



**National
Transportation
Safety Board**

Evacuation Communication and Decision Making

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NTSB

- Independent federal agency
- Conducts multi-modal investigations
- Determines “probable” cause
- Publishes accident/incident reports
- Conducts special studies
- Issues recommendations

Overview

- Past NTSB studies and recommendations
- Recent evacuations

Special Investigation on F/A Training (1992)

- Strongly endorsed joint cockpit/cabin emergency training and CRM for F/As
- Recommended requiring evacuation/wet ditching drill group exercise during recurrent training (A-92-74)
 - “Ensure that all reasonable attempts are made to conduct joint flight crew/flight attendant drills”
- Recommended F/A CRM including group exercises (A-92-77)



NTSB

FAA Response to A-92-74 and A-92-77

- Acknowledged that communication and coordination continued to be a problem
- Updated Advisory Circular 120-51B/C and stated that F/As should conduct CRM training with flights crews covering shared issues
- Directed POIs to be aware of benefit of joint drills
- No regulatory changes



NTSB

Evacuation Study (2000)

- Study was first of its kind
- Examined all Part 121 evacuations for a 16-month period
 - 46 evacuations
 - 2,651 passengers



Evacuation Study (2000)

- Identified safety issues
 - Decision making
 - Adequacy of air carrier procedures
 - Effectiveness of evacuation equipment
 - Communication issues



Evacuation Study (2000)

- 43/46 evacuations initiated by flight crews
- Flight crews received inconsistent guidance on when to evacuate
- Recommended changes to flight ops manuals and checklists (A-00-80)
- FAA directed POIs to review procedures and encourage operators to include checklist items

Evacuation Study (2000)

- Exit selection
 - Often done in an attempt to minimize injuries
 - NTSB was unaware of any data to support
 - F/A procedures were inadequate or nonexistent
- At a minimum, all floor level exits that are not blocked by a hazard should be used

Evacuation Study (2000)

- Communication and coordination
 - 23 of 34 flight crewmembers reported having joint CRM with F/As
 - Only 10 had exercises
 - 3 of 35 F/As stated they had joint drills with flight crews
- Communication and coordination problems continued to exist
- Recommended FAA require periodic joint evacuation exercises with flight crew and F/As (A-00-85)



Evacuation Study (2000)

- FAA directed POIs to notify operators about the desirability of having crews perform joint drills
- No regulatory changes
- Classified “Closed-Unacceptable Action” in 2004



