COMMENTS ON DRAFT REPORT "DURING TAXI-IN FOKKER 70 LOST ALL BRAKING PRESSURE".

Involved party	Chapter/ paragraph	Page.	Line	To be corrected (first … last word)	Argument / line of reasoning	Response Dutch Safety Board
CAA Netherlands	Summary	5	16	… partly switched from ground mode to flight mode…	Het is of ground of flight mode, waarschijnlijk wordt hier bedoeld dat een aantal van de PSEU sensoren in ground mode staan en de andere in flight mode	System responses show that some channels came in 'flight' during taxi-in. More investigation and analysis revealed this was not caused by a sensor failure. The word 'partly' has been replaced by a more descriptive condition of the output channels and that two channels have the condition 'flight'.
CAA Netherlands	Summary	6	1	… onboard source…	Op pagina 9 wordt er gesproken over een (bron aan boord) "internal source". Door hier (pagina 6) de term onboard source te introduceren lijkt het ergens anders over te gaan. Bijvoorbeeld passagiers en hun devices, uit het rapport blijkt echter niet dat dat is onderzocht.	Good point. It could either be a passenger device or an aircraft system. If known, it could have been addressed in the report. In the final report, the Safety Board explains that EMI from an internal source could not be further investigated because of practical reasons.
CAA Netherlands	Uitgebreide samenvatting	8		Algemene opmerking	Het is onduidelijk of de Fokker 70 beschikt over een "parking break" dan wel handrem of iets dergelijks wat een optie zou zijn geweest om wel te kunnen stoppen. Mogelijk ontbreekt dit systeem of wordt het geactiveerd door te remmen op beide pedalen.	The Fokker F70 has a parking brake (PB), see appendix A. However, also the PB needs brake pressure and it is activated by applying the brake pedals. Hence, it was not an option to solve the problem. That explains that Dutch Safety Board decided not to change the text.
CAA Netherlands	Uitgebreide Samenvatting	9	22	… praktische beperkingen…	Onduidelijk is wat hier mee wordt bedoeld.	A footnote has been added for further explanation.
CAA Netherlands	Uitgebreide Samenvatting	9	29 - 31	*Algemene opmerking*	Mogelijk dat dit probleem al eerder aan het licht was gekomen als er een Safety Management Systeem (conform ICAO Annex 19 editie 2, 33.2.1 c en d (dezelfde eis bestaat in editie 1 van Annex 19 die ten tijde van het voorval van kracht was) verplicht zou zijn voor onderhoudsbedrijven/fabrikant. Tot op heden heeft EASA deze verplichting niet overgenomen, kan ons inziens een aanbeveling worden. Zie ook pagina 10 regel 18 en verder: Het ontbreken van een sms maakt dit mogelijk.	For operators PSEU failures were a reliability issue in the first place. And not all failures resulted into a (serious) incident. Since the complains could often not be reproduced and the PSEU passed tests to regain airworthiness, it is not clear to the Safety Board whether a safety management system would be a solution. Because the direct cause was not found, the Dutch Safety Board has not produced recommendations. Likewise as the above.
CAA Netherlands		9	40	Informatie van de certificaathouder…	Wordt hier verwezen naar het voorval op pagina 30 en andere die niet genoemd noemen (het woord vliegtuigen wordt gebruikt, dus er zijn waarschijnlijk meer voorvallen).	A reference to page 30 is made indeed to list examples of a ground modes during flights.
CAA Netherlands		9	43-45		Onduidelijk is waarom deze conclusie in de samenvatting wordt opgenomen zonder onderbouwing. Uit de feiten blijkt dat dit niet het geval was.. Onduidelijk is wat er met "de vlucht" wordt bedoeld.	A footer in the summary has been added referring to the report. The text has been changed to better clarify this.

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CAA Netherlands	History of Flight	18	11-12	When … changes	Onduidelijke zin, met name het woord 'reluctance' in dit verband.	This word is literally taken from the Component Maintenance Manual (CMM) of the PSEU manufacturer.
CAA Netherlands	History of Flight	19	30	…both thrust reversers…	Er stond toch een motor al uit Verder is de zin erg onduidelijk. Wat wordt er bedoeld? Waren beide thrust reversers nog deployed (dus geactiveerd)? Hebben (of hadden) de piloten dit ook als rem gebruikt/ kunnen gebruiken?	Correct. Data show both thrust reversers were activated. Since normal braking action was lacking, the First Officer wanted to brake by using thrust reversers. In (flight) idle its effect is limited, in particular with one engine running. In Analysis 2.2 a sentence is added to address the use of the thrust reverser.
