Challenges in Managing Corporate Response in a Crisis.

Dave Chapel and Sam Farmiga, GE Aviation

Dave Chapel is GE Aviation's Executive Chief Consulting Engineer for Product Safety and was the Flight Safety Director for GE Aviation for over 11 years prior to this. He is currently responsible for leading the expansion of GE Aviation's Safety Management System across the entire enterprise including design, manufacturing, and maintenance. Dave has participated in 27 on-scene investigations, including the Ethiopian Airlines B737 Max investigation. Before GE Aviation, Dave worked at Gulfstream Aerospace Corp. as the Flight Sciences Advanced Programs Director, responsible for aircraft aerodynamics, performance, and propulsion.

Sam Farmiga is a Consulting Engineer / Aviation Safety Lead at GE Aviation, guiding all civil accident and incident investigations. He has represented GE and CFM in numerous investigations spanning more than 20 years. Sam's prior roles at GE include flight safety manager, product support engineer, field service engineer, and flight safety engineer/investigator. After receiving a BS from Purdue University in 1984, he started his career at General Electric in 1985 as a Field Service Engineer. Sam is a Commercial Pilot, a licensed Airframe and Powerplant mechanic, and has an MBA and has been a member of ISASI for over ten years.

Abstract / Executive Summary

This paper recounts the development of the crisis response process GE Aviation uses to respond to a product-related business crisis, including aviation accidents. It discusses the structure of our Aviation Response Center (ARC) and how it integrates with and supports training to ensure a world-class response to significant business crises. It also describes how GE supports crisis-response readiness and maintenance across the broad spectrum of our products and services.

GE Aviation's development of its crisis response process has been a series of evolutionary and adaptive process updates based on lessons learned through actual events and rigorous training. The origin of this process traces back to GE's response to the 2009 US Air "Miracle on The Hudson" event. This event was caused by simultaneous impact of flocking birds to both engines resulting in loss of thrust and subsequent landing onto the Hudson River. A review of how the event was handled at the GE Corporate and GE Aviation levels led to a reevaluation of our accident response system. We found that the speed of the news cycle and our ability to stay ahead of the evolving situation required that we conjoin our internal and external responses. The result was to create a process that supports our modern aviation safety investigations by ensuring our team works cross-functionally during an inquiry. In addition, this approach considers the needs of all internal and external stakeholders as the circumstances evolve. Today, the Safety Team supports an accident while equipping all levels of leadership and the communications team with the relevant and timely information required, which enables them to determine actions addressing any necessary field issues arising from an event.

Some key learnings from the creation, development, and use of the crisis management process include:

1) **By having a standard work process, we realized that each event is a learning opportunity and now perform an after-action review.** This review informs and drives the implementation of process improvements. The strategy has proven so effective that we now use it for product events, facilities, and workforce issues.
2) **We recognized that having a documented process is useless if we failed to develop an information and training package for our employees to reference at the time of an actual event.** We designed and implemented a crisis management handbook for every involved employee to reference. It covers guidance for several types of events, including aviation events, facility issues such as fires or natural disasters, and personnel issues such as violence in the workplace.

3) **The accessibility and connectivity of the ARC needs to include all stakeholders.** In a post-COVID world, it is hard to appreciate that even in 2011-2012, remote work was still limited to instant messaging, email, texts, and voice calls. GE's first crisis management area was in the basement of an out of the way building with limited connectivity. The reality was that no one from the leadership suite was going to take, or had, the time to travel to a hard-to-find location. Having the ARC in the same building as key leadership is critical.
4) **We developed a crisis management training program for each of our engine product lines to reinforce the crisis handbook content.** Training, also known as a "crisis drill," occurs throughout the year and consists of three parts. The first training module overviews the ARC and how it supports all GE employees involved in a crisis response. The second training module covers our "Annex 13" process and GE's responsibilities under it. The final training culminates in a role-play and a simulation of an accident response. During the simulation, the team works through the process requirements using our crisis management plan so that each member knows their responsibilities.