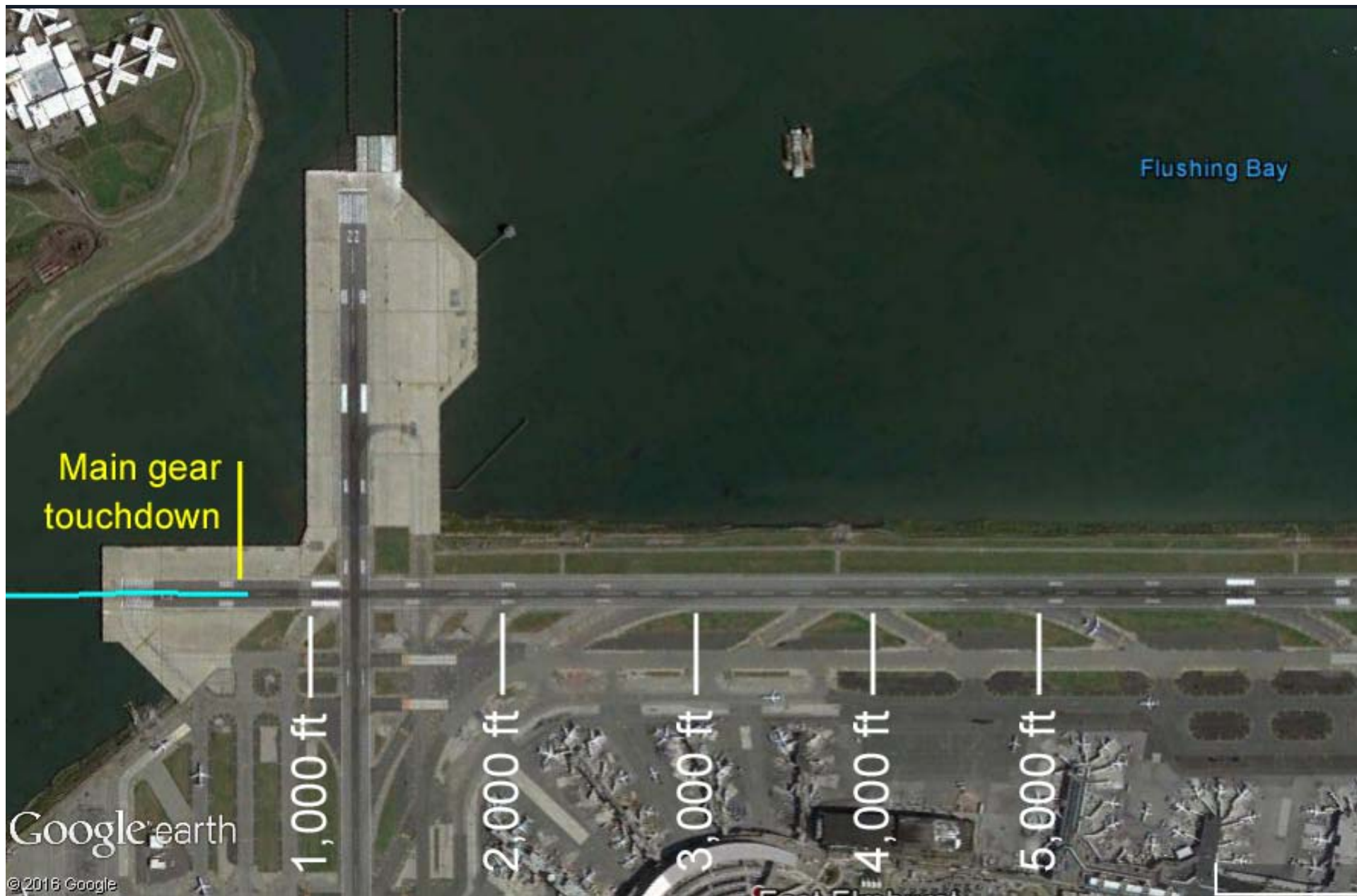
Delta Air Lines Flight 1086, MD-88 LaGuardia, NY March 5, 2015



