

# Attachment 1

Human Performance Factual Report

ERA19FA210

Interview Summaries

## 1.0 Agusta Westland Philadelphia Corporation (AWPC) Flight Crew Interviews

### Interview Summary

Interviewee: Steven J. Labows, Experimental Test Pilot, AgustaWestland Philadelphia Corporation

Representative: William Gaertner, Associate General Counsel, AgustaWestland Philadelphia Corporation

Date, Time: 11/5/2019, 1515

Location: AgustaWestland Training Academy, Philadelphia, PA

Interviewer: Dujan Sevillian, Ph.D. (NTSB), William Bramble, Ph.D. (NTSB)

During the interview, Mr. Labows stated the following:

He was 53 years old. His date of hire was December 31, 2012. His duties and responsibilities as an experimental test pilot for AgustaWestland included flight instruction in support of the training academy, production acceptance demonstration flights, and a range of other activities on the test side. He had also served as a flight safety officer, but he had relinquished that role to another pilot about six months ago. In his test pilot role, he was the lead Philadelphia test pilot for the MH139. He was also a test pilot for the 609 tiltrotor, and he had worked some test activities on the 119 for the U.S. Navy trainer program. He also supported supplemental type certificate flight test activities.

Mr. Labows provide a brief overview of his aviation background he stated that he had been in the U.S. Navy for 25 years. He began flight school in 1989 and went on to fly H46 helicopters operationally. After that he became an instructor in the H46. He transitioned to test pilot school in the mid-1990s and went on to do flight testing on the H46 and H60 at Patuxent River. Subsequently, he was government test director for the H60 program. After that, he was as at the Boeing plant in Ridley Park, where he oversaw defense contracting as part of the defense contracting management agency. Mr. Labows estimated that he had 4,200 total flight hours, of which 2,600 were acquired in the military and 1,500 were acquired at AgustaWestland. He estimated that he had 700 hours in the AW139. He reported to Chief Pilot Pat McKernan at AgustaWestland.

He had provided flight instruction for 2 years in the Navy and 6 years at AgustaWestland. There were 7 flight instructors in Philadelphia. Italy developed the curriculum. There was a simulator training path and an aircraft training path. He and the other instructors in Philadelphia only instructed in the aircraft. He was not involved in updating the flight training curriculum.

Mr. Labows confirmed that he had provided flight instruction to Geoffrey Painter during the period October 2, 2017-November 11, 2017 for course number OS-17-2488. Mr. Labows

was asked why Mr. Painter's training records did not show that he had received any hours in IMC<sup>1</sup> or night flying conditions during AW139 initial flight IFR training. He stated that the curriculum was split into VFR<sup>2</sup> and IFR<sup>3</sup> training. Mr. Painter had received 6 hours of IFR training and 8 hours of VFR training. Mr. Labows was asked if Mr. Painter had received training in actual IMC, he said that was not a requirement, just instrument procedures and maneuvers. He stated that Mr. Painter might have done some training in actual IMC, depending on the weather.

Mr. Labows was asked how he determined that a student had achieved the required standards for a sortie, and he said it was recorded on a maneuvers sheet that had been provide to investigators. Performance was compared to the practical test standards standards using specified tolerances for altitude, airspeed, and bank angle. There was an instructor and student guide for the curriculum. They utilized that to support each maneuver.

He was asked to describe what was reviewed for the 'rapid deceleration', and 'standard/steep turns' items in the Pilots' flight maneuver evaluation, he said being able to maintain altitude throughout the deceleration without climb or descent. For the standard turns it was half standard rate, and steep turns were 30 deg. Instrument maneuvers required maintaining the target altitude +/- 100 feet.

He was asked how he determined if a student had met the mark or needed more assistance on the items in the section titled "Airman's Skill", such as resource management, communication, decisiveness, mental capacity, and situational awareness. He stated that it was a matter of whether he would be confident that they could operate the aircraft on their own or with a crew as their copilot. With these students coming from a single pilot environment that was big emphasis area – using a copilot and using the checklist. The objective was getting them to the point at end of the training where he was confident they could safely operate the aircraft in the intended environment and getting them ready for the designated practical examiner (Mr. Woods) to examine them during the check ride conducted under part 61. All those items pertained to how they were managing the cockpit with all the distractions the instructors were providing, and whether they were using available resources such as checklists.

He was asked whether he talked with the students about how they were using the checklists he said yes. He gave them immediate feedback in flight, and they would discuss what they did well or not so well during the debrief. All those skills came into effect.

He was asked under what circumstances a student would be required to take additional training, he said if there was a specific maneuver they were unable to accomplish due to flying ability, or if they were not using resources during an emergency that was presented to them. He would evaluate whether they were calling for the checklist and complying with required flight and procedural parameters. He would assess their level of situational awareness and confidence. He would determine whether they could maintain safe parameters while executing the mission

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<sup>1</sup> Instrument meteorological conditions

<sup>2</sup> Visual flight rules

<sup>3</sup> Instrument flight rules

and performing the maneuvers. He stated that the nice thing about the AW139 was that it was very stable and there was a lot of available information. There were no memory items in the emergency procedures. They tried to make students confident and not rush.

He was asked what percentage of students in initial flight training had to take additional training, he said he could not provide a number, he would have to ask the academy. They had a wide range of backgrounds coming in, but they were not giving them primary training.

He was asked whether he was familiar with the two accident pilots' recurrent training records, he said that he had not seen them. He had heard some discussion. Asked for details, he said he had heard that they had initially had some challenges in the simulator. They might have needed additional training to take their check rides and pass the training. He said the instructor pilots in Philadelphia did not have access to Whippany training records. Asked if there was communication to him on how well the students progressed through recurrent training, he said no.

The flight training curriculum covered pilot use of the AW139 automated modes. Mr. Labows was asked to describe how the flight instructors taught pilots to transition to auto flight during a takeoff, he said each time they would break out the quick reference handbook checklist for the type of takeoff: normal CAT B or CAT A instrument takeoff. Once they had gone through the checklist, they would go through the takeoff briefing. They would state their intent for the profile to include what automatic modes would be engaged and when. During the takeoff itself, they were not in an engaged mode during the hover and hover check. If they were going to be flying VFR in the pattern, they would also not utilize modes. For instrument training, they flew with and without automatic modes.

Before the takeoff, they would have the student set up any target parameters on the ground – heading and altitude. They set the heading bug on runway heading so that when they engaged HDG mode, it was in the direction they were taking off to maintain a stable climb-out. The other setting would be the desired altitude if they anticipated a level-off for an instrument departure. Those were the two basic autopilot modes they used on takeoff. They would brief the minimum mode use heights. They went over that in the checklist when talking about IFR flight. There was a chart that showed phase 4 and 7 minimum use heights and speeds. They would brief that as part of takeoff. For phase four the minimum was 60 knots for most modes. For ALT mode it was above 150 feet. The minimum speed was reduced for some modes in phase 7. For ALTA – 150 feet was the minimum height. They would not engage that mode until they had exceeded those parameters on the climb-out. The way they would brief was to maintain the takeoff heading, bring gear up at 200 feet, and do after takeoff checks. For a CAT A takeoff, the rotor speed would be at 102%, but during the after takeoff checks they would bring it back to 100%. After that they could potentially engage the upper modes during the climb-out.

For the training he provided, he would set up the takeoff heading, fly out on that heading, and couple up to that heading. Continuing the climb-out he might couple to a NAV mode for lateral control. Upper modes were anything other than the basic ATT HOLD mode. Upper modes

could be HDG HOLD or NAV (FMS<sup>4</sup> coupled or very high omni directional range tactical area navigation (VOR<sup>5</sup> TACAN<sup>6</sup>). Vertical modes for collective were ALT, ALTA, or radar ALT. Other vertical modes in pitch would be airspeed hold.

Mr. Labows was asked if ALTA coupled with indicated airspeed mode, he said yes, ALTA would continue to climb to a preset altitude and speed could be adjusted with cyclic trim. They would use heading hold for the initial heading and then adjust the heading to acquire heading or switch to a nav mode.

He was asked to describe the use of the trim hat switch versus force trim release switch on takeoff. He said one could use the trim hat switch for small adjustments of attitude and the force trim release to get stabilized in hover and for the initial pitch trim adjustments. They would pitch down to start their acceleration, increase power 18% above the hover setting, do the climb-out to the takeoff decision point, land if an engine failed before that point, and fly away if an engine failed after that point. As the climb rate started, they would get to the takeoff safety speed of 50 kts, then bring the nose up 5 degrees and maintain that for climb-out. The pilot would use force trim release to set that initially, then use cyclic trim to fine tune it. Asked if there was any tactile feedback on the cyclic when using the force trim release, he said that there was less pressure on the cyclic.

He was asked if they used diagramming to help students understand the use of the auto flight control system modes, he said they did not use a diagram, but there was a section of ground school that described every mode. Students saw the mechanics and the cockpit primary flight display and multifunction display indications. They had diagrams of the profiles for CAT A and CAT B takeoffs, but those diagrams did not include auto flight modes.

He was asked if he would use the modes differently for a dark night takeoff than for a day takeoff, he said that he would treat a dark night takeoff as an instrument takeoff. The intent of the training was to standardize takeoffs. An instrument takeoff was a CAT A clear area takeoff. He did not want pilots to be doing something different in that case. He wanted them to be flying how they were trained. It would be the same power setting, the same initial pitch, and the after takeoffs would be performed at 200 feet, and they would clean up the cockpit and engage the modes if they were above the minimum height and airspeed. The aircraft did not care if it was dark or not. It would still do all the same stuff to help the pilot.

He was asked how the accident pilots performed compared to pilots of similar experience, he said that they were not the best or the worst he had ever trained. They fell in the median range. He could see their progress throughout the week as they got more comfortable with the aircraft. He had no reservations about recommending them for the check ride at the end

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<sup>4</sup> Flight management system

<sup>5</sup> Very high omni directional range

<sup>6</sup> Tactical area navigation

of that. The two pilots had different backgrounds and strengths. They were within the PTS<sup>7</sup> standards. They were acceptable.

The CAT B takeoff was a standard VFR takeoff. The CAT A takeoff had been developed for offshore operations, and there were various types – such as confined area. If the pilots followed those procedures, they would be guaranteed single engine performance. In training they introduced emergencies as well, such as simulated single engine. For the instrument takeoff they performed a CAT A clear area takeoff. In the takeoff hover, the helicopter was in ATT hold mode. In normal operations both autopilots would be on, and the helicopter would be in ATT hold mode. The autopilots went on before takeoff. They emphasized having the copilot call out power, positive rate and airspeed to support hitting benchmarks on the profile. Asked whether they briefed minimum heights for engaging modes before every takeoff, he said not necessarily. That was something pilots would know after training. If they tried to engage a mode outside of the permitted window it would not engage. If they were in coupled mode and decelerated below 60 knots, the coupled mode would disengage. There was an audible chime that annunciated every time an upper mode engaged or disengaged.

Initial pitch changes during takeoff were 5 degrees down to get to takeoff speed for a CAT A clear area takeoff. They would add 18% to hover power, and once they hit the takeoff decision point and vertical takeoff speed they would pitch to 5 degrees nose up and maintain the engine power setting to achieve the Vy of 80 knots. They expected to see zero bank angle during the CAT A instrument takeoff. They would not need to make a turn for a clear area CAT A takeoff, and they would not want to make any turns during the initial part of the takeoff. He was asked at what point a crew could begin a turn, he said after climbing to 1,000 feet at Vy they could begin a turn. He could not think of why there would be an urgency to begin a turn lower over the water unless there was an obstacle on a published profile, which would not call for a turn below 400 feet. Mr. Labows had been in the Navy and done a lot of dark night takeoffs over water, and he would keep his wings level until he was away from the water. Asked whether they taught students to begin maneuvering at traffic pattern altitude, he said that was what they taught in training. It was a minimum of 500 feet before turning.