Historical Process:

GE Aviation has had a well-defined accident investigation process for years related to supporting the National Transportation Safety Board (NTSB) and other investigative authorities (see Figure 1). The approach was very focused on meeting the guidelines of Annex 13 and keeping the few people in the business that were responsible for the engine program aware so that we could provide proper support to an investigation. Without walking through every step of the process, some key observations can be made:

1) There was an Aviation Operations Center (AOC) that served as the communication center after an event occurred.
2) Other than the step related to media relations, there is not a single step that requires communication within the company itself.

Fortunately, there was a dedicated communication flowchart that supports the investigative process as well (Figure 2). Some additional observations can be made here:

1) The Aviation Operations Center (AOC) serves (again) as the communication center after an event occurred.
2) Beyond initial notification, this flowchart highlights that formal leadership communication notionally occurred much later in the investigative process. For example, the term PSRB in the right-hand column of Figure 2 stands for Product Safety Review Board, a safety meeting that the senior leadership team attends. It is held on a quarterly basis.

The reality is and was that no leader at GE Aviation is going to wait 1-3 months to hear about an event – senior management responsible for driving and resourcing safety and appropriate field action needs to be in the loop real time. This set up a scenario where the Flight Safety Office received a large volume of inquiries when an event occurred distracting the team as they were prepping to launch on an investigation. From 2000-2010, most of GE Aviation's senior leadership grew up in the business, knew how our process worked, and understood how we dealt with events. They understood investigations had a protocol where the investigation team adapted to evolving circumstances and primarily interfaced with the impacted engine program team. All that changed for GE on January 15, 2009, with the water landing of US Airways Flight 1549 on the Hudson River. At that time, GE owned NBC Universal, and 30 Rockefeller Plaza in New York City was part of our corporate family. Imagine your company having significant media operations in the immediate proximity of a water landing on the Hudson River (see Figure 3). From this perspective, it was a watershed moment, and the accident became instant world news and the first significant event amplified globally by social media. The accident was front and center for GE's corporate leadership team and by extension, GE Aviation's leadership team. Furthermore, the overwhelming media coverage led GE's corporate leadership to launch an Enterprise Risk Management (ERM) initiative to quantify an aviation accident's impact on the company, our clients, the public, and our products' future viability.

Identification of a need:

The Hudson River event showed that our historical process for dealing with the event had not kept pace with the growth in media and the current flow of information. The identification of this gap inspired a dialog between GE Corporate and GE Aviation centered around the best way to manage during a crisis. Early on it was clear that the crisis management process needs to include product safety, facility safety, and people safety. Before defining a new process, GE Aviation benchmarked other organizations such as airline customers, disaster relief organizations, and our local county and state emergency operations centers. From a product safety perspective, several things emerged as key to the development of the crisis management process:

1) Background information related to the specific products needed to be easily accessible.
2) The communication plan for leadership needed to follow a consistent format with functional owners and clear guidance for escalation.
3) A way to monitor the real time flow of information across the globe to assure that as soon as something of interest happens in the world, we can identify and react to it.
4) A communication center, near leadership, was desired.

Product Information Handbooks:

Providing the background information related to the specific products was addressed by creating what is called the Product Information Handbook. This was one of the early successes related to crisis management. A process was established where each of the product lines would provide, on a quarterly basis, a summary of fleet information as well as a summary of any key issues currently impacting the fleet. This information was collated and made available digitally. An example of this is shown in Figure 4.

Product Event Response Process:

The product event response process is our leadership communication plan (Figure 5). At a high level this is a two-step process. The first consists of an Event Assessment team that decides if criteria are met to warrant a Triage Call. The second is the Triage Call itself. GE Aviation is currently using four criteria to decide if an event moves to the Triage Call stage. These four are:

1) Were there any fatalities?
2) Is this a CAAM Level 3 or higher event (see Reference 1)?
3) Is there significant media coverage?
4) Does this appear to be an uncontained event?

If the answer to one or more of these questions is “yes”, the event proceeds to the Triage Call phase.

Triage calls are a formal series of meetings set up shortly after we are aware of the occurrence of an event. Distribution of information and invitations to attend are minimal at the onset of an event. The team invited to a Triage Call is predefined within the Crisis Management Plan for each product line. Each contact can get multiple notifications and invitations through either phone calls, texts, a mobile app that can send phone notifications, and email meeting notices. This multi-mode notification process helps ensure that all stakeholders are aware of the issues and embedded in the resolution process. Triage calls take priority over all other items a person is working on, and those participating understand the company's Annex 13 requirements. The agenda used at the Triage Call has evolved over the years and is known as the "Crisis Board." It follows a fixed structure that dictates the role of each cross-functional participant.