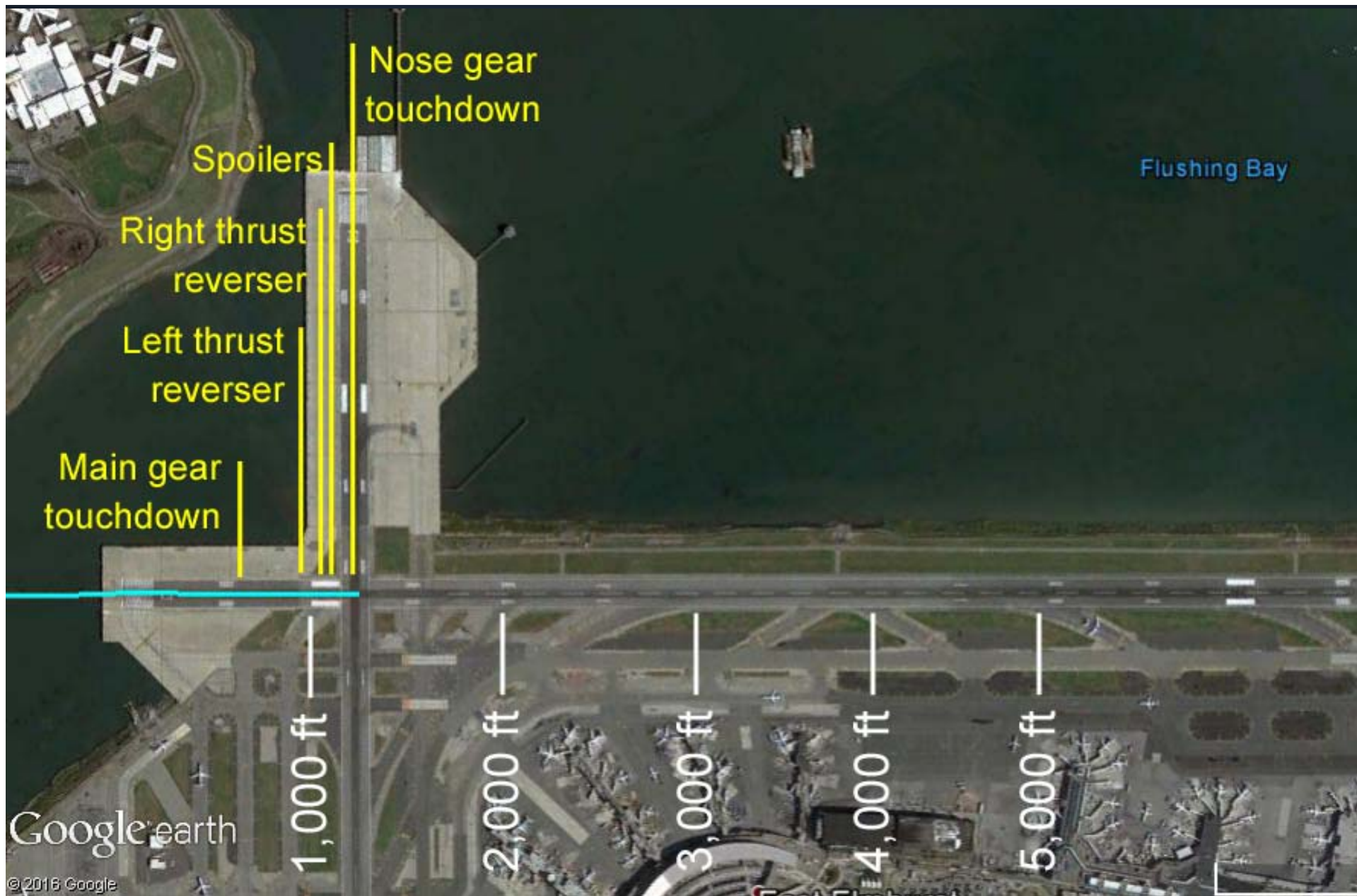
Accident Summary

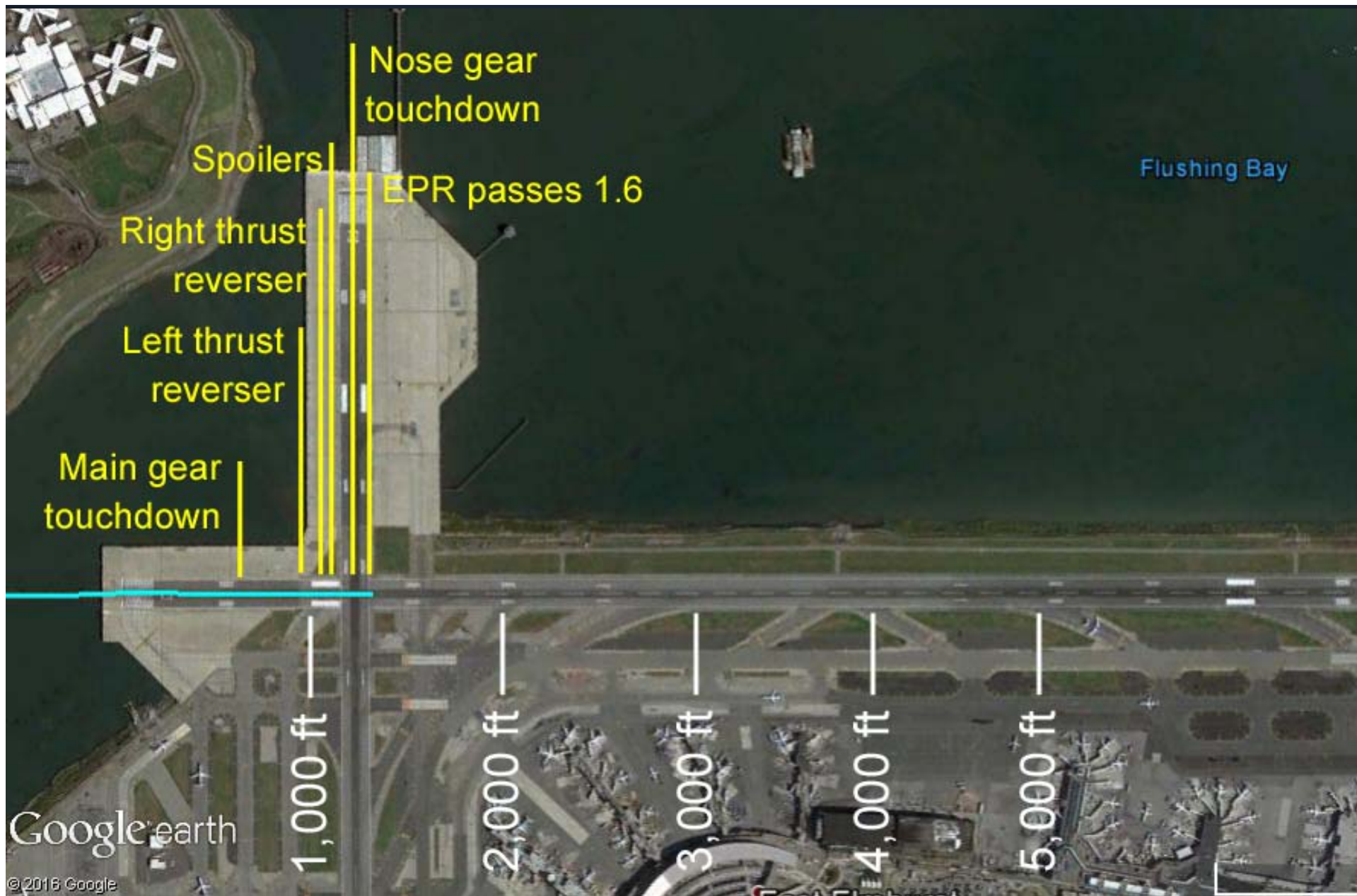
- 2 pilots, 3 flight attendants, and 98 of 127 passengers not injured
- 29 passengers received minor injuries
- Airplane substantially damaged
- Flight originated from Hartsfield-Jackson Atlanta International Airport, Atlanta, Georgia