CAA Netherlands	History of Flight	23	31-32	The event …. 2015	Onduidelijk is waarom de melding niet eerder werd gemeld? Is dat onderzocht?	It was not before 5 days after the event when the operator realised it had to report the serious incident to the Safety Board immediately. This was not part of the investigation.
CAA Netherlands	History of Flight	25	34-35	The sensor …. Requirements.	Hebben jullie onderzocht of bij eerdere onderhoud ook het part en serial number is gechecked en vastgelegd?	No, that was not part of the immediate focus of the investigation. Though it was not efficient to lack this information, during the progress of investigation it also appeared to be less relevant.
CAA Netherlands	History of Flight	26	1-2		Waar uit blijkt dat de sensor zonder part en serial number wel op het vliegtuig goed functioneerde als voorgenoemde tests deviations vertonen? (zie pagina 25, regel 37 en verder) Hebben we hier te maken met een bogus part??	In essence the problem was the simultaneous switching into 'flight' of two independent channels. Minor deviations of one sensor cannot explain this, since also one 'good' sensor switched into flight. In analysis 2.4 an extra sentence has been added to emphasise this. Moreover, it was not confirmed that the sensor with the missing s/n and p/n was installed on one of the switching channels. It was not investigated whether it was a bogus part, because it did not appear to be the essence.
CAA Netherlands	History of Flight	27	12-14	The investigation team …	Is de EMI testing niet een certificatie eis?	To resist EMI usually is part of the certification.
CAA Netherlands	History of Flight	29		Figuur 5	De figuur geeft informatie over januari – juli 2015, alhoewel de titel bij de figuur suggereert dat er tot en met 2017 informatie in de figuur staat.	It is about information from 2015 – 2017. A sentence has been added to make this more clear.
CAA Netherlands	History of Flight	30	34-35	Some…. zero	Laatste zin is onduidelijk.	It is unclear what the author of this comment does not understand.
CAA Netherlands	Analyse	37	45-55	However ,…. water	Waarom wordt er dan een link gelegd met het eerder genoemde voorval, zie pagina 30. Wat is de relevantie van het noemen van dat voorval?	Leaking water into avionics equipment can cause unpredictable failures. The day prior to the event the water system of the aircraft had been modified. The text in analysis 2.6 has been adapted.
CAA Netherlands	Conclusies	39	34 - 35	The repetitieve … level.	Cont. Airworthiness is ook verantwoordelijkheid van de fabrikant, goede reden om Annex 19 vanuit EASA in te voeren.	Dutch Safety Board has not produced recommendations, but the involved parties may learn from this investigation report conclusions, as indicated in chapter 4.

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CAA Netherlands	Appendix C	43	3 en verder		Waarom heeft het zo lang geduurd (4 jaar)? Er is een verklaring gegeven tot oktober 2015 (MH-17), maar niet voor de periode daarna? Zijn er tussentijdse maatregelen of AD's door Fokker of the PSEU fabrikant uitgegeven?	The net investigation time was not augmented. Investigation capacity and internal priorities affected the completion time. No intermediate measures or AD were issued by authorities or manufacturers.
CAA Netherlands		4	4	5 March 2015, approximately 12.15 UTC	Uit het diagram op bladzijde 13 volgt dat het voorval om 12:02 ten einde was.	Adapted to 12:03 (rounded off) when the braking issue occurred.
CAA Netherlands		9	34	Uiteindelijk bleek een volgende storing niet zonder gevolgen en vond het ongeval met de PH-WXC plaats.	Idem	Amended.
CAA Netherlands		12	19	The crew chose to leave the runway via the next runway exit and the captain called that "lift dumpers are out now". During the interview with the Dutch Safety Board the first officer explained that it was not a normal call.	Het geschetste verloop wijkt af van de voorgeschreven procedure, zoals lijkt te zijn onderkend door de bemanning. Normaal gesproken worden de lift dumpers direct na touch down automatisch geactiveerd. De suggestie wordt gewekt dat dit hier niet het geval is. De afwijking wordt echter niet in het rapport geanalyseerd of beschreven.	The sentence has been deleted since it was no longer relevant.
