. The pilots depended on the Airplane Flight Manuals for their day-to-day operations. The Airplane Flight Manual for DA-42 was approved by Austro Control GmbH on 25th October 2005 (the crashed aircraft was built in 2007) but no approval from NCAA. There was no NCAA approval page for Diamond DA-42 Maintenance Inspection Program Manual (MIPM) provided by the operator. The manufacturer's Aircraft Flight Manual (AFM) provides a checklist for landing gear unsafe warning as stated in Appendix A.

1.17.2 Nigeria Civil Aviation Authority (NCAA)

NCAA is charged with Certification, Registration, and Oversight among many other duties of the Authority. The aircraft was dully registered and certified by NCAA for private category operations. NCAA issued a Certificate of Airworthiness No. 1316 "in pursuant to the Convention on International Civil Aviation dated 7th December, 1944 and the Civil Aviation Act. 2006 and the Order and Nigeria Civil Aviation Regulations 2009 (Nig.CARs) issued there under, in respect of the above-mentioned aircraft, which is considered to be airworthy when equipped, maintained and operated in accordance with the foregoing and the pertinent operating limitations. A Flight Manual forms part of this Certificate".



Nig.CARs 11.6.1.4--(a) No pilot may conduct television and movie operations unless he or she has:

- (1) A commercial license with ratings appropriate to the category and class of aircraft to be used under the terms of this waiver.
- (2) At least 500 hours as PIC.
- (3) A minimum of 100 hours in the category and class of aircraft to be used.
- (4) A minimum of five hours in the make and model aircraft to be used under the waiver.
- (5) If the pilot intend to perform aerobatics below 1,500 AGL, a statement of Aerobatics Competency for the operations to be performed.

1.17.3 Nigeria Airspace Management Agency (NAMA)

NAMA provided the Air Traffic Services at the airport, there was good communications between the pilot and the Tower. The aircraft was dully cleared for the approach and the Tower maintained a constant radio contact with the aircraft until it crashed.

1.18 Additional Information

The Licensed Engineers attached to the fleet denied any knowledge of the accident flight, being done for the purpose of testing the work done on 28th June 2012.

Inspection after the crash indicated that both the normal landing gear handle and the emergency landing gear lever were deployed. There was no avionic licence holder among the Engineers charged with the day-to-day administration of the maintenance of the aircraft.



The Maintenance Inspection Program Manual (MIPM) and the Airplane Flight Manual (FM) were provided for AIB by the operator.

Both pilots confirmed that they were practicing a glide approach. There was no training policy in place or any Standard Operating Procedure (SOP) in place as at the time of the incident.

Flying Schools have started using Diamond Aircraft for pilot training in Nigeria. Aviation School Ilorin use DA-42 in their Flight Training

The crew has never done any CRM before.

There was no Safety Officer in the administration of the fleet.

The two pilots had almost the same experience. The training pilot is the junior of the two in rank but more experienced on the aircraft with 300 hrs on type. He had earlier lost his seniority. The pilot flying had only 102 hrs on type and was in command of the flight, as well as in charge of the unit.

FLIGHT CREW certification is for Minimum crew: 1 (one person)

The pilots were military personnel, flying civil registered aircraft with NCAA civil licences. In the course of this investigation, it was observed that rank/seniority in the cockpit was more emphasized than competence in operation.

Maintenance Engineers responsible for the maintenance however, did not have appropriate rating. The aircraft has a glass cockpit that requires appropriately licenced avionics engineers and maintenance support.

1.19 Useful or Effective Investigation Techniques

Nil.



2.0 ANALYSIS

2.1 Operator/ Owner

The aircraft belong to the Federal Government of Nigeria National Security Adviser Office, The Presidency, Abuja, Nigeria. The registered Operator is Presidential Implementation Committee on Maritime Safety and Security (PICOMSS). There was no record of any published policy/standard operating procedure from either the owner or the operator. However, the operator used the services of the Nigerian Air Force pilots and maintenance personnel for the day-to-day operation of the aircraft.

2.2 The Pilots and the Operations

The pilot flying (PF) was type rated to fly the aircraft. He had total flying experience of 500hrs, out of which 102:55hrs was on type and 61:35hrs as PIC on type. His Licence number is CPL 5145 and he was in-charge of the unit. He is a Group Captain in the Nigerian Air Force (NAF) which runs a regimented and highly disciplined system.

The pilot monitoring (PM) on the other hand had a total of 778hrs flying experience, 309hrs on type and 116hrs as PIC on type. At the time of the incident, he was an instructor on the aircraft. He lost his seniority at one time and was a Wing Commander in NAF. His licence number is CPL 5144.