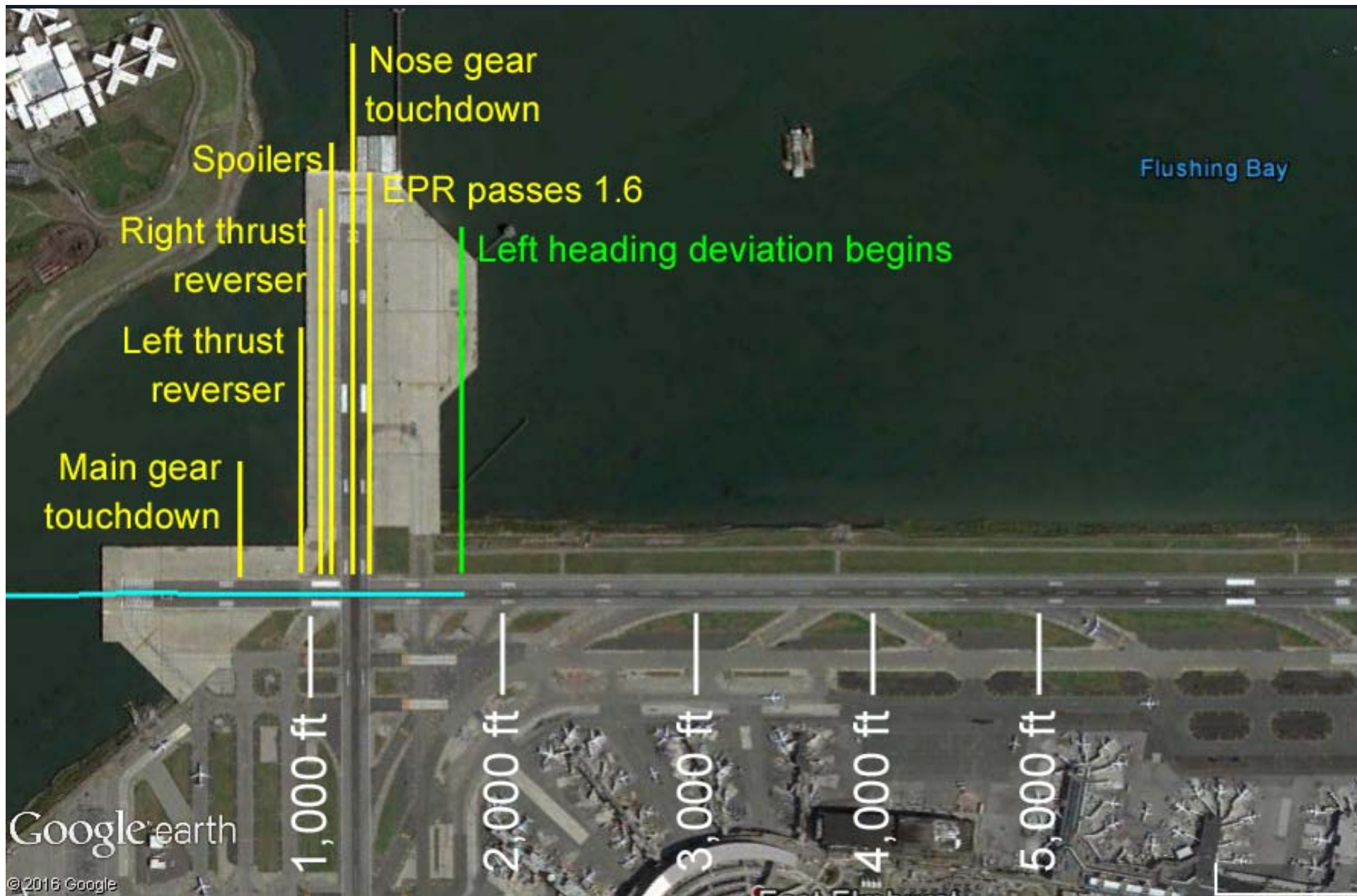


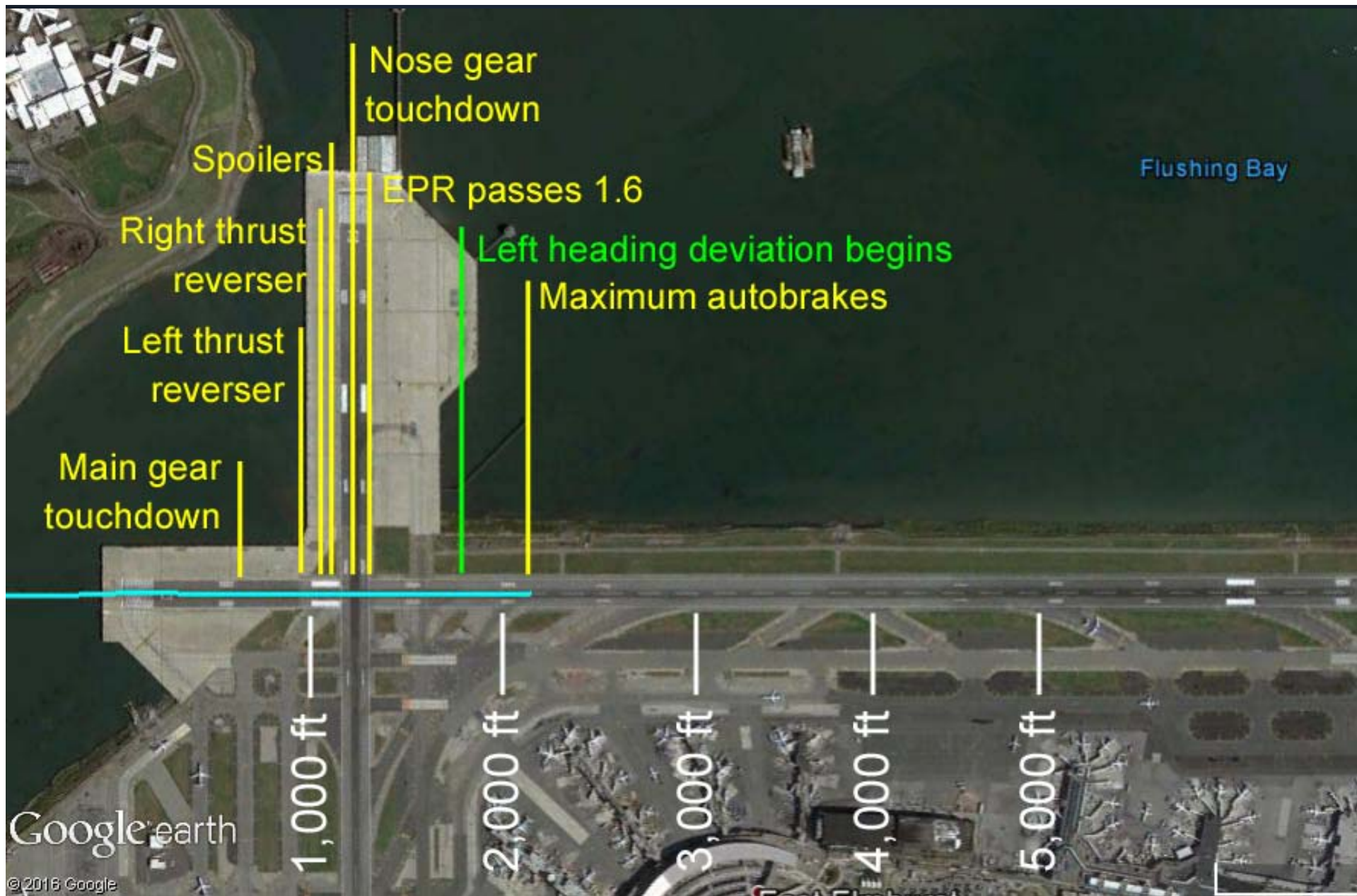