CAA Netherlands		12	22	When vacating the runway the first officer requested the captain to shut down engine #2 in line with company policy 23 to save fuel.	Voor zo ver bekend is het gangbaar om motor #1 uit te zetten in dergelijke omstandigheden en niet motor #2. Uit andere tekstpassages volgt overigens dat niet motor #2 maar motor #1 is uitgezet. Deze feitelijke onjuistheid vraagt om correctie.	In this case engine #2 was shut down which was not in conflict with the aircraft operating manual (AOM). Dutch Safety Board has no information which could indicate what is valid or not and what the reason should be. At a certain point also engine #1 is shut down as an attempt to stop the aircraft when normal (wheel) braking and reverse thrust appear to be unsuccessful. All engine are out now. The author of this comment is likely confusing two different actions in the time line.
CAA Netherlands		32	26	It is mentioned that the concerned part of the ground-flight system still remained in 'flight' after engine #1 had been shut down.	Zie voorgaande opmerking	See above.
CAA Netherlands		33	9	… the occurrence of flight idle 10 mode of engine #1 during taxi-in confirmed that …	Onduidelijk of motor #1 of motor #2 uitgezet is.	See above.
CAA Netherlands		34	40	However, as engine #1was still operating during taxi, its fuel lever was in the 'OPEN' position preventing a 'flight' mode activation in the unlikely event that the CFDU would have given an un-commanded 'flight' mode input to the PSEU.	Idem	See above.
Fokker Services	Summary	5		From 2012 maintenance history of this unit demonstrated that the difficulty of finding causes of the failures which would have helped in solving the technical problem.	The report does not contain evidence let alone establishment of a probable cause that the previous unit failures had any relation with the behaviour experienced during the incident.	See below under 'Uitgebreide NL-samenvatting' , blz. 9.

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Fokker Services	Summary	6		Still, electromagnetic interference (EMI) from an onboard source cannot be ruled out.	If EMI from an outside source can not be excluded then this may contradict the above conclusion that the incident was caused by the PSEU.	It is unclear whether the author confuses inboard and outboard sources with reference to its 'text to be corrected'. If not, it is unclear to Dutch Safety Board why in view of the author this may contradict. See Dutch Safety Board analysis in the 2.3 and 2.4 in the Final report.
Fokker Services	Uitgebreide NL-samenvatting (extensive Dutch summary)	9	32	Daarbij is het de Onderzoeksraad op basis van shop *finding reports* niet gebleken dat de oorzaak daadwerkelijk was gevonden en opgelost. Uiteindelijk bleek een volgende storing niet zonder gevolgen en vond het ernstige incident met de PH-WXC plaats. De Onderzoeksraad stelt dan ook dat het bij herhaling in gebruik nemen van PSEU 207, zonder dat de oorzaak van de storingen waren gevonden en weggenomen, duidt op het structureel tekort schieten van hiervoor bedoelde veiligheidsvangnetten (veiligheidstekort).	Om deze conclusie te kunnen trekken zou het onderzoek een verband tussen de inadvertent flight indicatie tijdens het incident en de reden voor afkeur van de PSEU moeten vaststellen. Er zit in dit rapport geen nadere onderbouwing. Sterker nog de redenen waarom de PSEU in het verleden afgekeurd was hebben geen relatie met inadvertent air indicatie. Daarnaast kan het natuurlijk ook nog zo zijn dat de PSEU verwisseld is ten gevolge van foutieve troubleshooting. (er zit een intermittent fout in het vliegtuig en de maitenance crew verwisseld de OPSEU uit voorzorg.	Dutch Safety Board included comments from the manufacturer about previous rejections of PSEU 207 by different operators in paragraph 1.7 of the report. In 2.5 Dutch Safety Board analyses why it disagrees with the manufacturer that there could not be a possible commonality between previous failures/complaints and inadvertent air indications. Also the Dutch Summary has been changed accordingly.
Fokker Services	1.1	12		The crew chose to leave the runway via … . ….to shut down engine #2 in line with company policy to save fuel.	AOM Flight Techniques state: To conserve brakes and fuel, one engine may be shut down after flaps, lift dumpers and speed brake are retracted. 'Lift dumper are out now' zou dus juist 'lift dumpers are in/retracted' moeten zijn.	The text was already amended because of other reasons, making this proposed correction unnecessary.
Fokker Services	1.5	19	31	Flight datat showed that both thrust reversers deployed after PH-WXC did not stop upon arriving at its stand.	Thus some sensors indicated on ground while other sensors indicated in flight.	The PSEU may be susceptible for EMI, either from an outboard or inboard source. Chapter 1.5 is factual information. The comment is included in the Analysis chapter 2.2.