Both pilots never had Crew Resource Management (CRM) training before the incident; this would have helped them to make their operation safer. This is a human resource specialized training that helps pilots and dispatchers to better manage their operations and enhance safety.

With reference to the profile of the two pilots, one can deduce that the pilot monitoring was the most experienced of the two. However, he was junior in rank and had to take orders from the Group Captain, having lost his seniority. Both pilots belong to a highly disciplined and regimented organization, where ranks are not compromised. The fact



that at one time these pilots were mates before one lost his seniority could lead to unhealthy rivalry and unsafe operating environment.

When flying a civil registered aircraft, competency should be the yard stick for leadership but this was not the case in this incident. This is a latent factor that should be changed to allow for professionalism and reduce the risk of accidents/incidents on the flight line. The system currently in use should be improved and efforts made to provide a Standard Operating Procedures and training policy that will guide all operations personnel.

The incident during "THE GLIDE APPROACH" could have been avoided if there was a published procedure. The use of a checklist would have helped the crew to know that the Landing gear was yet to be extended. The crew were concentrating on the approach since there was nothing published to help them, couple with the fact that they were low in experience on type and on flying.

Touch and Go is a specialized training that teaches pilot on how to abort any type of approach at any time on the approach regime. It is taught in a well established system, with published policy and Standard Operating Procedures (SOPs). These policy and SOPs outline what the PF and PM should do at every stage of the Touch and Go and which checklist to use. It is a specialized program that requires a compressed checklist for take-off and landing in less than 5 minutes. During this exercise, pilots are usually very busy and the policy/SOP recommends absolute cockpit silence (sterile cockpit) for the complete duration of the exercise.

The policy/SOP also emphasizes the authority of the instructor as to when he/she can take over control of the aircraft by announcing "I HAVE CONTROL". All these should be done with an experienced pilot instructor on board. The SOP will clearly state the individual roles as regards training and qualification of any pilot who is authorized to perform these specialized types of training.



2.3 Maintenance Engineers

The Licensed Engineers attached to the fleet denied any knowledge of the incident flight, being done for the purpose of testing the work done on 28th June 2012.

These Engineers reported that they were hardly aware of what the pilots do with the aircraft, but were usually called to release the aircraft for flights; an order they cannot refuse because of the regimented structure of the NAF system. The engineers further reported that the former head of the unit who was a Group Captain usually carried them along before he was sent to the War College unlike the new head who did things differently; a development they were not happy with.

The pilots took the aircraft on a flight purportedly to carry out a test flight on a maintenance job carried out a week earlier but instead performed a training flight which led to the crash. The evidence available to AIB was that the crew called for start-up and requested for a low level range navigation south of the field.

There were no licenced engineers with the appropriate rating in avionics to maintain and service the aircraft. However, since the unit was relatively new, the A & C and electrical engineers were covering that aspect of the maintenance. The aircraft is a high-tech aircraft with glass cockpit that requires robust avionics maintenance to enhance effective and safe operation of the aircraft.

2.4 Training and Experience

The training experience of the instructor was inadequate. There was no formal training procedure in place at the time of the incident; the head of the section was entirely responsible for flight operations in addition to his official assignment. The two pilots fly on either side as PF and PM, but only the instructor pilot was endorsed to fly from both sides. However, instructor's rating does not mean that you can train without the required experience on type or without a training policy/Standard Operating Procedures



in place. The pilot with instructor's endorsement had a total of 309hrs on type, 09hrs and 07hrs respectively in the last 90 and 28days. The pilot flying had a total of 500hrs with 102.5hrs on type, 31.55hrs in the last 90 days and 10 hrs in the last 28 days but had no instructors' endorsement.

It was evident that their flight schedules were not robust and frequent enough and as such needed to draw a training program that will enhance their experience and increase their productivity. The operator should draw up a plan that involves an experienced instructor to train the pilots at regular intervals that will not make them rusty and also give them the hours and experience required to operate and train on their own.

International Aviation College (IAC) Ilorin operates Diamond DA-40 and DA-42 for its training purposes. IAC also has appropriately licenced and rated Flying Instructors and Maintenance Engineers on these aircraft. AIB is of the view that the Nigerian Air Force (NAF) can benefit immensely from the training capability of the College by attaching its crew members and engineers to it in addition to having an MOU in place.

2.5 Landing Gear

The landing gear system on DA-42 is fitted with warnings that alert the crew when landing is initiated with the gear up when the aircraft is in a landing configuration. The gears' unsafe warning light (red) illuminates on the instrument panel if the landing gear is neither in the up nor in the down & locked position. Illumination of this light is therefore normal during transit.

