

Statement to the NTSB regarding the HA N393HA Pitch Trim event

Please answer the following in as much detail as possible:

Name: Kaiuwailani Yen

Position During Event (CA/FO/etc.): FO

1. What happened?

While climbing through FL360, the THS pitch wheel began to erratically move forward and aft. We were unable to hold the wheel or manually trim. With autopilot 1 or 2 engaged, the plane would immediately pitch up into a climb then pitch down creating an oscillation. With autopilot off, the wheel continued to move erratically but it did not affect the aircraft flight control stability. We contacted MOC and was told to maybe try a PRIM reset. We did not get any ECAM messages and we did not try this reset that should only be performed on the ground. We declared an emergency, jettisoned fuel to max landing weight, and headed back to LAX for a normal landing.

2. What cues were available? Describe in detail – noise, visuals, tactile cues...

The wheel started moving back and forth and we could hear it shaking in an erratic way. We tried holding the wheel but it would not allow us manual control and continued its movement. The pitch trim indication remained fairly constant while the wheel was shaking.

3. What actions were taken? (by whom, when, and in what sequence)

- Upon noticing the wheel movement, as pilot flying, I turned off autopilot 2. I turned it back on and the plane went into a climb then descent. I tried the same with autopilot 1 and had the same result. I clicked autopilot 1 off and left it off for the rest of the flight.
- My captain tried to manually trim but the wheel continued to shake.
- We had an A330 FO in the jumpseat and my captain called up one of our A330 captains to the flight deck from first class so we then had four of us up front.
- My captain contacted MOC via SATCOM.
- My captain declared an emergency and started heading back to LAX
- My captain informed the flight attendants and made a passenger address.
- We were cleared to dump so we began jettisoning fuel to max landing weight.
- We joined the arrival and landed safely in LAX.

4. What alternatives were considered? Why not implemented?

We considered resetting the PRIMs. The QRH warned against this type of reset being performed in flight and we had aircraft control at the time and did not want to worsen the flight control situation. We considered landing overweight, but we were high, over the ocean, and had time to jettison without needing a hold so we opted to land under max landing weight to prevent structural damage.

5. Describe your interactions and conversations with maintenance after the flight.

After the flight, LAX maintenance came onboard and began running tests. They discovered it was not a computer, but the pitch trim actuator unit that was causing it. However, they did not know what was preventing a runaway trim situation. They had never seen this before and wondered why no ECAMs were triggered.

6. What is your current understanding of the failure?

To my knowledge, the cause of the erratic trim wheel was some kind of fault with the pitch trim actuator. Maintenance said it needed to be replaced before the plane can be brought back to service.

7. Describe the controllability of the aircraft during the event. Were there any reversions of the flight control law?

No, the airplane had normal controllability and flight control laws with autopilot disengaged.

8. What training or guidance aided your response to the event?

When the automation is not doing what you want it to do, disengage and manually fly safely while you troubleshoot.

9. What training or guidance could improve others' response to a similar event?

I believe in any event if the airplane is not doing what it should, go back to basics. Aviate, navigate, communicate.

Mahalo,
Emma Yen

Statement to the NTSB regarding the HA N393HA Pitch Trim event

Please answer the following in as much detail as possible:

Name: James Morton

Position During Event (CA/FO/etc.): Off Duty Jumpseating Pilot.

1. What happened?

After climbing out from KLAX we leveled off at FL360. The THS Pitch Trim Wheel then started to shake FWD and AFT about 15% of a full rotation. This caused a slight pitch up with the autopilot engaged. Autopilot never exceeded RVSM tolerances but was disconnected and the other channel was tried with the same result. The plane was hand flown for the remainder of the flight. Regardless of the level of automation the Pitch Trim Wheel continued to shake. During manual flight the aircraft flew perfectly and trimmed correctly as indicated on the F/CTL pitch page. The Pitch Trim Wheel problem did not affect the automatic trimming of the plane in manual flight. We dumped fuel and returned to KLAX for a safe landing.

2. What cues were available? Describe in detail – noise, visuals, tactile cues...

The THS Pitch Trim Wheel shaking back and forth as described above accompanied by a pitch changed and unusual autopilot behavior in that it was struggling to maintain the altitude it was initially leveled at. Exhibited porpoising.