Mr. Labows was asked what would happen if both pilots were trying to manipulate the cyclic at the same time, he said whoever was stronger would prevail because the controls were linked. He was asked if they used vision limiting devices for IFR training, he said sometimes they needed to use Foggles, and sometimes they did not. Asked if he had used Foggles with the accident pilots, he said yes.

Mr. Labows was asked whether he would expect pilots to know what the takeoff briefings should contain without looking at any information, he said that there was not a takeoff briefing format, it was just that before they took off in the training they did a takeoff briefing. It normally addressed the departure profile, what type of takeoff was to be performed, what the next leg would be after the takeoff. They always briefed an abort. Where they would go. If on the

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<sup>7</sup> Practical test standards

runway, they would come back to the runway if on a CAT A takeoff. They were always talking about what was the takeoff decision point. If they lost an engine before that point they would land, if not, they would continue.

Mr. Labows was asked whether the AW139 could be flown single pilot day or night, he said yes, and single pilot IFR under FAA<sup>8</sup> (but not European Aviation Safety Administration regulations<sup>9</sup>). He was asked whether there was anything about which investigators had not asked that investigators may have missed, or whether there was any additional information he would like to offer that might be relevant to the accident investigation, he said that Mr. Jude was the less experienced of the two pilots, but the thing that impressed him about Mr. Jude was that he rode along on every flight in the jump seat if he wasn't flying.

Mr. Labows was asked whether they always used the trim hat during takeoffs, he said not necessarily. For CAT A takeoffs the takeoff pitch attitude changes were a little more rapid than one could do with the trim hat. The maneuver would be too slow with the trim hat. They would do the initial 5 degrees nose-down and 5 degrees nose-up with the force trim release, then fine tune with the trim hat.

He was asked if there was anyone else with whom he thought investigators should speak, he said no.

Mr. Labows was asked whether he had any safety recommendations to offer us regarding this case, he said not related to the training that they were required to provide. He thought they had executed what was expected of them.

The interview concluded at 1640.

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<sup>8</sup> Federal Aviation Administration

<sup>9</sup> During the NTSB technical review, the following was provided: The AW139 can be flown single pilot VFR and IFR according to EASA. See EASA RFM Supplement 22 (IFR Single Pilot Operations) and Supplement 24 (VFR Night Single Pilot Operations). None of these two supplements are approved by FAA which only approved a dedicated Supplement 32 (VFR Single Pilot Operations). Therefore, according to FAA, the following limitations apply: 1 - Visual Flight Rules (VFR) Day, Night: Two pilots. For VFR single pilot operation see Supplement 32. 2 - Instrument Flight Rules (IFR) Day, Night: Two pilots.

## Interview Summary

Interviewee: Anthony Mancini Jr., AW139 Ground Instructor, AgustaWestland Philadelphia Corporation

Representative: William Gaertner, Associate General Counsel, AgustaWestland Philadelphia Corporation

Date, Time: 11/5/2019, 1317

Location: AgustaWestland Training Academy, Philadelphia, PA

Interviewer: Dujuan Sevillian, Ph.D. (NTSB), William Bramble (NTSB) Ph.D.

During the interview, Mr. Mancini stated the following:

He was 59 years old. His year of hire with AgustaWestland was 2014. His duties and responsibilities as ground instructor were to teach the AW139 ground course syllabus and he also created the AW609 ground course syllabus. He mentioned that he was a qualified examiner for theoretical courses and is type rated in the AW139, and other aircraft. He had over 13,500 hours total of flying time and had AW139 simulator time. He reported to Allen Wotto who was the lead AW609 instructor pilot. He had provided ground instruction to students for 5 years and he said there were two other ground instructors. When asked about details of the AW139 ground instruction course, he stated that the course covered the entire helicopter and covered every system of the aircraft. He said that ground instruction materials are updated in Italy, and updates were not on a cycle. If there were updates, he would put it on their computers for instruction. He stated that he only provided instruction to 3 pilots from Challenger LLC<sup>10</sup>. He also noted that the ground course was instructor led and the course training location was Whippany, NJ. It was his daily routine to teach students via theoretical training how to operate the AW139 systems.

When asked if Mr. Mancini could elaborate on what was covered in Ch. 22-00 Auto Flight Control System-Emulator Demonstration, he replied that it was a brief flight plan, training on how to enter information into the flight management system, how to close the flight plan and put in holds and direct to. He said that Italy develops the final examination questions. Mr. Mancini was asked to provide his perspective on David Jude's performance in training compared to other pilots with similar experience. Mr. Mancini said that Mr. Jude was enthusiastic, willing to learn, and did not resist the change. Mr. Jude was at class every day and was interested just like any other pilot that was getting a type rating. When Mr. Mancini asked review questions Mr. Jude was able to answer them. Mr. Mancini was asked to confirm that 70% was the passing

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<sup>10</sup> Limited Liability Company



score on the final examination and he said yes. Mr. Mancini was asked if Mr. Jude's examination score of 73% was unusual and he said no, there was a wide range of scores in the initial class. Mr. Mancini said that Mr. Painter was eager and excited about the new aircraft and wanted to learn it. He did not compare the AW139 aircraft to other aircraft he had flown.

Mr. Mancini was asked what type of follow-up discussions he provided to students after the final examination. Mr. Mancini said that he went over the examination so they could see the questions they missed. He also stated that he went over each question to ensure they understood their mistakes. If there were any follow-up questions, he would stay after to discuss more. When asked if Mr. Mancini possessed any follow-up notes regarding the accident pilots' that were not contained in the records provided to our team, he said no. Mr. Mancini also said that there were no forecasted updates to the ground instructor course he could remember. When Mr. Mancini was asked about examination questions being multiple choice and if fill-in-the blank was an option on tests. He said that the examination is multiple choice and that Italy develops the information. He was asked to describe any conversations he had with other instructors about the accident pilots' performance on the ground final examination. He said they were average and there was nothing out of the ordinary and he was only ground instructor in the building.

When asked if there had been any updates to the examination questions for course number PH\_17\_0065 since 9/9/2017, he said that that he saw new questions on the tests. He stated that there were large number of questions in a data bank for the test. The examinations were updated but he said he did not how or when they were updated. He said that he had no idea about future updates regarding the AW139 ground instructor course. Mr. Mancini said that during his 5 years as ground instructor, 3 students could not pass the examination and it was due to a language problem with the students. He said that there was a very low percentage of students that failed the ground course examination. When asked about the accident pilots' recurrent training deficiencies noted by other instructors, he said that he was aware of the deficiencies and that the recurrent ground instructor training would have been done in Whippany, NJ. If the students were in his ground school, he would have made mental notes in this training comments. As far as the simulator training, he would not know. When asked who performed the accident pilots check ride, he said he was not sure who instructed the pilots for their check ride.

When asked if there was anything NTSB<sup>11</sup> investigators did not ask him about that they may have missed, or whether there was additional information he would like to offer that might be relevant to this accident investigation he replied no they were good students, eager to be there an learn.

When asked if there was anyone else investigators should speak with, he replied no?

When asked if there were any safety recommendations, he wanted offer investigators regarding this case he said he did not know much about the accident.

Interview concluded at 1343

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<sup>11</sup> National Transportation Safety Board

## Interview Summary

Interviewee: Scott Walden AW139 Instructor Pilot, AgustaWestland Corporation Philadelphia Corporation

Representative: William Gaertner, Associate General Counsel, AgustaWestland Philadelphia Corporation

Date, Time: 11/5/2019, 1347

Location: AgustaWestland Training Academy, Philadelphia, PA

Interviewer: Dujuan Sevillian, Ph.D. (NTSB), William Bramble (NTSB) Ph.D.

During the interview, Mr. Walden stated the following:

He was 50 years old. His date of hire with AgustaWestland was March 2015. His position was instructor pilot. His duties were primarily a) aircraft flight instruction and b) he assisted the chief flight instructor on program development. In the development of the navy training aircraft he assisted in developing the syllabus. He also developed FAA training programs such as the FAA industry training standards program. Mr. Walden said that his helicopter pilot background was in the U.S. Army for 8 years then he switched to the coast guard for 13 years. He worked offshore oil and gas flying the AW139 helicopter. His total flight hours were just under 8,000 hours with 500 hours in the AW139 helicopter. He reported to Roger Woods and he said he provided flight instruction to students off and on in the Army. The last part of his career lasted 4 years in the Army, 2 years in the coast operational. He was also an instructor in the Navy school. He had provided flight instruction to students at Leonardo helicopters for just under 5 years. When asked if he was the only flight instructor that provided instruction to students at Leonardo Helicopters, he said no and that there were 7.

Mr. Walden described the flight instruction curriculum for students. He said initial training is ground instruction with a ground instructor. Depending on the length following ground instruction, pilots would get the flight instruction portion. Discussion of maneuvers can take a couple of hours, then flight instruction begins. Usually the flight instruction is a two-hour sortie and generally an hour and a half blocked for a sortie. He was asked how often the flight instructor course curriculum was updated? He said it is not in scope for him to update the curriculum, Mr. Woods usually updates. If he saw something that needed to be updated, he would have brought it to Mr. Woods attention. He worked with various people that approved the curriculum.

Mr. Walden only provided flight instruction to the 3 former students from Challenger LLC. Mr. Walden was asked to provide details as to why Mr. Painter struggled with FMS

entries, CRM<sup>12</sup> issues, and wanting to fly single pilot. Additionally, he was told that Mr. Painter received a below average grade for too much single pilot mentality causing him to get overwhelmed with weather/ATC<sup>13</sup>/flying.

Mr. Walden stated that the FMS was a complex entry system through the MCDU<sup>14</sup>, and it takes practice. He said that Mr. Painter did not struggle unexpectedly. It is normal for someone that has not used the Honeywell system. As far as the CRM issue, he downgraded Mr. Painter in CRM because we wanted them to work with each other as a crew. He cited the need to communicate and work with the other pilot before making configuration changes to the aircraft—working as a crew to guard against any inappropriate actions. Mr. Painter was trying to do everything himself and not as a crew. He was also overwhelmed with certain emergencies. For example, we had to jump from one airfield to another due to thunderstorms. The combination of him trying to do everything himself, he would get behind the aircraft and try to catch up all the time.

Mr. Walden said that they determine if the student has achieved the required standards by referencing the PTS standards for the type rating. He was also asked to describe what is reviewed in the inflight section ‘rapid deceleration’, and ‘standard/steep turns’. He said it is a quick stop helicopter maneuver when on a takeoff maneuver and wanting to abort the takeoff, and a decent nose up to stop at a hover. Steep turns are a 30-degree angle bank and they would turn 360 or 180 degrees.

Mr. Walden was asked how he evaluated student performance regarding resource management, communication, decisiveness, mental capacity, and situational awareness? He said that there is not a specific standard and it is how he felt they were processing the information and what their situational was. It was usually obvious if the person was missing radio calls or overwhelmed with a task and did not have the resources to cope with another. The airman skills were subjective. Mental capacity was the pilot’s ability to process information. Decisiveness was rational and clear decisions. CRM was how well they work together and communication and resource management, using the crew, checklist, and ATC. Mr. Walden discussed these aspects during the flight and during the debrief he emphasized these factors. There was a student study guide that talked about CRM and crew aspects. The information was available to them prior to the sortie.

Mr. Walden said that a student would have been required to take additional training if he/she did not meet the standard required. He said that they assess performance in a demonstrate, practice, and achieve way. They would have demonstrated something, and the student would practice it and should achieved it, and if they did not achieve it, they would have additional flights scheduled and more opportunities to practice. Usually we recommended a 1.5 hour-2.0-hour sortie for additional training. When asked what percentage of students that attended flight training must take additional training, he said that is was a very low percentage

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<sup>12</sup> Crew resource management

<sup>13</sup> Air traffic control

<sup>14</sup> Multifunctional control display unit

and that they generally flew experienced pilots and only that type of airframe. With new students or lower hour students it was about 5 percent, but that is pure guess.