Fokker Services	1.5	20	8	Flight data showed that after landing the tail anti-icing switched to off.	Conclusion? Sensor on ground or in air with anti-icing switched off?	Chapter 1.5 is factual information. The comment is generally addressed in the Analysis chapter 2.2 and appendix C (QAR data).
Fokker Services	1.5	20	18	Flight data showed that the lift dumper system was armed and deployed after landing.	Conclusion the sensors were indicating on ground after the landing?	Idem.
Fokker Services	1.6	20	4	Furthermore maintenance reported that a plug[1] between a ground-flight sensor and the PSEU gave interference during measurement and needed to be replaced. No further details were listed in the maintenance documents. Involved engineers explained that during trouble shooting they had seen the brakes 'flipping'	Replacement of the PSEU did not resolve the issue?	As written in the text (to be corrected) no further details were listed.

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Fokker Services	1.7	22	41	In February 2012 PSEU 207 was sent to an overhaul shop by an Austrian operator since it had been removed from an Austrian registered aircraft. According to the Shop Finding Report ground–flight control messages occurred during the take-off producing proximity system inoperative massages on the MFDU and fault codes.	A ground/flight control message is generated when the radio altitude is above 400 ft and the LH or the RH ground flight sensor indicates on ground. Assuming that the aircraft is on ground during the take-off roll it seems to be more radio altitude related than PSEU related. It seems likely that the reporting by the operator may be inaccurate.	During an extra meeting at Fokker Services on 16-05-19 it appeared that no more official maintenance documents existed other than the Shop Visit Reports the Safety Board already had. See also previous Safety Board response under 'Uitgebreide NL-samenvatting', page 9.
Fokker Services	1.9	27	11-13	The investigation team requested the manufacturer background information about how the PSEU is protected against EMI. This information was not received.	Unacceptable that information was not received.	The information had not been gathered under the provisions of Annex 13 for the event with PH-WXC. The text in the report has been changed and it includes the reason why.
Fokker Services	1.11	30	22	During the last 4 years roughly ten ground-flight control fault events have been reported. According to the manufacturer in those instances at least one channel of the MLG ground-flight control system showed a 'ground' mode signal whilst the aircraft was in air (flight).	Relevance?	This is addressed in Analysis 2.7. Though the event with PH-WXC was during ground operation, ground-flight protection is particularly important during flight.
Fokker Services	2.3	33	35-40	Maintenance documentation suggests ….. safety investigation.	The performed troubleshooting prevent a proper safety investigation. There is information that during troubleshooting in the hanger one of the sensors remained in the air position. Replacement of the PSEU did not resolve the problem. After further troubleshooting including the replacement of the sensor the problem was solved.	Dutch Safety Board is not questioning this information, but is not aware of such a finding in any received (maintenance) documentation. This comment suggest the sensor as cause, however, further analyses of the sensors in 2.4 showed a different result. Also, it cannot explain the simultaneous switching of two channels which was crucial for the event.
Fokker Services	2.5	36	32	Based on the Shop Finding Reports multiple complaints were reported since 2012 and in particular since 2014, see 1.7. All complaints seem to be associated with ground – flight control functioning.	However these faults were inadvertent ground indication and not inadvertent flight indication.	See again Dutch Safety Board response under 'Uitgebreide NL-samenvatting'. Additional statistical information has been included for analysis.
Fokker Services	3	39	26-27	However, in total PSEU 207 was involved with five ground–flight control associated events when installed in five different Fokker F70/F100 aircraft worldwide.	Ref. previous comments on the different characteristics of in-flight 'ground' events and on-ground 'flight' condition.	See again Dutch Safety Board response under 'Uitgebreide NL-samenvatting'. Additional statistical information has been included for analysis.
Crane Aerospace	2.7	38	17	Incorrect switching than may also result into a 'ground' mode during flight,	Minor typo –	Since the paragraph has been re-written this sentence disappeared in the final report.
Crane Aerospace	3.0	39	22	Since incorrect independent simultaneous switching of left and right MLG ground-flight control system is extremely remote, it can only be explained by a common system or component associated effect or failure. The PSEU is the only component in common.	Based on the evidence from the investigation, this section currently does not provide an accurate or complete conclusion. Should read," Since simultaneous independent incorrect switching of left and right MLG ground-flight control system is extremely remote, it could possibly be explained by a common system or component associated effects or failures. The PSEU, Flight Operation Relays, and the associated Aircraft Wiring are the components that are in common."	As for the left and right MLG channels, the Board found that none of the mentioned components were in common on the F70 aircraft, except the PSEU. In the Final report the Board brings up a reservation whether the event was typically related to PSEU 207.