3. What actions were taken? (by whom, when, and in what sequence)

The THS Pitch Trim Wheel was initially grabbed by the PM. Autopilot was disconnected soon after by I assume the PF. Plane was hand flown back to level altitude. Other channel of the Autopilot was then connected and the same pitch issues were exhibited. Autopilot was disconnected again. Captain called for the DH 330CA in business class to come to the cockpit. DH pilot and jumpseater looked through QRH and manuals to find procedure as there was no ECAM. No procedure matched the current situation. MOC was called via SATCOM and all they could tell us was to try and reset a PRIM which is not allowed inflight according to the computer reset table in the QRH. No reset was performed. Captain decides to return to KLAX and notifies ATC. Fuel jettison is then performed down to 401.2 the MLW. Fuel jettison occurred while we were proceeding direct to a fix on the STAR. Jettison concluded before the start of the STAR and no holding was required. PF manually flew the STAR and Approach to 24L with no control problems. THS Pitch Trim Wheel continued to shake until touchdown.

4. What alternatives were considered? Why not implemented?

The PRIM reset was considered briefly until it was read that it is only allowed on the ground according to the computer reset table. Further trouble shooting was not warranted because the condition appeared stable. The plane was fully controllable with manual flight and trimmed correctly as it should in normal law. There were other ideas on what we could try if the Pitch

Trim Wheel decided to runaway but those would be a last resort since they are not in the manual and were not necessary given the situation.

5. Describe your interactions and conversations with maintenance after the flight.

Minimal. MX said they had some error codes but that was it. I left the cockpit shortly thereafter as I was a non rev.

6. What is your current understanding of the failure?

One of the stab trim computers faulted but did not completely fail which prevented the others from taking control. I have not been told officially what the problem was.

7. Describe the controllability of the aircraft during the event. Were there any reversions of the flight control law?

Flew perfectly manually. There were no revisions or ECAMS as far as I could tell from the jumpseat. Autopilot was unstable around the pitch axis but maintained RVSM tolerances during its brief use during the problem.

8. What training or guidance aided your response to the event?

There was zero guidance outside of the computer reset table saying PRIMs are only to be reset on the ground. Flight crew experience over our careers was most valuable since that's all we had to fall back onto. There used to be an OEB that would force the plane out of normal law for uncommanded nose down pitch that would have been considered had that situation occurred even though the exact situation for that old OEB is not the same. Getting the plane out of normal law to stop the trim from running would have been the next step since we had no other guidance.

9. What training or guidance could improve others' response to a similar event?

Having an ECAM or a clear paper procedure for a running or unstable THS Pitch Trim Wheel would improve response greatly. Including a similar situation in CQ would also greatly increase response and awareness.

Statement to the NTSB regarding the HA N393HA Pitch Trim event

Name: Jeremiah Dewey

Position During Event (CA/FO/etc.): CA

1. What happened?

Departing LAX. Flight 3. September 22, 2022

During climb, at approximately FL 360, the THS pitch trim wheel began to very quickly move forward and aft at a very significant speed. The wheel would move about 6" which equals about .3 to .75 units of actual trim. There were no ECAM's or alerts. The crew elected to initially turn off the autopilot to isolate the autopilot from the malfunction. We did try reengagements of each autopilot, however if autopilot 1 or 2 was engaged the aircraft pitch would become mildly unstable as the autopilot became affected by the abnormal trim wheel movements. I don't recall the actual vertical speed, but I do know the pitch would alternate up and down and was significant enough to be unsettling as a pilot. In each instance we disengaged the autopilot before the rate of climb/descent became excessive enough to cause a deviation of more than 150 ft or be noticeable to passengers. This was also evident as actual trim changes on the flight control system display. At this point the decision was made to not attempt further use of the autopilot. During this time we leveled off at FL390 and the FO continued to 'hand fly' the aircraft. With the autopilot disengaged the wheel movements did not affect the digital trim indication and the aircraft exhibited normal flight control and stability. I elected to continue the climb and level off as planned for a few reasons. The main reason is that we were in a stable flight path and I didn't want to change that until we figured out the problem. I did analyze our safety margins (altitude, weight, airspeed, etc.) and concluded that we had adequate margins with the autopilots not engaged.