Mr. Walden said that he was familiar with the two accident pilots' recurrent training records but did not physically look at them. The students had deficiencies noted by other instructors in recurrent training. He was told they required additional training due to deficiencies (tail rotor malfunctions) but did not remember any specifics. Mr. Walden said that no one directly communicated with them regarding recurrent training. Recurrent training was completed in Whippany, NJ so no feedback was provided to him.

Mr. Walden said that the flight training curriculum covered pilot use of automated modes. Usually during takeoff, they had the student brief the takeoff they would have used. For VFR it was a pre-selected altitude, non-flying pilot selected HDG and ALTA which also engages the IAS. They might brief a CAT A takeoff procedure, which was an IFR takeoff and say engage ALTA, HDG, at 70 knots. Pilots could also engage NAV if they had a route entered in the FMC and they could have used go-around mode, but it was not generally used because they would have to engage other commands. In an IFR takeoff CAT A can be used or instrument takeoff (just a simulation of 0-0 conditions). Still have to get to  $V_{min}$  engage modes like ALTA, NAV/HDG. For moonless night conditions we would have treated it as an instrument takeoff/low visibility and emphasize getting to an airspeed to selecting modes and then select them. Mr. Walden said that they help pilots understand how to use the auto flight system through demonstration and practice. He said they taught them to confirm what was engaged and walk through callouts. Mr. Walden stated he did not recall the accident pilots having any difficulty understanding the modes.

When asked to describe a takeoff scenario on how they would teach pilots to transition to auto-flight during takeoff, procedure used, and buttons pushed, Mr. Walden said that an example for ALTA is 200 feet and 50 knots, software Phase 4, but it is a minimum speed, but he was not sure and he thought it changed between Phase 4 and 7. ALTA was used for visual takeoffs. ALTA would put the helicopter in a climb, would have leveled the pilot off at the desired altitude and engages the IAS<sup>15</sup>. It does three things with one push button and was one of the more useful functions and now it allows the pilot to focus on the route. Mr. Walden said to disengage ALTA mode the pilot can engaging another collective mode. Pushing the same button disengages the mode or use of a button on the cyclic disengaged all modes. There are various ways to disengage modes. He said that he taught students how to disengage the ALTA mode during flight training. The aircraft would go to whatever altitude that is put into the system, and there was always an altitude in the system. When selecting an altitude, the system would take the helicopter to that altitude. Mr. Walden was asked how did he teach use of manual flight and automated flight on takeoff? He said in the traffic pattern it would have been manual takeoffs and landings.

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<sup>15</sup> Indicated airspeed

Regarding the AW139 helicopter, the process was to manual takeoff then engage modes. The modes he discussed were on instrument flights, then he told the pilots to manually takeoff then couple the autopilot. When using FTR<sup>16</sup> on cyclic they were disengaging pitch and roll modes, if there were any or the attitude hold mode, which was the base mode. When not using the FTR, attitude hold mode would maintain the last attitude. He taught students to minimally use the FTR to reposition the aircraft to a new attitude and retrim. The ATT Mode and SAS<sup>17</sup> modes were simple modes. When hitting FTR SAS mode is engaged and attitude mode is the default. The ATT hold mode was used in manually flying—controlling the aircraft route using aircraft systems. When asked about his perspective on how well the accident pilots performed during the training compared to other students of similar experience, he said that the students were all three different and good pilots. They could handle the aircraft and take instructions and were not particular slow. The two accident pilots did not have the CRM background and to a less degree David Jude. Geoffrey was single pilot mentality, not usually deficient and picked up the aircraft and was on par with his peers.

Mr. Walden described the what the process was of going from manual flight to ALTA. He said that he emphasized that a takeoff brief should have been done so that the pilots knew what to expect and then set up the autopilot, preselect an altitude, current heading, and NAV course. He said make sure the proper guidance (FMS/VOR) was setup prior to takeoff. The takeoff brief would have been what the flying pilot and non-flying pilot responsibilities were, emphasizing the CRM aspect and then request and confirm before they engaged anything is what they taught students. He said request and confirm is what they taught and for transitioning from manual to automated flight. The pilot flying would have said preselect 2,000 feet and pilot monitoring would have said selected and pilot flying would have said confirmed. There was a chime that told the pilot when the mode is engaged. Regarding the accident pilots, this was new to them. They were used to single pilot flying. Getting to work as a crew was their job so nothing would have been unexpected. Mr. Walden was asked what happens when engaging ALTA when too low and too slow. He said that ALTA would not engage. If ALTA is pressed on the lower console it would light up on the both the lower console and PFD, and the tone can be heard if it was engaged.

He said that they did not train pilots on blackhole night VMC hazards environment or anything like that. If a pilot was faced with taking off in a blackhole, the preferred method would have been a careful instrument transition takeoff. The power setting, attitude, pre-selected altitude heading bug, desired airspeed, ALTA and let the aircraft fly was the method. When asked about the ALTA strategy versus manual flight, the ALTA strategy was trusted to work in a blackhole environment because the aircraft does not get vertigo a pilot would trust the aircraft and systems because it would fly better than the pilot.

Mr. Walden said that he could not imagine a pilot in a similar scenario using FTR after engaging ALTA. Once coupled, there would have been no need to use FTR. The FTR would

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<sup>16</sup> Force trim release

<sup>17</sup> Stability augmentation system

have been used to move the cyclic (pitch, roll). The trim hat in ALT mode was used to make small changes in aircraft trim. FTR cyclic could be used to conduct a takeoff and FTR holds an aircraft attitude. If a pilot wanted to roll into a turn he/she would have had 3 options a) use FTR to roll into a turn and release using the trim hat (pushing button to right but slower), move cyclic against force trim, and it puts pressure against the cyclic. The ATT hold allowed the pilot to trim the aircraft attitude. If pushing against the cyclic and rolling to a 30-degree bank it will move back. If wanting to sustain a climbing turn the pilot would trim into any angle of bank. The aircraft would have turned circles until the pilot interrupted it. His approach for FTR was small changes, trim hat, then trim out. He did not have issues with using the trim hat during steep turns. He did not like using FTR only, the pilot should press, make an entry, and then release. He did not like leaving it in because it took away the ATT hold feature.

When making turns in bad weather, the trim hat is the safest. FTR could continue to roll, but not the best to use, hitting the FTR a pilot could have rolled into a steep bank. The pilot would need good weather conditions or visible horizon. When asked how these strategies would have been completed in training, he said the accident pilots went out to the Everglades and were asked to use the FTR button and roll out of turn, and we used all procedures. In instrument flying (hand flying), instructors teach students to use the trim hat and ATT hold if it is available. Mr. Walden emphasized in the patterns to use FTR, when hand flying the aircraft. We worked a lot on the trim hat to use the ATT hold mode as available. We demoed a lot of methods, using the FTR hat so they could see how the aircraft pitched and how much power they needed to enter a 30 degree turn so they would not descend. Early in VFR training they used all methods but in IFR they were really working the trim hat. When coupled, the best method was using ATT hold using the trim hat because they had more control over roll rate. He said that he wrote one of the pilots up on steep turns. It was probably pitch deviations.

Mr. Walden recommended using the trim hat during the check ride. He read the comment in the training records and stated that when a pilot rolls into a turn the aircraft tended to pitch up. A lot of times that was the trim technique maybe if the rate was rolled in with FTR, the pilot was focused on controlling one axis and not the other. With ATT HOLD it controlled pitch and roll axis. It was recommended for a power setting of 15% above hover torque perhaps 85% on the previous scenario. The LIM indicator (collective couple mode) would not have allowed an over temp or torque the aircraft -95% and would have not allowed the pilot to get below 10%. This is just a collective limiter to prevent the autopilot from exceeding any limits of the aircraft. The limiter on the collective (button) which was not related to the autopilot. If the pilot were to grab the collective and pull, he/she may exceed the limits if he/she wanted to. On the PFD<sup>18</sup> the annunciation was related to the autopilot.

Mr. Walden was asked of any feedback regarding engaging FTR, Mr. Walden said that there was no indicator it was just free to move. Generally, feet should have been on the floor so that the pilot would not hit the trim pedals. When asked what the use of the STBY mode is, Mr. Walden said that it takes all upper modes away and puts the helicopter in ATT hold mode. He

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<sup>18</sup> Primary flight display

was asked when if they had any scenarios in training where warnings, cautions, and advisories were annunciated, he said that TAWS<sup>19</sup> was just a verbal discussion. When asked if students use ALTA mode often when taking off, he said that he thought most AW139 use ALTA as a daily tool. If going from point A to point B, they would be using ALTA and NAV or ALTA and Heading if they were going to use the upper modes. He said that the trim hat had not been specifically a line item in the training curriculum. But it was normal that they cover every feature of the aircraft and it was one of the key features. Mr. Walden was asked if there was anything investigators didn't ask him about that we may have missed, or if there was any additional information that he would like to offer us that might be relevant to this accident investigation and he said no. He was asked if there anyone else he would like us to talk to and he said no. Mr. Walden was asked if there were any safety recommendations that he would like to offer investigators regarding this case and he said no.

-Interview Ended 1500

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<sup>19</sup> Terrain avoidance warning system

## Interview Summary

Interviewee: Roger G. Woods, Chief Flight Instructor, AgustaWestland Philadelphia Corporation

Representative: William Gaertner, Associate General Counsel, AgustaWestland Philadelphia Corporation

Date, Time: 11/6/2019, 1020

Location: AgustaWestland Training Academy, Philadelphia, PA

Interviewer: Dajuan Sevillian, Ph.D. (NTSB), William Bramble, Ph.D. (NTSB)

During the interview, Mr. Woods stated the following:

He was 56 years old. His year of hire with AgustaWestland was 2011. His duties and responsibilities as chief flight instructor included making sure they were standardized, ensuring course material was up to date and in accordance with relevant regulatory authorities. He also organized the pilots in carrying out their duties.

Mr. Woods was asked to describe his aviation background, he said he had been an army pilot. He began flying in 1990 and became a helicopter pilot and instructor. He also flew fixed wing in the British military, and he was a qualified flight instructor at a central flight school for the UK<sup>20</sup> armed forces. He left the military in 2004, worked for British Aerospace in Riyadh for a couple of years teaching Royal Saudi Air Force pilots in fixed-wing aircraft. In 2006 he went to work as a government pilot in the UK. He moved to the United States in 2008 and converted his licenses to FAA certifications, obtaining an airline transport pilot certificate and instructor ratings. He flew for a company doing VIP transport in fixed wing and rotary wing aircraft. He began working for AgustaWestland in 2011. He initially worked in production test. He transitioned to the role of chief flight instructor in 2014 and was still in that role. He became an FAA designated pilot examiner in 2017 and he was involved with a U.S. Department of Transportation aviation rulemaking advisory committee addressing pilot certification testing standards. He flew all models of AgustaWestland aircraft except the 101 and had very broad knowledge of all the company's aircraft.

Mr. Woods was asked to whom he reported in the organizational chart, he said he reported to Terry Eichman, head of training operations USA for Leonardo Helicopters, and to the head of training for Leonardo Helicopters in Italy.

Mr. Woods was asked whether he had provided instruction to the accident pilots. He said he had not provided them any training, he had performed their evaluations, and he had also evaluated a third individual from the same company, William Sewell. Asked to describe their performance compared to other students of similar experience, he said that he had had them fly as a crew. The pilot in the right seat was taking the evaluation and the pilot in the left seat served

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<sup>20</sup> United Kingdom



as the pilot monitoring. They were very typical. Geoffrey Painter was a very experienced pilot, good at hands-on flying, and very good at instruments. David Jude was quite a good hands-on pilot, but he needed a little bit more on instruments. He was at the standard, but he might not have flown as regularly as he should. Often with crew flying, if he put two pilots together, he could see where it worked well and other moments where they were trying to work out who was doing what. They were certainly at the level where they needed to be to operate the aircraft. Mr. Jude served as the copilot for Mr. Painter, and Mr. Sewell served as the copilot for Mr. Jude.