Participants use the structure to ensure they cover the required information during the call and what should be shared. The first Triage Call may be a few hours after an event, but we may not know much about what has happened. The triage team is responsible for steering our response and allocating resources to support the event.

This triage team helps ensure that there is no roadblock to the team delivering the needed actions, and it places a strong expectation on the factory to meet the schedule with validated solutions. The Triage Call is a supplement to the engine program's factory team working on the event. GE Aviation has a procedure for accident investigations that calls out the creation of a “factory” team when an event occurs. This team is a cross-functional team that is brought together to support the on-scene investigators as well as trying to understand what happened and determine if there is a broader fleet issue. As noted above, one of the key goals of the Triage Call is to provide the leadership team with the current / available information while the investigative and factory teams can execute their respective tasks.

During this process, the Flight Safety Office team serves as the company’s party leader, ensuring that we operate within Annex 13 requirements. The triage team’s responsibility is to provide correct information flow within the team and ensure everyone has resources to support their deliverables. The last step in the Triage Call process sets the exact time of the next call so that the team is fully aware of when the subsequent deliverables are required. These follow-on calls can be later the same day or the next morning. The most important part of this process is that the team actively works towards the next update because they know their requirements. This firm setting of the following call eliminates the need and urges for numerous calls between the different functions to find out what is happening. This process sets the expectation of when the next update will occur and what will be delivered, thus freeing people's time to accomplish the needed tasks to support the investigation. When we come to the next triage call, we operate with a consistent fixed agenda that fully identifies the required people who clearly understand their deliverable, and when on the schedule, they provide their updates. This process continues until the team decides the added oversite is no longer required, and the process is then handed to the factory team to work to a conclusion under the guidance of the Flight Safety Office, who coordinate with the agencies and maintain our Annex 13 requirements. The factory team stays engaged until the conclusion of the investigation and only closes out the investigation internally when the agency issues the final report.

Development of the Aviation Response Center (ARC):

The establishment of ARC came about in 2015. The ARC is a physical location in our facility, in the same building as most of our leadership team, but it is more than a group of rooms; the ARC is a process and how we operate our business. Three simple pillars guide the ARC:

1) It drives our approach to the safety of our employees and the flying public.
2) The ARC supports our customers and employees through the investigative process.
3) It enables us to protect our brand reputation as a company with world-class safety values and procedures.

We function with the concept that if you accomplish the first two, the third item comes naturally. The ARC is staffed 24X7 with trained intelligence analysts that monitor the world for any event that could be affecting the company and our employees. They use the same approach for any significant events, from those involving product safety to natural ones involving our facilities, and / or employees. The ARC also guided our response to COVID-19. The ARC gives GE a location to operate from and monitor and control the process. Examples of the ARC's actions included sending gasoline, food, and water supplies to employees at a facility in a region struck by a hurricane; facilitating the repatriation of employees that have been affected by health issues or political events when they are outside their own country. More recently, the ARC ensured that employees affected by COVID received the care and resources needed for their recovery and the safety of their families. It also facilitated testing and international travel exemptions so that GE Flight Safety could travel to support accident investigations when travel was brought to a halt by the pandemic. The ARC is also our tool to support aviation events affecting our products. The ARC is fully versed in our Annex 13 requirements and help facilitate information flow, travel need, and local resources that can provide support for an accident.

As discussed above, the ARC is a brick-and-mortar facility (see Figure 6), but that is not what it truly is. The ARC is genuinely a way of thinking. It is a process staffed by a skilled team that learns and evolves with each event. At the inception of the ARC, we had new access to timely information with a global reach, and we had skilled people to operate the process and deliver the requirements.

A Consistent Process for Multi-modes:

The triage process is initiated and facilitated by the ARC. The ARC uses the same triage process for all the company's crisis issues. It is not only used for product safety events; it serves GE for facility events, natural disasters, geopolitical events, COVID-19 responses, employee emergencies, and many other critical events. While the overall process stays consistent for each different type of event, each event has a unique crisis board, and the team invited is different. In all cases, the ARC facilitates the process, and they have a skilled team trained to understand the unique modes and their related regulatory environment and how we can best and most quickly respond. In summary, we follow the same high-level process for a facility that may have had a fire, or a hurricane strike, as we do for Annex 13 investigations. The approach lets us ensure our employees are safe and we are responding to the event while bringing to bear the complete resources of the company with speed and a thoughtful, logical, and compliant approach.

