

By Jens Flottau

Is Europe's aviation safety system proactive enough to head off safety concerns? That has become a question in the wake of how regulators and other stakeholders have dealt with problems linked to Thales pitot tubes on Airbus aircraft.

Late last month, Airbus advised operators using Thales pitot probes on their A330/A340s to replace all but one of three on an aircraft and to switch to Goodrich devices, the only other supplier at the time. European Aviation Safety Agency (EASA) regulators echoed the finding, with a July 31 notice that it intends to issue an airworthiness directive mandating replacement of the probes.

But the action comes only after at least two years in which repeated problems with the Thales devices had been reported. EASA officials were aware of those at least since 2007, having internally expressed concern about "a significant number of in-service events." Those events were described as "at least hazardous" in an EASA presentation in late 2007. According to its own definition, "a large reduction in safety margins or functional capabilities" of the aircraft is typical of hazardous events along with "physical distress" and a high workload for pilots who "cannot be relied upon to perform their tasks accurately and completely."

Industry sources see room for improvement on how airlines, manufacturers and authorities share safety data, such as incidents of faulty speed indications. Airlines are required to report serious events to airworthiness authorities, but not to manufacturers. This may have contributed to Airbus's long-standing position that there was no need to replace Thales probes.

Problems with the pitot tubes have come to the fore as a result of the June 1 crash of Air France Flight 447. The fault warnings transmitted by the A330-200 before it crashed off the Brazilian coast pointed to a problem with speed indication and, potentially, the probes. Investigators are looking into whether ice crystals may have blocked the probes leading to incorrect speed measurements, which were documented in the automatic ACARS (Aircraft Communications Addressing and Reporting System) messages. EASA is now taking a more intense look at test results that seem to indicate a close correlation between pitot tube icing and extreme weather conditions encountered in the intertropical convergence zone that Flight 447 was flying through.

French accident investigators insist they have no evidence to lead them to conclude the pitot tubes were responsible in any way for the crash, a point Air France CEO Pierre-Henri Gourgeon has also emphasized.

Another big unknown is whether pilot performance may have been a factor; flight crew workload increases while navigating near severe weather. Since the crash of Flight 447, EASA and Airbus have reminded operators of the need to ensure that pilots are skilled in techniques to maintain level flight.

Air France underwent an extensive review of its safety operations following the 2005 crash landing of an A340 in Toronto. The report was highly critical of its safety and pilot training standards. Executive Vice President of Operations Gilbert Robetto says 90% of the recommendations have been implemented.

But four of Air France's pilot unions recently demanded further changes, including more simulator time. Nevertheless, even before the crash, problems with its pitot tubes had led the airline to pursue a replacement program, switching out an older Thales P/N C16195-AA standard, with the newer "-BA" version. Flight 447 aircraft had not undergone the change.

Further review is now prompting EASA to require airlines largely to shun the -BA version. The agency says the Goodrich probes have demonstrated "greater reliability" under simulated extreme weather conditions. The failure rate for Thales tubes was significantly worse than the alternative model. The "-AA" models, which were subject of an airworthiness directive early in their production run, will also be banned.

A Goodrich official says the company is assessing how it can meet the expected surge in demand. In recent days, Cleveland-based Aero Instruments has received FAA approval for its 0851HL-AI pitot probe as a retrofit option for all Airbus types except the A380.

Thales did not respond to Aviation Week's questions. Airbus would not comment, citing the ongoing investigation of Flight 447.

EASA stopped short of banning the Thales probes outright, allowing operators to continue to use the so-called -BA standard

as a third sensor on Airbus widebodies. A regulatory official says continued use of one Thales -BA probe is "probably acceptable."

Despite the higher propensity for icing, EASA officials have also allowed the -BA probes to continue to be used on A320s. An agency official says tests indicate that most failures occurred at Flight Level 35 (35,000 ft.) or higher and temperatures of -50C or lower. These results could be a hint that extreme weather conditions could have played a role in the Flight 447 crash, he adds. The aircraft had almost traversed an area of severe weather in the intertropical convergence zone when the ACARS failure message regarding unreliable airspeed data was sent.