Mr. Woods was asked if he was familiar with the accident pilots' recurrent training records. He said he was. He knew they had not flown in the simulator. He said that sometimes people drifted away from the desired standard and needed to be corrected, especially if they had been flying single pilot VFR. Some of the single pilots needed more assistance in dual pilot with CRM, and he stated that pilots also did not practice emergency procedures every day. Some of those procedures one could not do during a real flight. He was asked under what circumstances an AW139 initial training student would be required to take additional training and he said that they would be required to take additional training if he sensed they were not at the PTS standards, or if they were doing things that were not in line with the performance limitations of the aircraft. If an instructor had to intervene on things they had already demonstrated and practiced, the instructor would come to him to discuss it and seek advice, and sometimes they would require extra flying. In the case of a type rated aircraft, in Part 142, they could take the test on the system. In Part 61, the instructor was not going to provide a signature recommending the student for an evaluation if they did not meet the standard. They would sometimes look at whether there was a need to change instructors. It was not common for students to have this kind of difficulty because the aircraft were expensive, and most owners were not going to employ a pilot who did not have a significant skill set. In most cases, it was something they could work through.

Mr. Woods was asked what percentage of students that attended AW139 flight training must take additional training, he said he would have to look. He knew it happened. It was low. He was asked how they dealt with students who had trouble with CRM when they were coming from a single pilot aircraft, he said that what the PTS said about CRM changed across documents, and a company might have their own CRM procedures. The manufacturer might or might not have its own CRM procedures. At Agusta they tried to teach a three-way conversation. Someone asked for something, the other person understood, and there was feedback of that. That was how they taught the use of the modes in the aircraft. The autopilots were on all the time per the requirements in the AW139. When they engaged an upper mode, such as heading, altitude, or airspeed, the PF would command it, the other pilot would acknowledge and engage it, and the crew would confirm the engagement. It was a three-way loop.

Mr. Woods was asked how they trained a pilot to transition from a single pilot to a crew environment, he said it could be a challenge. A pilot could be set in their ways. They tried to bring them into using the checklist, to have it out, and to use it as a confirmation. They also tried to get it out of their hand and into the other pilot's hand. They had already started CRM the

correct way if they did that. After they were working with good CRM, the instructor would introduce distractions to see how they dealt with them.

Mr. Woods was asked to explain how instructors taught pilots to transition to auto flight during a CAT A unrestricted instrument takeoff. He said that the most important thing was to pre-brief the takeoff on the ground, and to sort out the CAT A profile. After that was done, they should talk through the departure they were going to fly and talk through each of their responsibilities. His guidance was that the PF<sup>21</sup> should fly and ask the PM<sup>22</sup> to enter the commands that he wanted. In the hover they would be visual, and they would transition per the CAT A procedure. They might use altitude or altitude acquire or airspeed. The PM would call out altitudes and airspeeds. They should have discussed what each would be responsible for in the event of an engine failure. If the engine failed before the critical decision point, the PF would fly pitch and the PM would call out airspeed,  $N_r$ ,  $V_{tos}$ , and  $V_{mini}$  (the speed for going into IFR). As a pilot, one was not looking at a million things, one was looking at the most critical things.

In the AW139, they needed to consider the  $V_{mini}$  speed, 50 knots. There was also a minimum speed and altitude for engaging automation commands. They did not often fly the phase four version, but he was fairly confident there was no difference. The minimum speed for engaging heading, altitude, and airspeed modes was 60 knots and the minimum altitude for engaging altitude mode was 150 feet, so they would have briefed that. After takeoff and the transition to forward flight, the pilot monitoring would call out  $V_{mini}$  and 60 knots and would make any other callouts that had been discussed on the ground. The PF might call for heading, ALTA, and airspeed. The PM would engage the modes, and the crew would see the modes indicated on both sides of the cockpit in front of them. The PF would then say airspeed and heading confirmed.

Mr. Woods was asked how the PF would use force trim release, Mr. Woods stated that in normal operations, cyclic force trim release was only used for initial takeoff into the hover and transition to forward flight, and during the very last stages of an approach. They always tried to take off within 30 degrees of the wind. Otherwise they were not in compliance with the performance charts. They would take off, get in the hover, confirm that the power was set, have the force trims made, have feet on the pedals, and the finger would squeeze the trigger of the collective. They would then start pulling the agreed power. When they reached the TDP<sup>23</sup>, the PM would call out TDP, and the PF would tilt the rotor forward while maintaining power. This was all done using the force trim release. As the aircraft began to accelerate and went through VTOS<sup>24</sup>, the PF pitched up and established 80 knots to establish best rate of climb. They would let go of the trigger as they went through 60 knots. After that they could use the four-way trim switch on the cyclic to fly the aircraft. Almost at that time as the PF began using the trim hat switch the PF would be calling for upper level modes. Below 500 feet, the requirement was to fly

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<sup>21</sup> Pilot flying

<sup>22</sup> Pilot monitoring

<sup>23</sup> Takeoff decision point

<sup>24</sup> Vertical takeoff speed

tentatively. After transitioning through 500 feet, the crew could relax a bit more, and they would conduct post-takeoff checks. They should not be turning before 400 feet, per PAN-OPS. A procedure on a published departure would not be required below that altitude.

Mr. Woods was asked whether the four-way trim switch was also referred to as the four-way trim hat, he said yes. If a pilot tried to turn the helicopter without using the four-way trim hat, the helicopter would turn, but after the control inputs were relaxed, it would roll back to its original attitude. The force trim release would remove the system's memory of the attitude. The force trim release was only used during initial takeoff and the last part of the arrival. Otherwise a pilot flew with the trim hat.

Mr. Woods was asked to clarify what it meant to fly tentatively below 500 feet, he said that when using upper-level commands on a departure or arrival, the requirement was that the pilot should be ready to take control of the aircraft. He was asked whether the requirement to fly tentatively meant that the pilot should not make any turns below 500 feet, he said it depended. If a crew was flying VFR or at night with good visual references, they could turn below 500 feet, if they were flying IFR they should not.

Mr. Woods was asked to describe the preferred procedure for performing a dark night takeoff over water in visual meteorological conditions. He said the procedure was to climb straight ahead unless there was an obstacle. He would set his final cruise altitude, such as 2,000 feet, and if there was no other guidance from ATC, he would climb to about 1,000 feet and engage upper level commands while climbing and turn the heading bug to execute his turn. Asked whether ALTA was considered an upper-level command, he said yes. If selected, the helicopter would climb to whatever altitude was set in the altitude window. ALTA and airspeed were collective commands. If the crew was asking the aircraft to climb and accelerate at the same time, there could be a high demand on power. There was protection built into the system up into the high 90s to prevent the demand from being too high. If a pilot selected ALTA and dialed in an altitude of 20,000 feet and asked the aircraft to go to 140 knots and climb at 2,000 feet per minute, the engines would eventually run out of power, so airspeed would automatically be reduced to 80 knots for  $V_y$ , after that, the target altitude would be reduced and the helicopter would climb to whatever its performance ceiling was. The system would not allow an over-torque.

Mr. Woods was asked to describe the power limit indicator, he said that the power limit indicator would appear on the PFD but not in CAS<sup>25</sup> messages. Power limit was only available if the crew selected upper level collective modes. The torque limiter was a button that would limit torque if selected. If the torque limiter was engaged, and the PF tried to pull the collective it would not permit full engine power, and if they continued to pull it would droop down to 90 percent and it would simulate an engine fail. They showed pilots that in training because they wanted them to see what it was like if they started to over torque the aircraft. They did not normally fly with the torque limiter on. Mr. Woods was asked whether the procedure for a CAT

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<sup>25</sup> Crew alerting system

B visual takeoff was different than what he had already described, he said not so far as the briefing went.

Mr. Woods was asked if he would use any different procedure for conducting a dark night takeoff over water in VMC, he said the best procedure was a CAT A takeoff because it was the most stable procedure. Pilots would want to get a bit of altitude and climb out. It was critical that they brief when to put the commands in and what they were going to do after that. Asked if they had ever seen situations where pilots did not brief commands before takeoff, he said yes. The instructors tried to find the root cause. If they had briefed everything and the student still selected the modes rather than calling for the PM to do it, and if that was all they did wrong, he would let it go for a second and then ask why they did that. He would tell them that "That's my job." It was a very hard question to answer, but it would be dealt with straight away or later if it was not critical at the time.

Mr. Woods was asked whether the curriculum addressed dark night takeoffs, he said no, there were so many scenarios: hoist lift, buckets, and night. They did not train night. That was not part of the PTS. That would be adding his own input as an evaluator. They were trying to level the playing field for everyone. They did offer CFIT<sup>26</sup> programs and deteriorating weather training packages in the simulator, but that was not part of the basic course. If they included everything it would be \$200,000 and no one would take it.

Mr. Woods was asked how they trained pilots to use the trim hat switch and cyclic during takeoffs and during maneuvering at altitude, he said that if they were using it at altitude, they would have decided not to use the automation. If taking off on the force trim, they would use the four-way trim switch after performing the pitch-up transition and selecting the climb altitude. They would use the four-way trim switch for any pitch and roll changes thereafter. During the climb, those maneuvers would not be that big. They were probably not going to be turning more than 20 degrees. They tried to do a rate 1 turn. They taught students that they needed to understand their rate of roll if they were going to fly at altitude without using the upper modes. Their feet would be on the pedals and they were going to use the coolie hat, then crosscheck outside to clear their turn, then move their focus inside to their instruments. If they saw that something was not right with speed or altitude, they would make changes in pitch or collective using the collective trim switch and the four-way trim switch and they would start to roll out when approaching their desired heading.

Mr. Woods was asked how things would be different if the conditions were dark night, he said they would use the aircraft as a reference. He would be in upper commands. If they were teaching that, he would tell them they should not do it low level. They should maneuver up high. They would still need to look outside to ensure no aircraft was around them, and then they would use the artificial horizon in the aircraft. They would need a little bit of pitch up and power in their turns. Rolling through 15-20 degrees they would need to increase power by 10 or 15. After that they would need to look outside again and they would bring their scan in again if they saw

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<sup>26</sup> Controlled flight into terrain

there was a decay in speed or climb they could adjust power or pitch. Pilots often forgot to take out the additional 10% power when they rolled level and would climb as a result. If they were not instrument-rated they would not have been trained to do that.

Mr. Woods was asked if the automation provided any bank limiting, he said that when the automation was engaged, bank angle was limited to 25 degrees if they wanted to change heading with upper commands engaged. If not using the upper-level automation and the pilot grabbed the cyclic, there was nothing preventing them from flying upside down. They would have to overpower the trim motors, however, and they would feel the force pulling the other way, but they had to be able to override those forces in the event of a trim runaway.

Mr. Woods was asked to describe the check rides he provided the accident pilots, and he said they were based on the practical test standards for the ATP<sup>27</sup>, which would soon be changing. He stated that what he did was come up with a plan of action. He would go through the appointment, check eligibility, check signatures, and the trainee would produce documentation. They would do weight and balance and he would provide them a proposed route in advance. If there was a published departure, he would have them fly that. If not and it was an IFR check, he would make up a departure. On the day of the check ride he would give them some problem, such as too many passengers, and he would give them some simulated weather and require them to think about where they could or could not go. He would have them calculate fuel and reserves. After establishing their eligibility and providing a handbook, he would give them Foggles, do a pre-oral brief, and confirm the type of exam they were doing. He would make sure they had read the PTS. He would talk about the rules as to who was the PIC. He would discuss scanning techniques, and who was responsible for doing what. He would discuss ineffective scan as a cause of failure. He would discuss special emphasis items. He would talk to them about possible outcomes. At that point they would begin the exam. He would have previously flagged the elements he needed to address and mixed up the order for the oral examination. This was often where students would fail, especially newer ones. From there, they would preflight the aircraft. Then he would ask them some things like what crew resource management and situation awareness meant to them, and what were some obstacles to maintaining them. Then they would begin the flying part of the exam. He did not have to follow the order of the practical test standards, just cover the required points.