Audible warning alerts GEAR RETRACTED CHIME TONE (repeating) if the landing gear is retracted while the flaps move into position LDG or when the power lever is placed in a position below 25%.



The landing gear was not extended, hence the landing gear unsafe warning light did not illuminate. However, the audible alerts GEAR RETRACTED CHIME TONE came on repeatedly without any of the crew recognizing it.

The landing gear handle and the emergency landing gear were deployed. There are conditions to be met before emergency landing gear can be deployed, more so that the deployment was done when the aircraft had already crashed. The emergency landing gear is slower than the normal landing gear extension process. The extension of the emergency landing gear brought to the fore the pilot's lack of knowledge of the landing gear system.

The crew confirmed that during the final approach for a full stop landing, as they were on a glide approach with the power lever at idle and delayed selection of the landing gear in steep angle of descent; they were pre-occupied with the procedure and failed to hear the landing gear warnings. According to the crew, they made a last minute attempt to extend the gears, but it was too late to lock the gears down before touchdown. The aircraft landed on the retracted unlocked gears, and belly rolled and skidded off the runway.

2.6 Nigerian Civil Aviation Authority (NCAA)

The aircraft certificate of airworthiness was valid as at the time of the incident. From the evidence available to AIB, the Flight Operations Manual which forms part of this certification did not have NCAA approval page. The NCAA oversight on the operator was inadequate.

The pilots were not trained to operate the cameras and videos used on the aircraft. Nig.CARs 11.6.1.4 stipulates a minimum of 500hrs to act as PIC and a minimum of 100hrs in the category and class of aircraft to be used. However, the PF on this aircraft had 110:05hrs and the PM had 187:15hrs as PIC respectively. The pilots were low in experience and yet one of them was instructor rated. There was no evidence of initial



CRM training in the records submitted to AIB and in the NCAA personnel file. CRM training should not be limited to AOC holders alone. Private Category Operators should be encouraged to make CRM training mandatory.

The crew were military personnel, however they were operating a civil registered aircraft with NCAA licences, hence the need for a proper Civil Aviation oversight. Competency should be emphasized to enhance professionalism and improve safety. Rank/Seniority in the cockpit should be de-emphasized, especially where the junior is the more experienced and not the captain or pilot flying of a civil registered aircraft.



3.0 CONCLUSIONS

3.1 Findings

1. The two pilots were Nigerians and Nigerian Air Force personnel.
2. The pilots were certified to fly the aircraft.
3. The PF and PM had 110:05hrs and 187:15hrs respectively as PIC.
4. The aircraft was manufactured in 2007 with total airframe hours of 312:58
5. The aircraft is owned by the Federal Government of Nigeria with civil registration, operated by Presidential Implementation Committee on Maritime Safety and Security (PICOMSS) and flown by the Nigerian Air Force pilots with civil licences.
6. The aircraft touched down 3,609ft into runway 05.
7. The aircraft crash landed on its belly and veered off the runway.
8. There was no outbreak of fire.
9. The aircraft destroyed one runway edge light.
10. There were no records of any deferred defects.
11. Both pilots confirmed that they were practicing a glide approach exercise.
12. The crash alarm bell in the mobile tower was unserviceable at the time of the crash.
13. FAAN Fire watch-room was contacted by NAMA through the radio.



14. The Maintenance Engineers were not aware of the training flight.
15. The crew had no initial CRM training neither was it required by law.
16. There was no documented training policy or Standard Operating Procedures (SOP) in place at the time of the incident.
17. The Emergency Landing Gear Lever was found deployed when the aircraft had already crashed.
18. The fire services from both the Federal Airports Authority of Nigeria and the Nigerian Air Force arrived the crash scene promptly.
19. The aircraft was removed from the crash site before the arrival of the Air Safety Investigators.

3.2 Causal Factor

The decision of the crew to continue the glide approach despite repeated landing gear warnings with the power lever below 25% rather than initiating a Go-around.

3.3 Contributory Factors

- The failure of the crew to recognize the landing gear warnings.
- No Standard Operating Procedure/Training Policy in place.
- The crew low hours and experience, coupled with the rostering of two pilots with same capability on a training flight.
- Lack of Crew Resource Management (CRM) training.



4.0 SAFETY RECOMMENDATIONS

4.1 Safety Recommendation 2014-014

NCAA should ensure that all hi-tech aircraft essentially with 'glass cockpit' in special operations e.g. surveillance, aerial mapping etc. but operated on Private Category be attached to ATO/AMO for training and maintenance support to sustain safe operation.

4.2 Safety Recommendation 2014-015

NCAA must ensure that the Nigerian Air Force should militarily de-rank the cockpit of its civil registered operated aircraft and adopt the protocol of civil aviation command structure to improve control, safety and professionalism.