This process is a learning process, and after each use of the process, we examine the outcome to identify improvements and then adjust our approach for subsequent events. Nearly every time we have used this process for aviation events, we have identified enhancements and corrections and proceeded to implement them rapidly. At GE, we used this process for all our fielded products, including all our partnership engine programs. Since we do not compete for safety, we share 100% of our methods with our partner companies and ask for their ideas for improvement that they think may make this a better process.

Exercising the Muscles in the Off-season (Training)

Fortunately, commercial aviation has become a very safe environment, and for us, the number of Annex 13 events where we go on-scene or support an engine teardown is around three / year. Considering we have around a dozen distinct engine product lines, the opportunity to go through an actual crisis is limited. Our crisis management process accounts for this gap in expertise by having team members that are highly skilled in the function. They steer and guide the process during the infrequent uses of this process, so the team members from each engine program involved are coached and know what is required. We have also developed a training package we call a Crisis Management Drill. The drill is mandatory training for the key members of an engine program and occurs once per year. We can also do separate drills with each engine program to address unique or specific needs such as working with our Joint Venture partners or OEMs. There are instances where phasing drills accommodate a program's operating environment. The approach for large Commercial, Business, General Aviation, and Military programs have things in common, but there are unique differences, so we separate the drill by-product to ensure we train in each sector's uniqueness in what we deliver. Our drill is a training session, and it contains three distinct sections of training. The activity in the first training section describes the ARC itself and the coverage it provides to all employees. It includes information on the 24-hour support and a description of analysts on staff. It goes into the scope of the ARC's coverage, including awareness of all GE business travelers across the globe and our emergency notification system available to all employees. The second phase is all about Annex 13 and the process of an investigation, and where our company fits in as a technical advisor or party member. The third section is a walkthrough of an Annex 13 investigation from initial notification and into the Triage Calls. It provides them exposure to an initial triage call and a typical second call. This section teaches the communication requirements of each role as we operate on the premise that each employee at this business level knows how to do their part. By setting their communication expectations, we define what they need to do to complete the process. GE, like many large corporations, is a very fluid organization and this training provides another check on making sure the contact lists

are up to date. The ultimate goal is to assure that all the team members that may become involved in the process have had exposure to how the process works prior to an actual event. We also do a quick refresher with the designated factory team members when initiating a new event.

Crisis Management in Action:

Before 2015 we used a controlled email distribution to keep the key leaders and factory team members informed during an Annex 13 accident investigation. As noted previously, this frequently resulted in multiple calls to the Flight Safety Office, disrupting preparations to support an investigation. On March 24, 2015, Germanwings crashed into the mountains of France. Today we all know that was an act of suicide, but at the time, most in the industry could not conceive how this event could happen. With our partner in France, GE Aviation produced the engines on the Germanwings aircraft. We focused on how we could support the investigation. Did we have a potential airworthiness issue to address? Information flow was languid during that event, and our leadership was becoming anxious about what we could do to support our flying fleet. This event was the final impetus to move forward with the Triage Calls and the Crisis Board.

We harmonized our response across the business and now use similar processes for many different events. As we were developing our enhanced Crisis management plan, 2015 emerged as a year that tested our methods multiple times. It started on February 5, 2015; a fire at GE's Dowty Propeller facility caused severe damage to 80% of the factory building, destroying the main production line. This event and our need to perfect the accident response process were compounded by a similar event on April 3, 2015, when a fire erupted at General Electric Appliance Park in Louisville, Kentucky, shutting down production at a sprawling manufacturing center that employs thousands. Both events clearly show that the company needed to respond quickly to meet the needs of our employees and our customers so that normal operations resumed as promptly as possible.