For the type rating, there were a lot of the questions that had to do with the aircraft. There were maneuvers they needed to see, an instrument departure, fully coupled and hand-flown approaches, an approach with a failure of a power system. They were all standard items in the practical test standards. There would not have been an autorotation because the AW139 was multi-engine. After completing all required items, they would come back, shut down the helicopter, and fill out documentation. The pilots' 8710-1 forms would be in FAA system.

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<sup>27</sup> Air transport pilot

Mr. Woods was asked whether the mode selection callout standard operating procedures were included in the AW139 initial training materials, he said that they had a FCOM<sup>28</sup>. They used a lot of the callouts with the pilots that they trained. Asked if the callouts were taught informally, Mr. Woods said no, the procedures for selecting the modes that they taught two-pilot crews were very formal. Asked whether they were documented in any of the written training materials, he said they were not described in the syllabus. The callouts were addressed as part of CRM. Asked if they consistently taught the mode selection callouts, he said yes.

Mr. Woods was informed about an Agusta recurrent training instructor comment that was written about one of the accident pilots, David Jude, which stated, “David flies well, however he has received insufficient training during initial type rating training.” He was also informed about an Agusta recurrent training instructor comment about the other accident pilot, Geoffrey Painter, which stated, “Geoffrey was not trained, or he received substandard initial training for all the maneuvers that he failed. He is going to require additional training.” Mr. Woods was asked what he made of those comments. He stated that he thought the pilots’ reported deficiencies involved items that were trained in the simulator that the pilots would not have encountered when they underwent their initial training in the aircraft, and he thought perhaps the recurrent training instructor might have assumed the pilots’ initial training was done in a simulator. Specific items where poor performance was noted in recurrent simulator training included a tail rotor drive shaft failure. That could not be taught in the aircraft. Tail rotor malfunction was another item. It was done in basic pilot training and tended not to be covered in initial training courses for bigger aircraft because they did not know of a larger helicopter that had experienced such a malfunction. To simulate that in the aircraft, an instructor would have to get on the pedals and opposed the student’s input. The student might make a landing at an angle as a result and scuff the tires. That was not something they would not advise doing in an expensive, wheeled aircraft, especially when the accident pilots told them that they intended to attend recurrent training six months after they completed initial training, and it was not required by the regulations.

They also could not accurately simulate an autorotation all the way to the ground because the minute they pulled the collective, the engines would spool up and provide power. Another deficient recurrent training item involved an electrical engine control failure. The engines on the AW139 were controlled by a FADEC<sup>29</sup>. They could change the engine control to manual but they had had a couple of instances where a student got a little bit out of sync and put the engines where they did not want them to be, so they had decided that this item should be done in the simulator. They did that item in the AW109, however, and most of Mr. Jude’s flying had been in the 109, and Mr. Painter had flown it as well. It had exactly the same control system as the AW139, and Mr. Painter was an instructor on the 109, so he would have been teaching it.

Mr. Woods was asked whether, in light of these factors, he felt the recurrent training comments about the quality of the pilots’ initial training were fair, he said that he was not surprised the pilots had not performed these items during initial training in the aircraft. They had

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<sup>28</sup> Flight crew operations manual

<sup>29</sup> Full authority digital engine control

encouraged the pilots to go back to the simulator and catch up on the aircraft, and they had come back for recurrent training a year later. Both pilots were also new to helicopter simulators. Mr. Painter had had a simulator introduction, but he had not flown in a helicopter simulator. The simulators were fantastic, but they were simulators. Some people would feel sick. He was not surprised that the pilots experienced some difficulty. He thought that perhaps the recurrent training instructors incorrectly believed that the pilots had previously undergone training in a simulator somewhere else.

Mr. Woods was asked whether he would have expected the recurrent training instructors to communicate these concerns to the initial training instructors, he said Mr. Painter had not flown a lot of hours in the intervening year. Mr. Jude had flown a bit more, but not a lot. It might be surprising if they did poorly if they were flying a lot, day in and day out, but the instructors might not know what people had been doing since they passed the initial training course. If they came back a year later and they had not practiced it, they might not perform well. The purpose of the recurrent training course was to address the pilot's current situation. The instructors did not go back and look at how the pilots had done in the past in order to avoid passing judgment. When a pilot started training under Part 142, it was a separate area of the regulations. Their initial training was conducted under Part 61. The training academy had taught 4,000 students over the years.

Mr. Woods was asked whether, from a training quality improvement standpoint, he felt that the quality of the initial training was poor, he said "Not at all." The accident pilots were taught by Steve Labows, an experienced test pilot and search and rescue pilot. The training they had received was of the highest standard. They had been proficient. If they had drifted from an acceptable performance level, he could understand why, based on the amount of flying they had done and the fact that it was their first time in the simulator.

Mr. Woods was asked whether the amount of flying the pilots had done between initial and recurrent training was low, he said he thought it was less than 10 hours in the AW139 for Mr. Painter. When the two pilots had come to them the simulator was fully booked, so they just flew their aircraft. They had worked with Mr. Painter to have him do the full two weeks of ground training, and then the flight training in West Palm Beach. That had been beneficial because it was the area in which they were operating aircraft, and they could do actual IFR flight out of west Palm.

Mr. Painter had been very happy to do the initial training with them and come back in six months to do the recurrent. They wanted to do that to keep up their skill set. After initial training, however, Mr. Painter flew less than 10 hours and Mr. Jude flew with the owners, and unfortunately that path had not been followed. They were only required to come back for 61.57/58 for night IFR after initial training, but they had indicated they were going to come back in 6 months because they had not been in the simulator and they were going to catch up on some of the items. Eventually they came back in October. Typically, the pilots would come back after a year, but Mr. Painter had said he would come back in 6 months. The pilots also had an AW109S that they flew on the same route to the Bahamas. It was not an unknown route to them.

He thought the reason the owners got the AW139 was because they wanted to be able to take more people to the island.

Mr. Woods was asked to comment on recurrent training comments indicating that the pilots' "progressive checking was halted and changed to traditional," He said that if a pilot started on a progressive check with three training flights, they could tick off all the elements they needed as they went along, instead of doing them all in a check at the end. If on the first flight they did not reach the standard on some of the required items they could not continue with the progressive check because they would not be able to catch up. In that case they would switch to traditional training which consisted of 1 VFR mission and 1 IFR mission, followed by a check ride. In this case, the recurrent instructors had realized that because they were not ticking off the requirements during the first flight, they could not carry on with progressive check. The pilots would still have been issued a 61.58.

Mr. Woods was asked if he had any information to offer about which he had not been asked, Mr. Woods said no. He said that at the end of the day the aircraft would fly itself back from 30 feet. It was very automated and extremely capable. Asked whether there was anyone else with whom he thought investigators should speak, he said no.

Mr. Woods was asked whether he had any recommendations to offer in relation to this accident, he said it was hard to judge until he saw all the evidence. The system by which they taught was very robust. They were very clear on their standards, what they provided, and how they achieved that. They were very clear about how they communicated. Someone might come in with their own procedure, so it could be off-putting, but they were very clear that a command was requested, a change was made, and the results were confirmed. Especially on the command side. Anything learned from the NTSB investigation would be of huge benefit to them. They would take any information they could get to improve, but he had a lot of confidence in the training.

The interview concluded at 1207.



## 2.0 CAE NETC Flight Crew Interviews

### Interview Summary

Interviewee: Rory A. Mitchell Simulator Instructor, AgustaWestland Philadelphia Corporation

Representative: William Gaertner, Associate General Counsel, AgustaWestland Philadelphia Corporation

Date, Time: 11/19/2019, 0910

Location: CAE NETC Whippany, NJ

Interviewer: Dajuan Sevillian, Ph.D. (NTSB), Katherine Wilson, Ph.D. (NTSB)

During the interview, Mr. Mitchell stated the following:

He was 52 years old. His date of hire was July 8, 2014; he was previously hired as a contractor for CAE in 2013. His duties and responsibilities as a Part 142 flight instructor included instructing pilots through initial training and recurrent training as well as periodically conducting checks with other instructors. He also conducted FAA examinations for pilot check rides, and he was a performance evaluator.

In 1994, he received his private pilot rating in R22. He was a New Jersey state trooper for 25 years working with state police. In 2003, he was brought on to the aviation wing and flew Jet Ranger Helicopters. He later moved on to flying a Sikorsky S-76B model for dignitary transport which was most of his flight time. He trained in the S-76B while in West Palm Beach, and in 2005 he started flying the S-70B at Flight Safety. He flew 12 years with the state police and retired at the end of 2013. He was then hired by Augusta Westland on July 8, 2014, where he instructed many pilots over the course of time there.

He had over 3000 hours total time. He had CFI<sup>30</sup> experience including a CFII and ATP; he accomplished this with the New Jersey State Police. The New Jersey State Police purchased the AW139 in 2011 and he had flown the aircraft for two years. In the actual AW139 aircraft, he had a couple hundred hours. He reported to Christian Durante.

Mr. Mitchell had provided flight instruction to students for 4.5/5 years. He described the Leonardo Helicopters initial training for US<sup>31</sup> students consisting of a 2-week ground school and a 2-week simulator school. The VFR portion consisted of 7 lesson plans, but this could change if a customer requested a single pilot situation. Students would then transition into a 4-day IFR portion, followed by a 3-hour check ride. Each pilot would get about 25 hours in initial training,

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<sup>30</sup> Certified flight instructor

<sup>31</sup> United States

so a SIC<sup>32</sup>/PIC<sup>33</sup> crew would get 50 hours total before they left. The recurrent check ride was conducted via 14 CFR<sup>34</sup> 61.58. Customers could request 2-3 days recurrent training off the premises in the actual aircraft, but he had not done that type of training; if it was requested, it would go through Terry in Philadelphia for in the aircraft training. He was not familiar with the timeline but knew the training curriculum was updated. He had not provided flight simulation instruction to any other students from Challenger LLC since the accident.

Mr. Mitchell was asked to provide a reason why the accident PIC received a below average mark on 'Decisiveness' in his most recent recurrent training evaluation. Mr. Mitchell said that he was assigned to teach IFR for both accident pilots and had reviewed their previous training records before he met them for the first time. He thought the accident PIC was the chief pilot for the company. After a nice briefing that instructors were required to give, they went into the simulator and this was when he started noticing things; it was the knowledge-based issue that he noticed.

The IFR portion he taught was like a check ride to make sure that he covered everything in the syllabus so that they were familiar with everything even the PTS. He noticed that neither one of the students were aware of how to load up/enter information into the flight management computer for a departure procedure. He knew that he had to walk them through this procedure and that they needed a refresher. During the flight he noticed things that they were not familiar with like the CDI for the approach; neither one of them know what to do and at which time. He started talking about CRM and they were talking to each other. The accident PIC was weak on a few things and he had to show him how to intersect an airway; the pilot did not recall how to set it up and vector out of the hold. He showed them in the MCDU, that the pilot can push a button and the system will vector the pilot out of a hold, and they left the hold behind and these were things he was seeing in the IFR portion. The accident pilots did not talk about what was going on; they were in a learning mode, so they were not talking like about who would push the nav button. He slowed things down and the pilots either remembered or finally started to get it. If someone said they were going to intercept an airway, then the pilot must talk and they did not talk, until the simulation was slowed down. For instance, on takeoff Mr. Mitchell taught to brief the other pilot on what were the intentions (flight director modes), but that was not happening at first until he reiterated it. The accident pilots were not the first pilots to need help on this.