SAFETY ACTION

The manufacturer did not have any objections on this report. Meanwhile Diamond issued a Mandatory Service Bulletin 42-003/16 which contains MAM 42-828. With that there is an acoustic warning: "Gear Warning" -//: Check Gear://.

This gives a DA42 Gear Warning scenario:

1. Sound chime
2. Warning on Garmin 1000
3. Acoustic Warning via Intercom.

The most important feature is that the warning now will also sound in the headphones via Intercom, therefore it should not be "overhead" anymore. This is especially important when using Noise Cancelling Headphones".



APPENDICES

Appendix A

Landing Gear Unsafe Warning

The manufacturer's Aircraft Flight Manual (AFM) provides a checklist for landing gear unsafe warning as follows:

The landing gear unsafe warning light illuminates if the landing gear is neither in the final up or down & locked position. Illumination of this light is therefore normal during transit.

If the light remains on for longer than 20 seconds during landing gear retraction / extension:

1. Airspeed check below VLOR 156 KIAS

2. Gear selectorre-cycle if continued illumination occurs

If the landing gear cannot be extended to the down & locked position or red light does not extinguish:

- Continue with 3.6.2 - MANUAL EXTENSION OF THE LANDING GEAR.

Emergency Procedures DA 42 AFM

Page 3 - 42 Rev. 6 30-Apr-2011 Doc. No. 7.01.05-e

NOTE

If the landing gear cannot be retracted to the final up position you may continue the flight with the landing gear extended in the down & locked position. Consider for higher aerodynamic drag, resulting in degraded flight performance, increased fuel consumption and decreased range. With the landing gear extended and at aft CG-locations, with flaps up and full power applied, the aircraft will easily recover from sideslip if the trim is set to neutral (normal procedure). Otherwise it may require corrective action with a



moderate amount of rudder input. In cold ambient temperatures it may help to reduce the airspeed below 110 KIAS for landing gear operation.

End of Checklist

Go Around

- 1. POWER lever MAX*
- 2. Airspeed min. 82 KIAS*
- 3. FLAPS position APP When a positive rate of climb is established:*
- 4. Landing gearUP, check unsafe light off*
- 5. FLAPS retract, position UP*

End of Checklist

Landing Gear

The landing gear is a fully retractable, hydraulically operated, tricycle landing gear. Struts for the landing gear are air oil assemblies.

The hydraulic pressure for the landing gear operation is provided by an electrically powered hydraulic pump, which is activated by a pressure switch, when the required pressure is too low. Electrically actuated hydraulic valves, which are operated with the gear selector switch, provide the required hydraulic pressure for the movement of the landing gear. The gear selector switch is located on the instrument panel. The switch must be pulled out before it is moved to UP or DOWN position. Gear extension normally takes 6-10 seconds. When the landing gear is retracted, the main wheels retract inboard into the center wing and the nose wheel retracts forward into the nose section. Hydraulic pressure on the actuators keeps the landing gear in the retracted position. A pressurized gas container acts as an accumulator which keeps the system pressure constant by replacing the volume lost due to the normal actuator leakages. This prevents a permanent starting of the hydraulic pump in flight. Springs assist the hydraulic system in gear extension and locking the gear in the down position. After the



gears are down and the down-lock hooks engage, springs maintain force on each hook to keep it locked until it is released by hydraulic pressure.

The three green lights directly next to the landing gear operating switch illuminate to indicate that each gear is in the correct position and locked. If the gear is in neither the full up nor the full down position, a red warning light on the instrument panel illuminates. Should one power lever be placed in a position below 25% while the landing gear is retracted, a warning horn sounds to alert the pilot that the gear is retracted. If installed a CHECK GEAR caution is indicated on the PFD additionally. The same warning appears if the flaps move into position LDG (fully extended) while the gear is retracted.

To test the gear warning system (refer to 4A.6.1 - PRE-FLIGHT INSPECTION) push the test button close by the gear selector switch. The aural gear alert should appear.

CAUTION

If the aural alert does not appear, an unscheduled maintenance is necessary.

To prevent inadvertent gear retraction on ground, an electric squat switch prevents the hydraulic valve from switching if the master switch is on and the gear extension switch is placed in the UP position.

After take-off, the gear should be retracted before an airspeed of 156 KIAS is exceeded.

Audible Warning Alerts

Warning Alerts Meaning/Cause

Landing Gear Retracted

A warning chime tone which repeats without delay is active when the landing gear is retracted while the flaps move into the LDG position or when the POWER lever is placed in a position below 25 %.