Summary / Conclusions:

With the growth of GE's installed engine base and explosion in social media and instant news and information flow, it became apparent to GE Aviation that our traditional methods for handling a crisis were not keeping pace with the times. We initiated benchmarking with other organizations with well-established methods or that were specialized in crisis management. GE then executed on a plan to modernize our operations which cumulated in the establishment of the ARC. The ARC is staffed 24X7 by analysts who are experts in their field, searching the globe for any issues that can affect GE Employees, our products, and the flying public.

The development of the ARC led to the refinement of our processes and has generated standard work that we use to respond to all nature of events that a large entity can face. This process includes after-action reviews that lead to improvements and enhancements each time we use the technique. We provide mandatory annual training to ensure employees understand how it affects their function and responsibilities, including regulatory compliance by sector and Annex 13 in the aviation sector. This training is given to all GE employees who may become part of the process and to our partner companies involved in our joint venture engines.

The ARC and our crisis management plan drive improved communication across all levels of the organization with respect to our event responses. The ARC response roadmaps enable GE to respond to crises that range from meeting the needs of employees stranded in a country due to a geopolitical issue, to those impacted by a natural disaster, or even those involved in an aviation-related event. Our process, team building, and training rigor ensure we respond to an event in an efficient manner, and it defines our clear guidelines to provide the best possible response while remaining compliant with applicable regulations related to the event. As accident investigators, it ensures proper resourcing and robust communication flow to all levels within the organization reducing disruptions to the accident investigation team as they prepare to launch.

As noted above, some key learnings from the creation, development, and use of the crisis management process include:

1) By having a standard work process, we realized that each event is a learning opportunity and now perform an after-action review.
2) We recognized that having a documented process is useless if we failed to develop an information and training package for our involved employees to reference at the time of an actual event.
3) The accessibility and connectivity of the ARC needs to include all stakeholders.
4) We developed a crisis management training program for each of our engine product lines to reinforce the crisis handbook content.

References:

1) Continued Airworthiness Assessments of Powerplant and Auxiliary Powerplant Unit Installations of Transport Category Airplanes, FAA Advisory Circular AC39-8, 09/08/2003