Companies that came through the training that flew through IMC conditions; they were ahead of the aircraft. Companies that did not readily fly under IMC conditions or IFR and only came here for initial and then recurrent, he had to refresh them all over again. Some of the lack of call outs was due to lack of having a game plan. In certain companies, before they lift off, pilots would say they were lifting. Some of the call outs were just SOP<sup>35</sup>s and the accident pilots really did not have any call outs. They were not established with a basis of SOPs and lacked recency of IFR flying. Once we got started with these guys it refreshed their memory.

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<sup>32</sup> Second in command

<sup>33</sup> Pilot in command

<sup>34</sup> Code of federal regulations

<sup>35</sup> Standard operating procedures

Normally, Mr. Mitchell would have them do a CAT A profile using force trim on cyclic and collective. Particularly from a runway the pilot would have done a CAT A clear area. Above 60kts the pilot should start requesting Flight Director modes. Whether it was ALTA mode and climb to the decision height, runway heading, or departure procedure, or if IFR the pilot used NAV. Above 60 or 80 knots, ALTA, NAV, or HDG, and tried to do this when the helicopter was stabilized before entering the modes, and Mr. Mitchell tried to get them to talk about it. When Mr. Mitchell discussed lower and upper modes, he said that pilots needed to look at the upper modes. If a pilot requested a mode (ALTA, NAV), the pilot should have seen it appear in the upper modes. The copilot pushed buttons on lower modes. Mr. Mitchell explained in training that the lower modes were the wish list and upper modes were what the pilot got. Or, the lower mode was a liar and the upper mode was the truth. Mr. Mitchell said that when flying along he did a Teterboro 2 departure right off runway 6 then went into the departure procedure. Takeoff fly runway heading then it would go into the departure procedure which was 040 up to 2,000 feet 2.3 DME<sup>36</sup> off the VOR and hard left turn at 280° and there was a discontinuity in the flight plan, from the clearance that he may have provided the pilots. He wanted to see how the pilots would react when they heard the chime due to the discontinuity. He told students that every time they hear a chime or blip, stop and identify what it was. Sometimes the chime was good, such as it captured the altitude requested, and sometimes it was not good. When a certain chime happened, it dropped the navigation off. The requirement was to fly as assigned or fly a heading of 280°. Sometimes he caught pilots that did not understand it, but he believed the accident pilots were fine with that.

Mr. Mitchell remembered that the accident pilots had their problems, but none of this was an issue. Their issues were intercepting an airway. If the pilot were clear to intercept the airway the pilot was cleared to hit NAV, and that needed to be explained to the pilots. Even though the helicopter was in HDG mode NAV was armed, so when the pilot got within a certain distance from the airway the helicopter would start to calculate and ultimately kick heading off and NAV will appear and the pilot would have joined the airway, and that needed to be explained but they ended up getting it. As far as knowing the system, they struggled with understanding vectoring out of hold and how do pilots update the MCDU box to get it ahead of the aircraft. They had trouble with flying to the course with the ILS<sup>37</sup> with two blue CDI<sup>38</sup> needles. If the pilot had two blue CDI needles the aircraft does not know what to follow. Mr. Mitchell wanted to prepare them for the check ride. Mr. Mitchell taught students from day 1 that he did not teach how to pass a check ride, but he was teaching them real world activities. He told them if the pilot followed what he said the check ride will come and the pilot would do fine. Mr. Mitchell knew they had a check ride the following day. There flying was fine, but they did not talk about the concepts, so he revisited it with 2 hours of flight, out of the sim and more briefing, 2 more hours of briefing. However, Mr. Mitchell, and the accident pilots came out of the simulator and went back into the simulator. Mr. Mitchell was confident and satisfied that they would pass a check ride and if they went inadvertent IMC, they could set up an approach.

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<sup>36</sup> Distance measuring equipment

<sup>37</sup> Instrument landing system

<sup>38</sup> Course deviation indicator

Mr. Mitchell did not teach dark night, moonless, nor overwater takeoffs including departures from helipads near water; he taught the night aspects in an IFR condition from airport to airport. He was not required to train at night, but he did it, so students would have night recency (3 takeoffs and 3 landings). Mr. Mitchell said that a pilot could get themselves in trouble by taking off in a night/moonless/over water environment; he did not encourage it, but the pilot could find himself in that situation. Pilots should be trained to the standards of the operation they were doing, such as if they used night vision.

During takeoff he told pilots to use FTR maneuver because the trim switches moved too slow; the pilot did not want to use these (trim hat) for takeoff or landing which were critical phases of flight. Trim hat was used when the pilot was coupled up en-route, during the climb, and away from the ground once the pilot was stabilized en route. For VFR he taught pilots to hand fly the aircraft and to push FTR cyclic in a nice gentle turn 10 or 20°, then release FTR, and that would hold that attitude, then when the pilot leveled, the pilot would have hit FTR bush the button, level off, and release FTR, which would have stabilized the aircraft in VFR. He had seen pilots go against the spring first and then push the button which resulted in a jolt in the helicopter. If in IFR, hopefully the pilots were coupled up using HDG Mode, then use trim switch, the helicopter would go around. He tried to refrain pilots from using FTR buttons in IMC conditions, because the pilot could over/under correct and get himself in an unusual attitude. If they were in IFR conditions and used FTR they could get themselves into an unusual attitude. The pilot would be already coupled up so the pilot should not override the coupled modes. If pilot was going to couple the aircraft, then let the helicopter fly the mission. The only time he would tell them to use FTR was to demonstrate 360° turn at 30°, decouple the helicopter and then go into steep turns. He said to use the trim switch on the cyclic for making turns. FTR was used when doing unusual attitudes in IMC. The pilot would get wings level release FTR and fine tune it with trim hat and get it close to level flight with FTR.

Mr. Mitchell was asked to explain how he determined if a student achieved the required standards for a sortie. He said instructors had a sortie they followed, and it depended on if it was a progressive check. If the maneuver was not done correct, then they could continue to train the maneuver then there was a second attempt block. After two unsuccessful attempts, he considered that a fail. Instructors followed the curriculum if there was an initial or recurrent training. They would continue to train until the maneuver was performed to Mr. Mitchell's satisfaction. He believed a pilot could pass the check ride if the pilot could perform the maneuvers successfully and if he would trust his family in the back of the aircraft to get from point A to B and back to A again. He had held students back before. He believed a pilot had to be able to fly the helicopter before getting into the automation and flying IFR. He would give the pilot the task and look to make sure that he was ready, then he would have a talk with the Christian Durante if there was a need for additional training.

Mr. Mitchell was asked to explain what was meant by a CAT A takeoff (various profiles). He said that he taught this during the VFR portion of the curriculum. For a CAT A clear area takeoff, first, the pilot would have set Nr to 102% in the event of an engine fail since this would set it up for a rotor droop. What they taught was 90% on the Nr. Mr. Mitchell would get the

helicopter back in the green range between 98-101, pick up the helicopter to a 5° hover, stabilized hover, nose it over to the horizon at -5° on the horizon, hold -5° which would hold airspeed and climb. When the pilot got to 30 ft, that was the TDP. If an engine failure happened after takeoff-TDP the pilot remained -5° until 50 kts +5°. Fly profile +5°, 1,000 ft and then end of maneuver. Vertical takeoffs for takeoff and landing would be 102% vertical helipad 5-ft hover, and TDP could have been 35 up to 70 ft, in the event the pilot had to return the helipad the pilot picked that depending on the obstacles ahead of the pilot. Once the pilot gets TDP nose over -10° on the ADI for 1 second and 0° pitch on the ADI<sup>39</sup> which was the most important aspect in the maneuver. If there was an engine failure the pilot was going down, so the pilot would nose over and get the airspeed, but that will get the helicopter to VTOS 40kts. Once the pilot got the takeoff speed, the helicopter would provide a positive climb. In a confined area the differences were in the numbers on where the helicopter takeoff TDP numbers would be. A confined area would be between 100 ft up to 400 ft that the pilot would lift off from the helipad. Nose it over -10° for 1 second back to zero and the helicopter would get 40kts for takeoff safety speed+5° on the ADI and that would get the helicopter a climb and acceleration to 80 knots.

Mr. Mitchell was asked his thoughts on how well the accident pilots performed during training compared to other students of similar experience. As far as the flying portion, he did not see anything that would hurt them. They were in the realm of other students as far as straight and level flying. They had no problems with CAT A takeoffs, they were in the realm. Their knowledge base of systems, IFR, setting up how to get on an airway, setting up an approach that was where he saw the issues, they needed a refresher. Flying wise they were fine and did not see anything out of the ordinary. They were not flying crazy, they did their steep turns fine, but their issues were what to do, when to do things, and talking about it, especially students that were not flying in an IFR environment. These pilots did not have a specific curriculum, some pilots had an entire lesson plan, they could look at their paperwork. When he had pilots from Cloud 9 and other countries come in so we would train pilots the same way just as any other student.

Mr. Mitchell was asked how he paired the accident pilots. He said there were two simulator sessions, each a 2-hour block pairing. Each pilot would be PIC/SIC for 2 hours, then they would leave the simulator and switch pilot roles SIC/PIC and the procedures were the same for another 2-hour block. The only time he would have changed something was if it was IFR and taking off from a different runway. The first departure procedure started off at 2,000 ft and wanted them to see that and asked them to fly it. The procedure was pretty much the same, still intercepting the airway and doing a departure procedure (recurrent procedure). Sometimes with an initial training they would have more time to have done RNAV<sup>40</sup>, GPS<sup>41</sup>, VOR, localizer performance with vertical guidance LPV<sup>42</sup> and they could do a lot, setting up holds, vectoring out of holds, and exiting out of holds. They had two hours in the sim, briefing, another briefing and then back to the sim. This was not normal; the normal time was two hours total block, and anything above and

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<sup>39</sup> Attitude directional indicator

<sup>40</sup> Radio Navigation

<sup>41</sup> Global positioning system

<sup>42</sup> Localizer performance with vertical guidance

beyond was extra. After the debrief with the accident pilots, he talked to Christian Durante, and they had to stop, debrief, because the pilots needed extra time. Both pilots were jiving and doing okay, and he wanted to put them through 30 minutes as PIC and 30 minutes as SIC to see how they operated. The extra hour would have normally been billed to their company, but this was not billed to their company. This was a free hour for the pilots, but this did not usually happen. Mr. Mitchell was confident that they would pass their check ride and it was a free hour of training.

Mr. Mitchell was asked if there were any discussions that pilots may have to take a flight that they were pressured to do. He knew that there were pressures out there and he could never understand why the bosses were not held accountable but knew that pressure existed; he would tell pilots to not be pressured to do something they were not comfortable doing. Mr. Mitchell was asked if they ever discussed previous aircraft accidents in ground training; he said sometimes video slides were discussed regarding accidents.

When asked if he had reviewed the accident pilots' training records prior to training he said yes. He was called and told to train the accident pilots IFR and their jackets were in his cubby/mailbox. Mr. Mitchell reviewed their names and pictures, just for familiarity/cursory look. The records included hours and type of aircraft flown; it was not the training records so he would not have known about any past training deficiencies.