What is raising eyebrows is that EASA and Air France officials say they tried to get clarification from Airbus as to how to handle problems with the probes long before the Flight 447 crash. An overview of the past 18 months also indicates that operators have been expressing concern about the issues with Airbus for at least this period.

In September 2007, Airbus recommended replacing on A320-family aircraft the Thales -AA pitot probes with the -BA version that allegedly showed improved performance, including less water ingress during heavy rain and a reduced risk of icing. Airlines did not generally follow the suggestion. Air France, for instance, replaced the -AA model on its A320 fleet, but not on its A330s and A340s because not a single incident occurred since the probes were installed in early 2003.

Since May of last year, Air France reported several episodes of speed data loss, initially on the A340. The airline counted seven incidents within six months and asked for corrective measures to be taken. Separately, in 2008, French leisure carrier Air Caraïbes experienced two serious icing events on two A330-200s in late August and early September, leading the airline to replace its pitot tubes. According to airline sources, Airbus replied that the probable cause for all of them was iced-over probes.

The later Thales -BA version nevertheless was not designed to address the problem of icing and could therefore not provide improved performance, contradicting the September 2007 assessment. Airbus also is said to have pointed out to Air France that the -AA probes exceeded regulatory requirements. On Nov. 12, 2008, Airbus formally altered its previous service bulletins in a memo saying that the -BA probes did not deliver any better icing performance.

Then, in a Nov. 24 meeting between Air France and Airbus, airline officials insisted on the "urgent need to provide an appropriate response," documents indicate.

Only in February 2009 were wind-tunnel tests launched to examine the -BA probe's susceptibility to icing.

In March, Air France experienced two additional in-service incidents, one on an A330, the other, an A340. "Once again we appealed to Airbus on several occasions. They replied by confirming the presumption of probe icing, referring us to a maintenance procedure and checks to the probes," according to one source.

In April, Airbus began to change its view on whether something needed to be done, suggesting that trials should be initiated to see if wind-tunnel test results could be confirmed in flight trials. Those tests showed significant susceptibility to icing. At this point, Air France decided not perform further tests, but moved to start replacing the probes.

The carrier began installing new probes on June 1, the day of the Flight 447 crash. The replacement effort was finished on June 12 covering all of its A320s, A330s and A340s.

In a June 8 service bulletin, Airbus reiterated that both of Thales's -AA and -BA and the Goodrich P/N 0851HL could still be operated.

That assessment came in spite of one incident on May 21: A TAM A330-200 temporarily lost all speed indications on a Miami-Sao Paulo flight. In a June 23 event, a Northwest A330 en route from Hong Kong to Tokyo experienced a temporary failure of speed and altitude indicators. Both inflight upsets could potentially be linked to pitot probe icing, although the U.S. National Transportation Bureau investigations are ongoing.

At that point, Airbus again changed its view on the issue by issuing a safety telex to operators on July 30. The telex stated that "dedicated wind-tunnel tests will be conducted under conditions more severe than currently applicable certification requirements to consolidate the knowledge of the behavior of each type of probe under extreme conditions."

Airbus recommends installing Goodrich-built probes into the No. 1 and 3 positions (Captain and standby) (see photo, p. 24) while the probe serving the first officer's instruments can remain Thales-equipped. The recommendation "is not applicable to A320-family aircraft at this stage."

Following the 2008 incidents, EASA claims to have asked Airbus for more details about how the manufacturer planned to deal with the problem - but long after dangers of pitot probe icing were known to its own experts. The effort came after Air France saw increased probe failure rates and Air Caraïbes suffered its inflight problem. That is also when the agency said it

asked the manufacturer to come up with proposals about how the probe reliability issues could be resolved.

Airbus, meanwhile, plans to review recurrent pilot training programs for unreliable airspeed conditions and hands-on flying, particularly at high altitude. Also, the manufacturer "will encourage at industry level the review of applicable certification requirements for icing conditions."

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