My next course of action was to advise ATC that we had a flight control abnormality and that we would be returning to LAX. We were nearing the point where ATC would terminate services and I wanted them to be aware that we intended to turn around shortly. This was intended to be an advisement of our situation, but I felt that there were still pressing issues to address regarding the flight controls before we started turning around. It also allowed them to start planning the routing of other traffic in the area. I think the only aircraft in our immediate vicinity was HA7 and they were not quite a distance away. I believe the immediate area below and around us was clear of traffic to the extent that a block altitude or vectors were not necessary.—At this time I contacted the flight attendants to request that a traveling A330 CA in first class be sent to the cockpit. I advised them that we would be turning around and I would give them more info in a few minutes. I also initiated a call via SAT to our maintenance control in HNL (MOC) to see if they could be of assistance. Consultation with MOC via SAT provided no useful suggestions. The only advice was to "maybe try a PRIM reset". Our reset table in the QRH warns against resets not in the table

and the table only allows for this type of reset on the ground. We did not try a reset and MOC backed down on this suggestion after I pointed out the QRH limitation on a reset.

As a crew we were unable to find any applicable OEB, reset, or QRH procedure to apply in this situation. A review of the system architecture and description in the FCOM for the THS showed that:

“Mechanical control of the THS is available from the pitch trim wheel, at any time, if either the blue or the yellow hydraulic system is functioning. Mechanical control from the pitch trim wheel has priority over electrical control.”

This is not what we were experiencing. We were physically unable to stop the wheel completely or introduce any permanent trim changes manually at any time. I did try a few times to stop the wheel and get a hands on feeling of what was happening. It was clear that there were forces being applied to the wheel that in all instances would supersede any manual input. It was obvious from the erratic movement that there were opposing mechanical forces and I was uncomfortable adding another opposing force to the equation. I thought this could possibly expedite making things worse.

The previous events occurred over approximately 10 minutes or less. My next actions were to:

- declared an emergency with ATC and advised of our need to jettison fuel.
- Call the FA's and gave them a 'TEST' brief. This is a brief detailing the type of emergency, landing, and time remaining.
- I made a PA to the passengers and explained that we would be returning to LA and advised that those seated by a window might notice our fuel jettison. The PA explained that this was a normal part of reducing our weight to land earlier than planned. I gave good reason for our return to LA, but did not communicate the dire nature of our problem. I see no reason that this would have benefited the passengers or overall atmosphere in the cabin. I did check up with the FA's a few times during our return to make sure the sentiment was ok in the cabin and was told each time that everyone was doing fine.

ATC provided excellent vectors and assistance for our return and to accomplish the fuel jettison. All this time the 4 crewmembers were each accomplishing necessary tasks and keeping everyone in the loop. The 330 FO in the jumpseat and an airbus 330 CA that came up from first class provided an excellent resource to expand the crew.

- The FO was solely tasked with flying
- The jumpseater was getting weather, landing performance, ATIS, and assisting with the jettison procedure.
- The 4th pilot was contacting LA station and monitoring everything that was going on from a back-seat global perspective.

- The three non flying pilots were all continually trying to reassess the situation, FCOM, QRH, etc. in an attempt to figure out the fault or procedure to utilize.
- I repeatedly made a point to ask everyone a few times for their individual input on the problem. We were basically doing a continual OODA loop (observe, orient, decide, act). The problem is that we could only decide and act using our limited knowledge of the malfunction. Without a solution to the problem the loop was continuous, but usually resulted in a decision to proceed without new action and start the thought process again.

We jettisoned fuel to max landing weight per the QRH procedure. After the jettison I had the other three crew members each take a short bathroom break. This was both for physiological reasons and I felt it would be a good opportunity for each person to step away from the situation and come back with a fresh perspective and mental reset from any stress.

We returned to LAX for a landing on 24L. I was extremely concerned during the duration of this event that the unexplainable THS problem would quickly escalate to something much more severe. I briefed the crew that we would take the arrival process in steps. I tried to change one factor at a time in order to not complicate matters any quicker than necessary. We would slow, configure, or turn as individual tasks and assess the trim and controllability before the next action. This concept is also explained in our Flight Crew Techniques Manual.

“Prior to landing and at an appropriate altitude, the flight crew must perform an assessment of aircraft handling qualities in landing configuration in order to help determine an appropriate strategy for approach and landing. The flight crew must perform this analysis at different speeds down to VAPP. If it becomes difficult to control the aircraft when the aircraft goes below a specific speed, the flight crew must perform the approach landing at a speed above this specific speed. The result of the above-mentioned assessments helps to build the correct follow up strategy. The quantity of flight crew workload required to maintain control of the aircraft is one of the decision factors to take into account for this strategy. Good flight crew coordination is essential throughout the assessment process. The flight crew should share their own understanding and view of the situation with their other flight crewmembers.”