Mr. Mitchell was asked if there was any initial training for visual illusions. He said spatial disorientation/visual illusions was a discussion at the training academy, but there was nothing in the curriculum that could get them there as far as a scenario. Mr. Mitchell told students that there were two ways to change the heading bug when the pilot coupled up to it or the pilot could use the switch on the cyclic (trim switch). When he gave pilots a lot of vectors, that would give them the onset of spatial disorientation as a way of technique. If he saw them constantly moving, he asked them if they had ever experienced the Leans effect. The PIC was behind, and he did not really know when to do certain things. Mr. Mitchell said that the PIC being the Chief pilot was behind in his piloting abilities, when compared to the SIC who was not the chief pilot. Geoffrey (SIC) was doing some of the same things; Mr. Jude did like not pushing buttons. Mr. Mitchell did not jump in right away during teaching, he let the guys talk about it and watched their communication. For example, when the pilots were told to hit approach it was a lag in timing. When asked how he knew the pilots were proficient, he said basically when they accomplished what they were supposed to accomplish. Mr. Mitchell said that this happened after the flights. The end overall grade was what we found, and we could find it in the notes. This was after Mr. Mitchell was satisfied. Mr. Mitchell was asked about the rating scale and he said that it was average, above average, below average. Above averages are very hard to come by and to get an above average, the pilot must have been good at that point. Whether the pilot was above average when they started the flight, at the end of the day, the pilot really came through on the maneuvers. So, the reports would show if one maneuver the pilot was struggling with and if the pilot did well.

Mr. Mitchell was asked how often students required extra training. He said not often but some students did require additional training. He had failed a student before, but not on a check ride. He had students for VFR/IFR, and he would notice that there was just no way that the pilot

could follow through with the IFR. Mr. Mitchell would go upstairs and say that this student would be a VFR only but IFR familiarization (which was on the certificate). Sometimes this was due to language barriers. If it was an initial, he would have to stop the training, but the pilot's company would have been notified. Mr. Mitchell was asked if he felt supported in the decisions he made; he said yes. Safety was always a concern for the company. He was a designated pilot examiner for the FAA, and they attached the performance evaluator aspects to make sure folks were briefing what they were supposed to brief.

CRM was briefly talked about in recurrent training. Recurrent was not as long as initial training. Before going into the simulator, he explained to pilots about CRM, saying that they were a crew. Mr. Mitchell did not explain things in a technical way; he needed pilots to talk with each other and identify with each other instead of one pilot doing everything. Even during emergencies, they needed to identify what was going on so that they were on the same page. If a pilot heard a bing, or blip, someone should respond to this. For example, the captain would state that they just lost NAV and ask the SIC to provide him with a heading. Or a different scenario, where the pilot was climbing to 3,000 ft and the aircraft did not stop at 3,000 ft, someone should be monitoring and talking about this.

The IFR environment was very busy, and if the pilot had a dull quietness/moment, there's something the pilot should be doing. Pilots should have a game plan and be talking to each other. He would tell the copilot that his job was to not let the captain kill the pilot. If the pilot said something to the captain and he did not respond, then say it again, and if he still did not respond, say "I have the controls" and take over.

Pilots were trained on inadvertent IMC and incapacitation in initial training; there was not enough time in recurrent training to cover those subject areas. An inadvertent IMC scenario would be to tell pilots to turn to a certain heading and descend below cloud cover; he always told them to do this. He saw pilots see the terrain, pullup and wanted to see their response. Every now and then, he would unplug the copilot's headset tell the PIC to make a right turn to 280° heading, to see what the SIC was going to do. He put them through this in initial training. Instructors would focus on flying this aircraft both by hand and use of modes. If the company purchased single pilot training, instructors would attack this by maneuvers, and simply talk about the flight as if there was another crew member. They would put them in inadvertent IMC conditions.

They only got single pilot training in initial training (check ride); a SIC was required on their license otherwise. With the IFR procedures, he could tell that the accident pilots did not do this often. Instructors tried to encourage use of CRM. CAT A profiles, the SIC should be doing callouts. There was a CAT A button in the helicopter. There was a female voice that would provide the pilot with cues, but they still encouraged the copilot or SIC to call out procedures. There were no memory items in the helicopter. There were two emergencies that required action: Dual engine failure—lower the collective. Second, if the tail rotor drive shaft, lower the collective--QRH and then stabilize. For initial students, he wanted them to brief it every time. The form they used discussed CAT A type takeoffs and it gave the pilot the parameters. In recurrent training the pilots

had their own checklist. The last instructor to have them before the check ride was on the signature sheet. He did not have anything else to add to the interview.

The interview concluded at 1215.



## Interview Summary

Interviewee: Cristian Durante, AW139 Chief Flight Instructor-Simulator, Leonardo S.p.A. Helicopter Division

Representative: William Gaertner, Associate General Counsel, AgustaWestland Philadelphia Corporation

Date, Time: 11/19/2019, 1325

Location: CAE Training Academy, Whippany, NJ

Interviewer: Dujuan Sevillian, Ph.D. (NTSB), Katherine Wilson, Ph.D. (NTSB)

During the interview, Mr. Durante stated the following:

His date of hire was July 2, 2007. His current position was chief flight instructor-simulator. In that position, his duties and responsibilities were a range of activities at the New Jersey facility. The training was approved under EASA<sup>43</sup> and as a Part 142 facility under the FAA. The training program under EASA was required to have a SMS<sup>44</sup> with a safety manager, and safety representative if outside Europe; an SMS was not required under FAA. They also had an SMS at the training program in Malaysia.

He started with the U.S. Navy in the late 1980 as a naval officer. In the early 1990s, he was selected to become a naval aviator, so he was sent to the Italian Air Force where he became a fighter pilot. In 1994, he became a Navy helicopter pilot and did electronic warfare. In the late 1990s, he joined the special operations task force and was there until 2002 when he left the Navy. He then joined the fire department where he volunteered to introduce a fixed wing turboprop aircraft (P180) to the operation which consisted mostly of helicopters. It was a good experience and he learned a lot. He was also in charge of the IFR training for the helicopter operations. He was there until 2007. He then joined AgustaWestland as an instructor, examiner, deputy for flight standards, and deputy for flight safety. He was involved mostly in 139 operations and sent abroad for consolidation of operations, doing oil and gas offshore operations and medevac in Saudi Arabia. He went back to Italy in 2015 and was asked to work for standardization. He then came to the US in 2017 to run the training facility at CAE.

His total time breakdown was about 5,000 hours in helicopters, 3,500 hours in the simulator and 1,800 hours in fixed wing aircraft; in the AW139 he had about 1,700 flight hours and 3,000 simulator hours. He reported to the head of training in Italy for the Part 142 and EASA training programs, and he also reported to the training operation US. As the flight safety representative, he also reported to the safety manager in Italy under the SMS required by EASA.

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<sup>43</sup> European Aviation Safety Authority

<sup>44</sup> Safety management system

He had not provided any simulator training to other pilots from Challenger LLC since the accident.

Asked to describe the recurrent training curriculum, he said it was 12 hours of ground instruction where they review the systems and 4 hours of training which consisted of 2 hours of VFR and 2 hours of IFR training followed by a proficiency check. There were two options for recurrent training – the normal recurrent with the proficiency check and the “progressive check”. This was requested by customers so pilots would feel less pressure when doing recurrent training. The limitation of the progressive check was that the instructor was a trainer and an evaluator.

The accident pilots started under the progressive check program, but because the crew had some training failures, the progressive check was no longer applicable, and they reverted to the normal recurrent. He recalled that immediately after the session with a failure, the instructor reported to him to tell him about the issues. It was necessary to provide additional training, so he had to deal with the business side and approve the proposal for additional training and fit the additional training into the simulator schedule. That was why he asked instructors to bring issues with customers to him immediately so that he could work on the issues. The schedule was busy, but they were able to schedule the additional training for the accident pilots. He recalled that the pilots were not confident on emergency procedures. He trusted his instructors and if the instructor reported an issue with a student, he trusted their standards. They would provide additional training until the pilots were comfortable.

It was not common for pilots to start recurrent as a progressive check and revert to normal recurrent. He clarified that the progressive check was only applicable to US students. Non-US students completed normal recurrent training; non-US students had additional challenges like language barriers. He could not speak for the initial training that the accident pilots received in the AW139, but he thought they delivered a good product. He was not aware of any past training difficulties of the accident pilots. He was only made aware of the difficulties following the first sortie during their most recent recurrent training. The difficulties were reported by Mr. Cantani who was the first instructor.

SMS was required by EASA and as a part of that program, he could report things he thought was a hazard to Italy. Regarding the accident pilots, he changed the instructor for the second day of training to have a new perspective. Both instructors talked to him after the training to say they needed to do something to prevent something like this from happening again. There were two types of reports – an occurrence report when something happened and a safety hazard notification for safety hazards. They submitted a safety hazard notification report to management in Italy which he clarified was about concerns that the accident crew received initial training in the helicopter versus the simulator and were having difficulties performing emergency procedures because of that. There was follow up from Italy, but he did not recall specifics. He could only make a recommendation and it was up to management in Italy to determine next steps. If relevant, safety information or information from accident reports would be shared with instructors to prevent something from happening in the future or something to emphasize in training.

The curriculum was updated almost every year. Last year they introduced an “other training device” and an additional 6 hours of training as a crew, and 2 additional hours to the normal type

rating. He recalled there were 5 VFR, 1 VFR night, 4 IFR and 1-LOFT<sup>45</sup> sections; sections were 2 hours. Previously they did not have LOFT and TCCPM thought it would be good to do LOFT to improve CRM and crew coordination. LOFT provided the big picture; leave the crew to fly and then discuss after. All instructors were qualified to observe LOFT.

The VFR night section included a takeoff and landing such as at a confined area like a hospital helipad; they used a CAT A profile. Typically, they used a New York location and it could be near the river. They played with the wind to force pilots to consider the wind for the takeoff.

Generally, they used different profiles like a helipad or confined area, both which had a similar technique and required energy management. The pilot flying would control the flight path and pilot monitoring would check the PF. After takeoff, generally, they had normal and engine failure before or after the TDP; TDP was the go/no go decision point. If the takeoff was continued, they would have separation from the obstacle. There was a speed and height requirement. When the specified altitude was reached, the PF would ask the PM to engage the mode on the flight director to manage workload.

He was more familiar with CRM from the European perspective which they referred to as multicrew cooperation - one side was crew coordination and the other was crew integration. Crew integration was the most challenging because they had the liveware interaction and with the automation. It was quite a complex system. Regarding coordination, they used it, but it was not a requirement for all customers. To train the callouts, they used SOPs. Crew integration was difficult because instructor might have two pilots with different backgrounds, and they need to start interacting. Some pilots might not have the mindset to do that and the instructor needed to educate them to use CRM and that there were different resources – automation, human, ATC. The instructor could immediately know if they had discipline. If they started doing a takeoff briefing, instructor knew if there were two professional pilots. If they did a takeoff without a briefing, at this point the instructor was going to observe what was going on. Pilots had to know that in the left seat they had their area of controls but if they moved outside of that they needed to be authorized by the other pilot, such as working with the MCDU. For example, a pilot should not change the flight path without knowledge from the other pilot. CRM was an issue globally with general aviation pilots where SOPs and checklists were not mandatory. From a safety perspective, they needed to push more in that area but recognizing these were not commercial pilots to have the right balance.

He was not in the simulator with the accident pilots so he could not say for certain, but his instructors told him that there were some issues with coordination, and he thought also integration. Instructors saw a big spectrum of pilots in relation to their standards. They trained to proficiency, but he thought they should train to competency. It was not just knowledge and skills but also attitudes. A pilot would not fail a sortie for CRM if the poor CRM did not affect the final outcome. An instructor would say that the pilot or crew was weak in that area, but it did not affect the final outcome. A pilot would be required to have additional training when it was recognized by an instructor or when the instructor was not fully comfortable to recommend a pilot for a check or there was a partial fail and they needed to redo the portion where the pilot failed. He could not say

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<sup>45</sup> Line oriented flight training

how much additional training might be needed for all situations. He trusted his instructors' judgment.

Pilots were taught to use ALTA mode from before takeoff by selecting the target altitude. ALTA was similar to flight level change in fixed wing aircraft. It was mostly used for climb. There was vertical speed and indicated airspeed that was assisting the vertical speed.