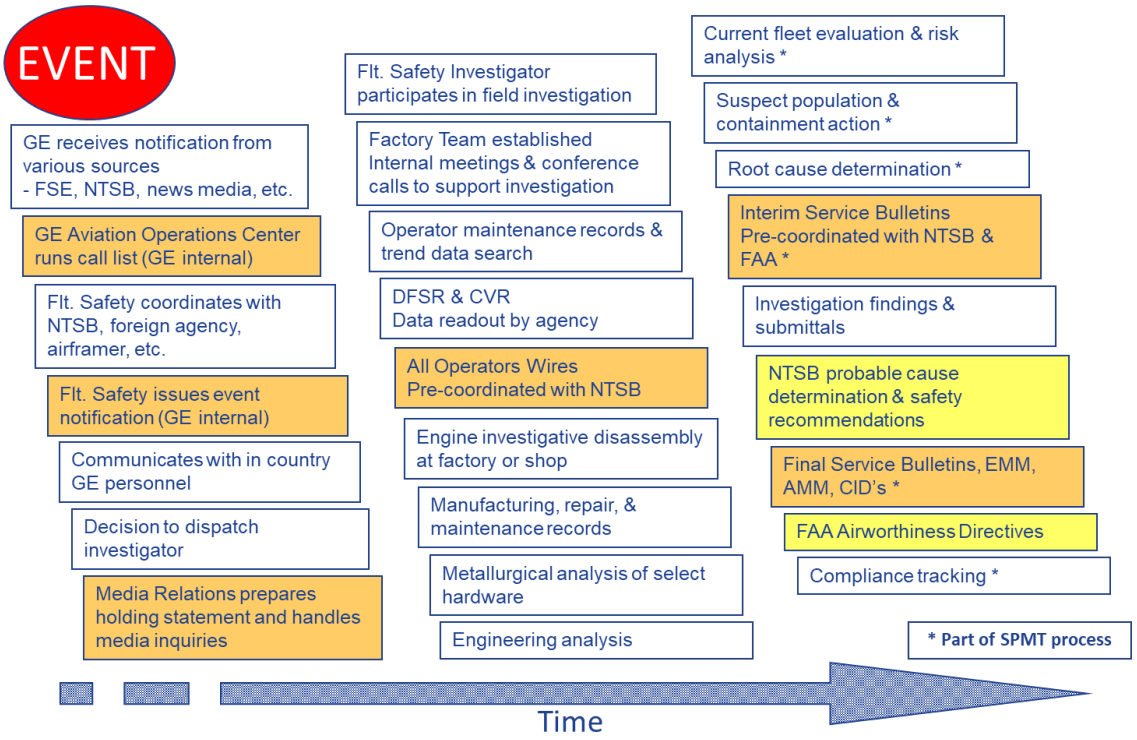


Figure 1 – GE Aviation Safety Investigation Process – Circa 2010

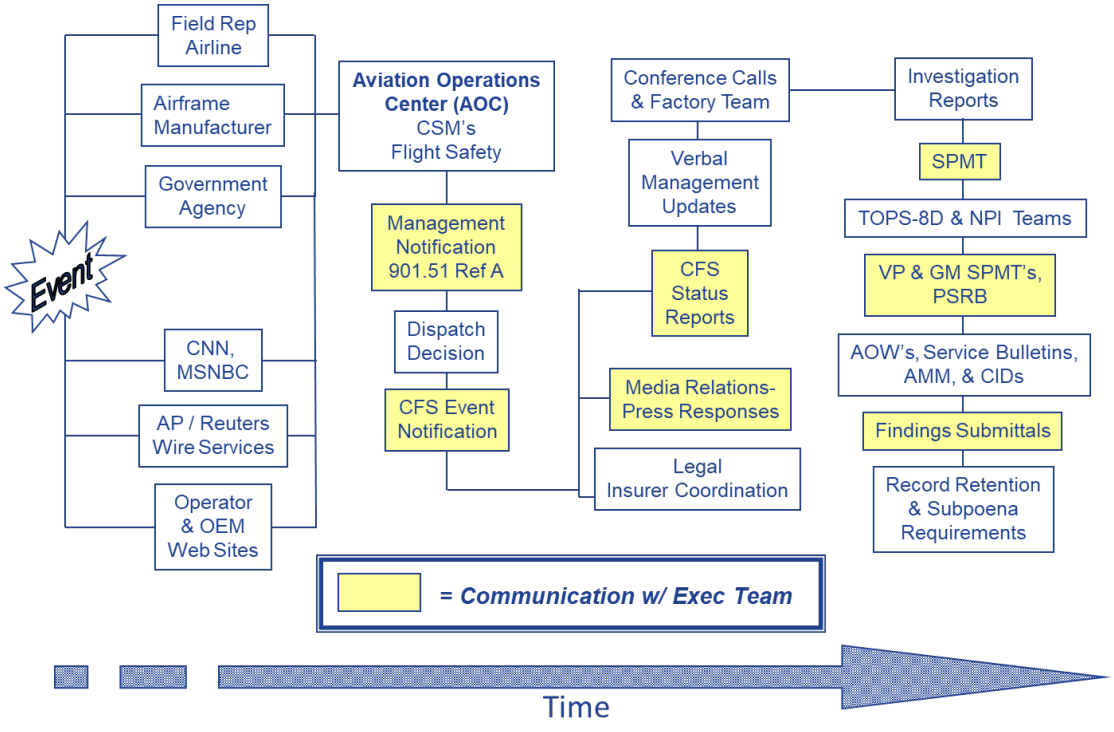


Figure 2 – GE Aviation Communication Flowchart – Circa 2010

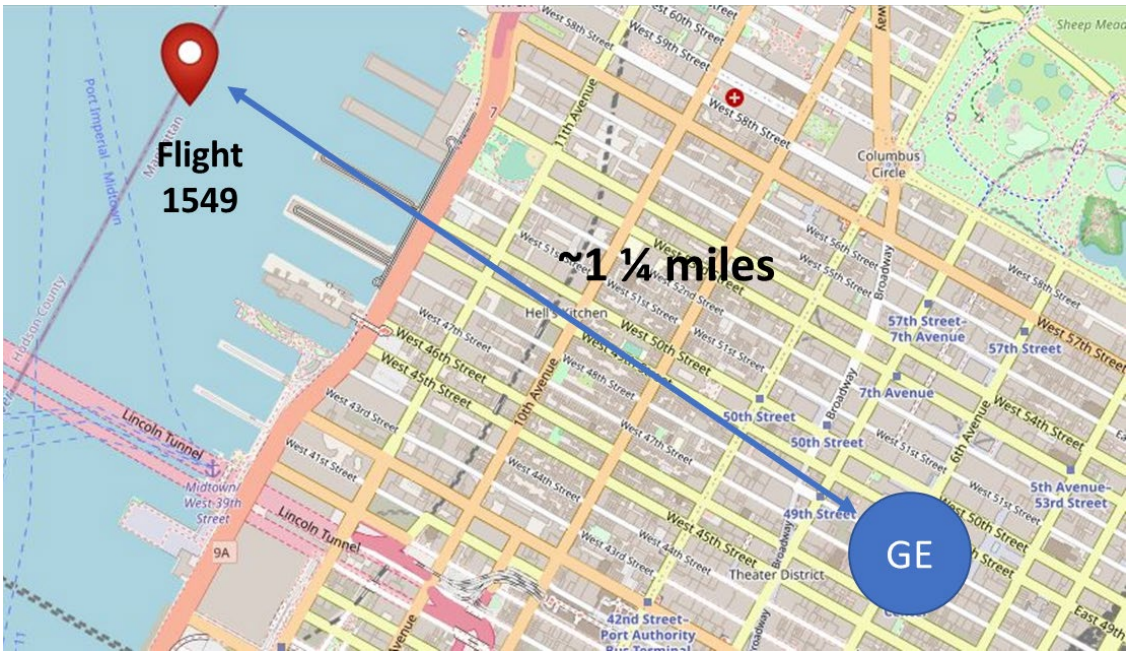
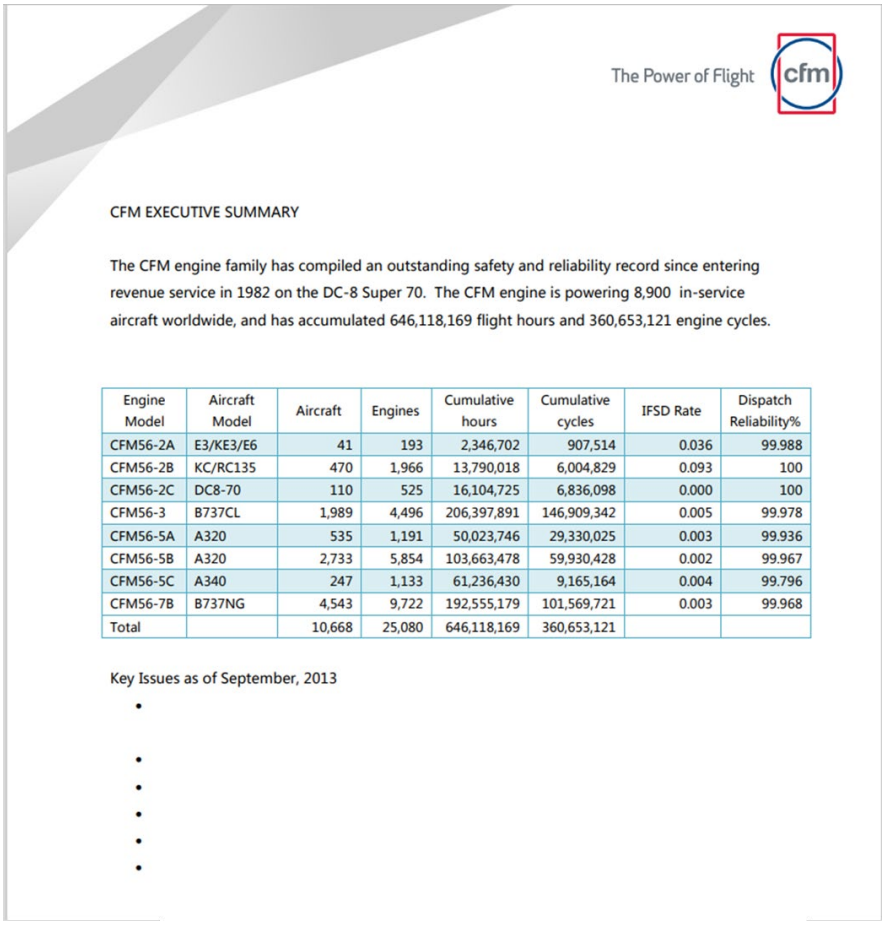


Figure 3 – US Airways Flight 1549 Proximity to GE (30 Rock)



The Power of Flight cfm

CFM EXECUTIVE SUMMARY

The CFM engine family has compiled an outstanding safety and reliability record since entering revenue service in 1982 on the DC-8 Super 70. The CFM engine is powering 8,900 in-service aircraft worldwide, and has accumulated 646,118,169 flight hours and 360,653,121 engine cycles.