This is exactly what we did. The landing proceeded without incident and concluded with a long rollout and parking at the west end of the airports remote parking. The emergency was terminated after landing.

I'm happy to provide further clarification if necessary or if I missed a topic of interest to the NTSB.

2. What cues did we have available? Describe in detail – noise, visuals, tactile cues...
 - The THS pitch trim wheel moving very quickly forward and aft at a very significant speed. These movements did stop 3 or 4 times during the return for brief moments (5-10

seconds), but then returned. There was no correlation as to why we got those brief moments of reprieve.

- The digital trim indication on the Flight Control page would mirror the THS wheel if the autopilot was engaged.
- The aircraft pitching up and down when the autopilot was engaged. I describe it as similar in severity as to the glideslope pitch oscillations that can occur on an ILS when an aircraft on the ground taxi's in front of the glideslope transmitter.
- No ECAM's, alerts, lights, etc.

3. What actions were taken? (by whom, when, and in what sequence)

Explained in narrative.

4. What alternatives were considered? Why not implemented?

There were many alternatives that I personally played out in my head. These were mostly worse case scenarios. Given that we had positive control of the aircraft, I choose to only discuss a few considerations in order to not introduce added stress and adversely affect the crewmembers. We did have discussions about what to do if things got suddenly worse. The jumpseater was advised that he would be responsible for trying to hold the THS wheel from moving if it began a runaway. We talked about how turning of PRIM's would only be tried if we began to lose positive control of aircraft. I firmly believe that in a situation where there is not a clear understanding of the fault that less troubleshooting is often best as long as the situation is currently manageable.

I did consider (internally and unspoken) staying offshore and landing to the east, however since the problem did not worsen and we remained in positive control of the aircraft I didn't feel it was necessary to prepare for a worst case scenario and avoid flight over land and populated areas.

5. Describe your interactions and conversations with maintenance after the flight.

After a safe landing I was queried by MOC on the phone if I would be willing to fly again if the autopilots were MEL'd. It became clear that the gravity of situation was not clearly understood. I shared a video of the THS wheel with MOC and Delta Mx and that seemed to make everyone understand how this event was completely unique and not what would be considered a normal system abnormality/failure. I advised the Company that I would be unwilling to fly this aircraft unless a maintenance repair was complete and an explanation of the repairs completely assured me that the problem was fixed. I felt that it was necessary for me to take such a strong position to prevent the use of a MEL to redispach the aircraft with an unresolved problem.

6. What is your current understanding of the failure?

I've spent hours on the phone trying to gather more information on what happened and what the crew could have done differently. I've also sought more information regarding what options might have been available to us should the THS become a true runaway event. From conversation with one Airbus person and our MOC I believe that one trim motor and its associated safety backup systems/computer failed in an unanticipated manner. I later found out that the 'normal' alerts of aircraft problems sent to MOC or Airbus did not occur due to the failure of the pitch trim motor/computer. This explains why they initially doubted the severity of the problem.

7. Describe the controllability of the aircraft during the event. Were there any reversion of the flight control law?

- If AP1 or AP 2 on: Pitch instability
- NO autopilot: normal flight control and stability
- No reversion of flight control law.
- I think it's important to note that the FCOM states "In the unlikely event of such a failure, backup enables the PF to safely stabilize the aircraft, using the rudder and manual pitch trim, while re-configuring the systems." Had the situation digressed we did not have the ability to manually trim.

8. What training or guidance aided your response to the event?

The fundamental aviation principles (those called "Golden Rules" by Airbus) of: Fly, Navigate, Communicate guided my decision making process. That's really all we had. It was mostly my experience with other failures over the years that guided my decision making process. Over the past 20+ years I've had multiple emergencies and learned a lot from how both other Captains and myself handled each situation. We can always improve and learn from both the successes and mistakes we make. Unfortunately, I am unable to think of any aircraft/system training that aided us in this event. The problem appears to not have been contemplated or addressed by any procedure or training.

9. What training or guidance could improve others' response to a similar event?

This was a truly unique emergency in that it required mostly judgment calls based on knowledge of systems and risk assessment as opposed to ECAM actions. I'm very interested in the final determination by Airbus as to why the aircraft systems did not function properly, provide any ECAM guidance, or have an identifiable abnormal procedure for this type of emergency. 1

would hope that, at the very least, Hawaiian/Airbus publish a bulletin explaining what happened and eventually a procedure for erratic THS with no ECAM.