On takeoff, a pilot was forced to use FTR on cyclic and collective on takeoff. For big changes, a pilot would use FTR on the cyclic. For small changes, a pilot would use beep trim located on the cyclic. They were very clear on that. In altitude hold, after a pilot changed the flight path, it was hands off because of the SAS. Altitude hold was basically an autopilot. If need to do big moves or maneuverability, a pilot would use SAS. They mostly taught pilots to fly in altitude hold mode. They also demonstrated SAS mode, so pilots had the complete picture. They showed pilots how to reduce the automation also. If immediate action was needed, it was best to disengage the flight director.

He was not sure if the company voluntarily instituted an SMS program with FAA.

He had reviewed the training records of the accident crew since the accident. Nothing additional stood out other than had been discussed. He referenced SMS and said they minimized the risk from unacceptable to acceptable by providing additional training and the crew passed the check. He had to draw the line between training and the operation. He had a conversation with the accident crew before they left and that their performance was not ideal. He knew there was stress when additional training was provided and made them aware that it was ultimately their responsibility for what they did, and SMS should be a part of their organization. He suggested that the crew return after 6 months and they would work together on issues. He knew it was different in general aviation, but Mr. Jude was the chief pilot and said he understood. The crew was scheduled to return for training in June 2019, but it was postponed due to a scheduling issue on the crew's side.

He was trained to takeoff at night over water and knew there was a black hole effect.

Because they did not charge the accident crew for the extra hour of simulator time to review the IFR issues experienced, there was no "Additional IFR Training" form that would show the outcome of that session. Pilots could pass a section with 1-2 yellow grades (below average) and then take a check ride. A red grade (fail) required additional training. There were 7 instructors that reported directly to him.

A pilot would experience an EGPWS alert during CFIT training, but this was not common. The FAA syllabi only required normal operations. If time permitted, an instructor could choose to include a scenario and see the pilot's response which should be TOGA<sup>46</sup> and pitch; they taught "don't sink, don't think."

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<sup>46</sup> Takeoff go around

Training for single pilot operations under FAA included normal procedures, takeoff, landing, and inadvertent IMC. It was 1 hour of ground training and 1 hour of simulator training; previously it had been 2 hours of simulator training only. Instructors used a 5-point rating scale for students – very poor, poor, acceptable and very good.

FAA document 8900 provided guidance for training. If a pilot was not performing within the specified timeframe or failed, the instructor would provide additional training. If the pilot performed well, then the instructor would become an evaluator and have the pilot perform the maneuver again. If it was out of tolerance, they could try once or twice, the pilot would fail that item and the training would move on. In the case of the accident pilots, they were reverted to normal training from the progressive check.

If a pilot required additional training, it would be with the sortie record. The accident pilots needed 1-hour VFR and 1-hour IFR, and we discovered that it was not being charged and it was off the records.

He did not have anything else to add to the interview and could not think of anyone else the investigation team should talk to. Regarding possibly safety recommendations that could come out of this investigation, he thought there needed to be better standards for general aviation pilots like use of SOPs; he thought without safety, discipline was tough.

The interview ended at 1453.

## Interview Summary

Interviewee: Roberto Rambelli Simulator Instructor, AgustaWestland  
Philadelphia Corporation

Representative: William Gaertner, Associate General Counsel, AgustaWestland  
Philadelphia Corporation

Date, Time: 11/19/2019, 1120

Location: CAE NETC Whippany, NJ

Interviewer: Dajuan Sevillian, Ph.D. (NTSB), Katherine Wilson, Ph.D. (NTSB)

During the interview, Mr. Rambelli stated the following:

He was 57 years old. His date of hire with AgustaWestland was June 24, 2013, but he had held the position as a flight simulator instructor and check airman since March 1, 2010. His duties and responsibilities were as a FAA ATP and program evaluator for the Part 142 training center doing instruction and checking; he was also a training center evaluator, type rating instructor, and type rating examiner under EASA. He carried out day to day initial and recurrent training for students. He was also temporarily the deputy chief flight instructor.

He started flying helicopters in the U.S. Navy and received his wings in 1985. In 1989, he began flying on the civilian side doing emergency medical services/offshore and then was a flight instructor. He piloted the AW139 since 2008 before coming to Augusta Westland to provide instruction on the AW139. He had over 9,000 hours total time. His total hours in the AW139 was about 500 hours and he had over 4,000 hours simulator time. He reported to Christian Durante and provided simulation instruction to students for almost 10 years.

There were 7 instructors that provide simulation instruction to students. When asked about curriculum updates, he said that it got approved by the TCPM<sup>47</sup> via part 142, and they could not deviate from the PTS standards; the TCPM was a part of the FAA certificate management office. Mr. Rambelli had not provided instruction to any other students from Challenger LLC since the accident.

When asked to provide details on what was covered in the AW139 PIC recurrent training he said they practiced non-routine maneuvers and malfunctions and refreshed normal IFR and VFR material; it was spelled out in the curriculum. The simulation instruction was held on the 2<sup>nd</sup> floor of the CAE-NETC building. Mr. Rambelli said that the Part 61.58 check was conducted in accordance with PTS standards and was evaluated by the TCPM.

When asked to discuss David Jude's and Geoffrey Painter's total training time at the controls, Mr. Rambelli said that they received 5 hours of training and 3 hours of checking via 61.58; typical was 4 hours of training with 3 hours of checking. They received additional training

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<sup>47</sup> Training center program manager

due to shortcomings for malfunctions and procedures. This was something that he would have expected them to know from the initial type rating training. He had not seen this in the past. He did not see the accident crews' training records prior to providing them instruction and did not want to. Mr. Rambelli clarified that theoretical training was ground school which consisted of 12 hours of instruction followed by a written test, then simulator training and checking.

When asked to discuss remarks on David Jude's performance regarding proficiency and why progressive training was halted during the recurrent training, he said that progressive training was a way of conducting recurrent training in an ongoing manner; because students had "check ride-itis", this was a way to do training and checking progressively. A student could only fail 2 items and then they were reverted to traditional training and a normal 61.58 check.

When asked which items David Jude failed, he said the students were not at the proficiency level to pass, so they had to go back to traditional training. Mr. Rambelli had both pilots in the simulator at a time. He needed to cover emergencies with more depth to bring the pilots up to standards. Normally, a below average mark did not require the pilot to go back and start traditional training. The accident pilot received a below average rating for CAT A takeoff.

When asked about CAT A takeoffs, Mr. Rambelli stated that they taught students CAT A takeoffs for an engine failure. A CAT A takeoff took place on a runway, acceleration was longitudinal with a TDP of 30 feet and safety flight speed was VTOS, attitude change and continued acceleration to the best rate of climb. The CAT A from a helipad was more of a vertical development up to TDP (vertical) and then the helicopter transitioned to normal forward flight. Initially on the vertical climb they used FTR up to TDP and certain speed to manage pitch/roll with cyclic beeper trim; this was because beeper trim was not the fastest and would be too slow a rate of change to allow  $-10^\circ$  on the ADI for 1 second and then back to  $0^\circ$  on the . Anytime large movements were made they said use the beeper trim to maintain altitude. When asked if cyclic beeper trim was part of the discussion during a maneuver, he said yes. To use ALTA, he said it was a stabilized takeoff to approximately 60kts and a preselected altitude, select ALTA mode and it defaulted to 1,000 ft per minute, but this could be changed with collective beeper trim.

Instructors followed their SOPs and they recommended takeoffs with briefings. At the top of takeoff, he said call outs should be used if flying with a co-pilot and a discussion of what to do in the event of an engine failure, IMC, stabilizing, and what modes that the pilot would like requested; deviation calls and checks were standard.

He taught CRM in initial type rating training. If students were never exposed to dual pilot for the AW139, they had SOPs optimized for the AW139 and he integrated that in the training. Before he got into the simulator Mr. Rambelli would brief these things to the pilots. He told pilots to call everything out before moving something in the cockpit. The accident pilots had some issues with CRM; it was in the standard calls and maneuvers, capability to brief and looking farther ahead where they struggled.

He conducted the VFR training for both pilots. When asked to provide his perspective on David Jude's performance in recurrent training compared to other pilots with similar experience,

he said he was not at the level he expected. Mr. Jude required additional training for the shortcomings. Mr. Painter had a similar experience as Mr. Jude. He knew that the pilots were flying back and forth from the east coast to the Bahamas for VIP<sup>48</sup> operations, but he knew nothing else about their operation.

When asked what type of follow up discussions he provided to the students after recurrent training, he said he provided debriefing discussions regarding the sorties and this was also covered in their 61.58 check.

Mr. Rambelli said Christian Durante was directly involved with the training performance of the accident pilots. When asked if he could describe any conversations that he had with other instructors about the accident pilots' performance on the ground final examination, he said yes. They issued a safety hazard notification and sent it up through their SMS. The safety manager in Italy was responsible for SMS and Mr. Durante was the local representative. The safety hazard notification was done on November 17, 2018, the day after the accident pilots' check. It was the first time the instructors went through this process of submitting a safety hazard notification.

The SMS program for Leonardo Helicopters had been in place since 2013. Mr. Rambelli stated that this was the first time they got students who received initial training in the actual helicopter versus simulator training; emergency scenarios could not be simulated in the helicopter. They wanted to push that up that in the future initial training should occur in the simulator so pilots could perform the emergency procedures. With the accident pilots not having a background in SOPs, they needed to operate with dual pilot. The accident pilots did not get a typical Part 142 initial type rating. The malfunctions could be replicated in a simulator and not a helicopter for safety reasons. The safety hazard reasons were initial training needs to be in a simulator. He heard a recommendation was provided by the safety manager in Italy, he thought to Mr. Durante.

Students needed a grade of 80% or higher to pass recurrent training; he thought it was uncommon for someone to fail recurrent training.

When asked what Mr. Rambelli's expectation was regarding pilots that may go back to flying single pilot, he said they trained them as a dual crew via supplement 32. There was an additional course that pilots could take for single pilot VFR which consisted of 2 hours of flying and 1 hour of checking. They did not train single pilots in recurrent training and that single pilots reacted differently. He would expect a single pilot to use the QRH but would not expect a single pilot to make standard callouts because he would be talking to himself.

When Mr. Rambelli realized that the accident pilots needed additional training, there was a discussion with Mr. Durante, and it was additional simulator training. At the end of all training, the pilots needed to be recommended by an instructor for a check ride. Sometimes there were discussions and they reached the standards and there was an examination in the simulator. Mr. Rambelli spoke to Rory Mitchell and told him to keep an eye on the accident pilots' CRM.

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<sup>48</sup> Very important person



The accident pilots received two hours of additional training; Mr. Mitchell did the first hour and Mr. Rambelli did the second hour. The first hour was done at no charge to the students and was not recorded; the second hour was recorded. Mr. Rambelli said the only reason why the hour was not recorded was because Mr. Mitchell was up on his duty time in the simulator.

When asked if instruction covered enhanced ground proximity warning system alerts, Mr. Rambelli said they covered EGPWS alerts in IFR training. Initial VFR training did not cover EGPWS alerts. In IFR training, they covered 5° nose up and takeoff power to get away from the obstacle.

Regarding the 7 instructors, all instructors could teach initial and recurrent VFR and IFR training. Not all instructors could conduct certification checks, some of them were only 61.58 qualified.

When asked if Mr. Rambelli failed a student before, he said yes, but this would typically happen in initial type check, but he tried not to recommend someone for a check that was not ready. He could not recall how often pilots needed additional recurrent training. Failures in training and failures in testing were not common but it was more likely to occur in initial than recurrent as this was usually a pilot's first exposure to a simulator or aircraft.

When asked if he possessed any follow-up notes regarding the accident pilots that were not contained in the records provided to the NTSB, he said they kept records for 5 years which was a FAA and EASA requirement. Mr. Rambelli said that the accident pilots were trained together all the time.

When asked if Mr. Rambelli ever conducted simulator sessions that included takeoffs in dark night, moonless conditions over water, he said it was not required nor in the PTS.

He had nothing else to add to the interview.

The interview concluded at 1229.

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