Engine Model	Aircraft Model	Aircraft	Engines	Cumulative hours	Cumulative cycles	IFSD Rate	Dispatch Reliability%
CFM56-2A	E3/KE3/E6	41	193	2,346,702	907,514	0.036	99.988
CFM56-2B	KC/RC135	470	1,966	13,790,018	6,004,829	0.093	100
CFM56-2C	DC8-70	110	525	16,104,725	6,836,098	0.000	100
CFM56-3	B737CL	1,989	4,496	206,397,891	146,909,342	0.005	99.978
CFM56-5A	A320	535	1,191	50,023,746	29,330,025	0.003	99.936
CFM56-5B	A320	2,733	5,854	103,663,478	59,930,428	0.002	99.967
CFM56-5C	A340	247	1,133	61,236,430	9,165,164	0.004	99.796
CFM56-7B	B737NG	4,543	9,722	192,555,179	101,569,721	0.003	99.968
Total		10,668	25,080	646,118,169	360,653,121		

Key Issues as of September, 2013

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Figure 4 – A page from the Product Information Handbook

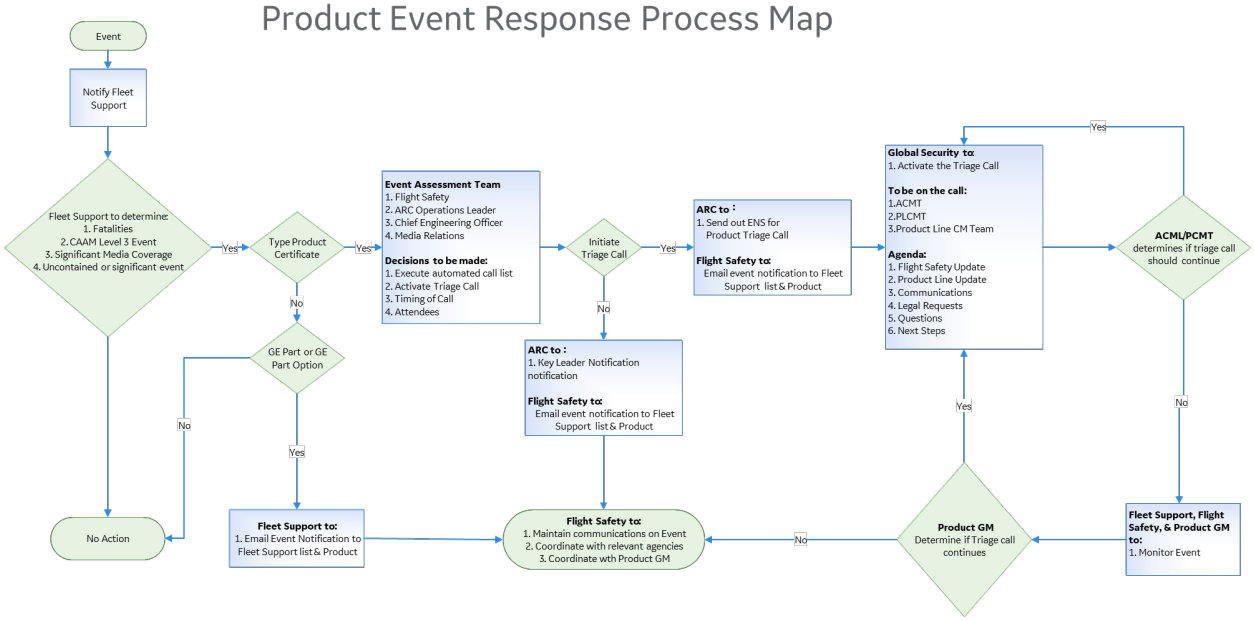

Figure 5 – 2022 Product Event Process Map

Figure 6 – The ARC