It might be useful to have limited training in accessing the maintenance portion of the MCDU to see current faults. Had we known what trim motor was malfunctioning it might have given us a better understanding of what PRIM to turn off had that become necessary.

I don't think we have training on any situation where we intentionally turn off PRIMs/SECs as a last resort. Most procedures address trying to reestablish a faulted computer. Instructors do turn off computers all the time in the sim to simulate direct law, but pilots are generally unaware what to expect as single and multiple computers are turned off. Obviously this type of training might lead pilots to use the knowledge in situations where they shouldn't, but it would be nice to have the knowledge when it's needed.

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The Event:

On 9/22/2022 on HA 3, approximately 45 minutes after take-off, I was called to the flight deck. Upon entering the flight deck, I observed that the Trimmable Horizontal Stabilizer (THS) was rapidly oscillating between nose up and nose down positions. I, also, observed that the First Officer (FO) was Pilot Flying (PF) and that the Captain (CA) was Pilot Monitoring (PM). At that moment, I believe that the PF was manually flying the aircraft. I was asked what I thought could be happening here and if I had any recommendations. I responded with "I didn't know what was happening and have never seen this kind of situation before." I think I asked if there was any ECAM's to which the CA said, "There was no ECAM". I did ask the PF how was the controllability of the aircraft and if she had positive aircraft control. She answered that she had positive aircraft control and controllability was good.

The CA had indicated that he just finished his call with Dispatch and Maintenance Operations Control (MOC). He indicated that he decided against resetting any flight control computers in the air because the Reset Table in the QRH indicated resetting any PRIM and SEC was an "On ground only" procedure. After hearing that, I felt comfortable knowing that he referenced our manuals as prescribed in our SOP for handling an irregular situation. At that point, the CA was handling a radio call with ATC to return to KLAX. Once we got turned towards the LAX airport, the CA informed the First Flight Attendant (FFA) that we were returning to KLAX and to inform the rest of the crew. A few minutes later, the CA made a PA to the passengers informing them that we were returning to KLAX.

At that point, I felt that the CA had everything under control, so I turned my attention to a more supporting role as the other observing pilot in the flight deck was already requesting the latest ATIS for KLAX and requesting landing distance performance for KLAX. I quickly looked up the architecture of the trim system in the FCOM, in case the CA or FO had any questions and wanted someone to research information. Since the other observing pilot was busy, I made sure I was on the observer headset listening to ATC, in the event, the PM inadvertently missed any ATC communications. I, also, called our LAX airport operations to get gate information and to ensure that our customer service and maintenance staff was going to be meeting the airplane at the gate. I relayed the gate information to the CA and FO informing them that we will be parking at a hard stand at the west end of the airport.

We were cleared to the LAX airport via the RYDRR arrival. The CA requested to land on runway 24L and that ARFF be standing by. The CA also requested radar vectors to an extended final approach to the runway in order to accommodate slowing and configuring the aircraft safely. The PM successfully handled all the ATC radio communication and other administrative duties and the PF maintained positive aircraft control at all times. We successfully landed on runway 24L and taxied off the runway to the assigned hard stand without incident. The CA cancelled the emergency and requested ARFF follow the aircraft to the gate. We arrived at the gate/hard stand where customer service and maintenance personnel awaited our arrival.

My Answers:

4. Resetting flight control computers could have been an alternative, however, the System Reset Table in our QRH indicates PRIM and SEC can be reset "On ground only". So, resetting any flight control computers were not a viable alternative. Continuing the PHNL could have been an alternative, however, continuing across the Pacific Ocean in that condition without any remedies did not seem like the safest option. I believe the operating crew made the safest decision to return to KLAX based on the resources available to them at the time.
5. I did not have any interactions and communications with any maintenance personnel after the flight. As a positive-space passenger traveling on company business, I was following the directions of our customer service agents and I deplaned the aircraft with the rest of the passengers and was taken to a holding area attached to the Tom Bradley Terminal.
6. My current understanding of the failure is that the aircraft possibly experienced a failure of the pitch trim actuator.
7. As indicated in my narrative above, the PF had positive aircraft control at all times. It did not seem that there were any reversions of the flight control laws that I could observe.
8. I was a former B767 Instructor/Check Airman, ETOPS and International Operations Instructor from 2012-2018, and an A330 Instructor from 2019-2020. With some of that experience, I was able to aid the crew during this event.
9. I believe our current training and SOP's are sufficient to guide flight crews to a safe and successfully outcome of the flight during irregular situations on the aircraft.