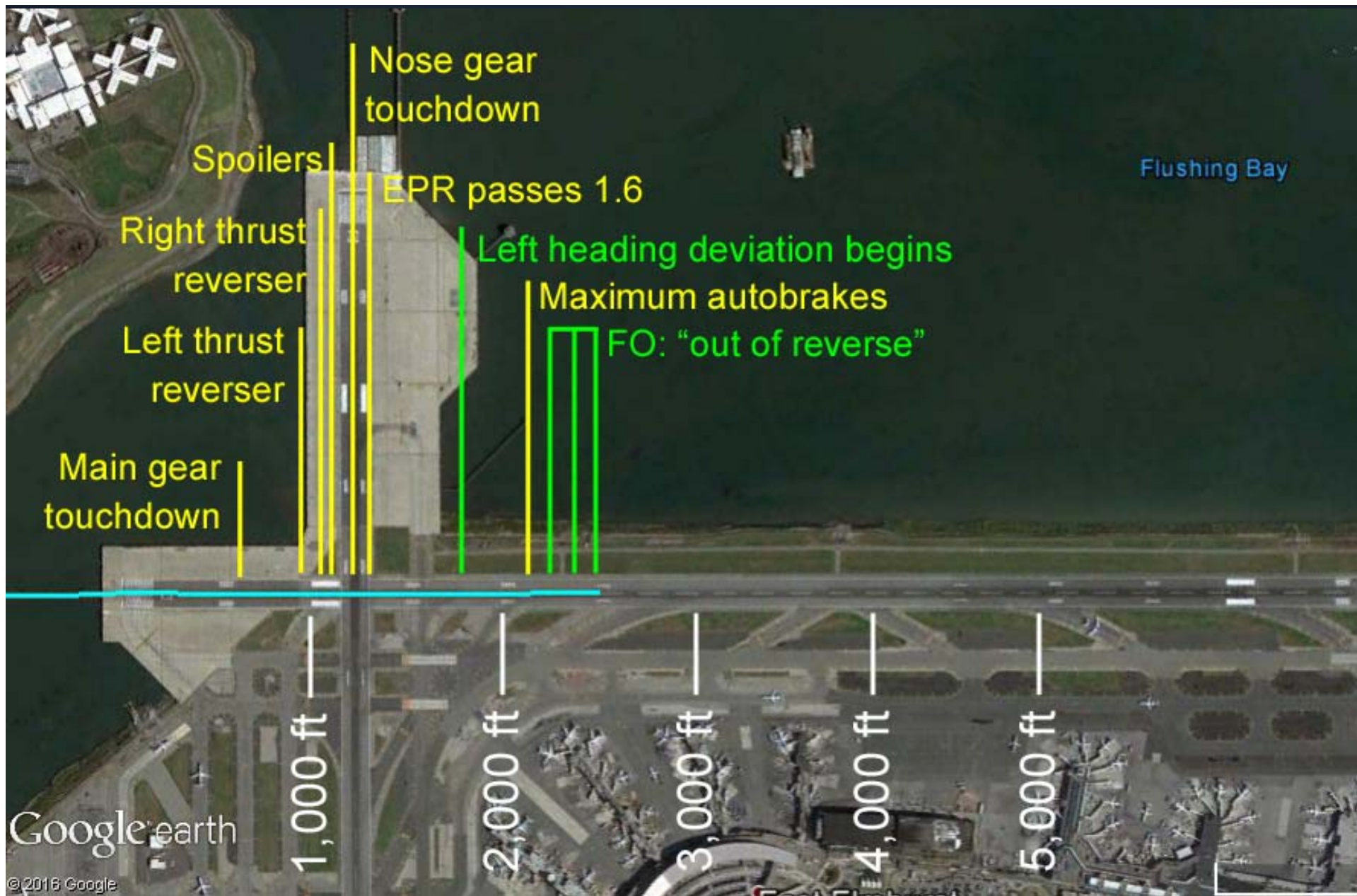


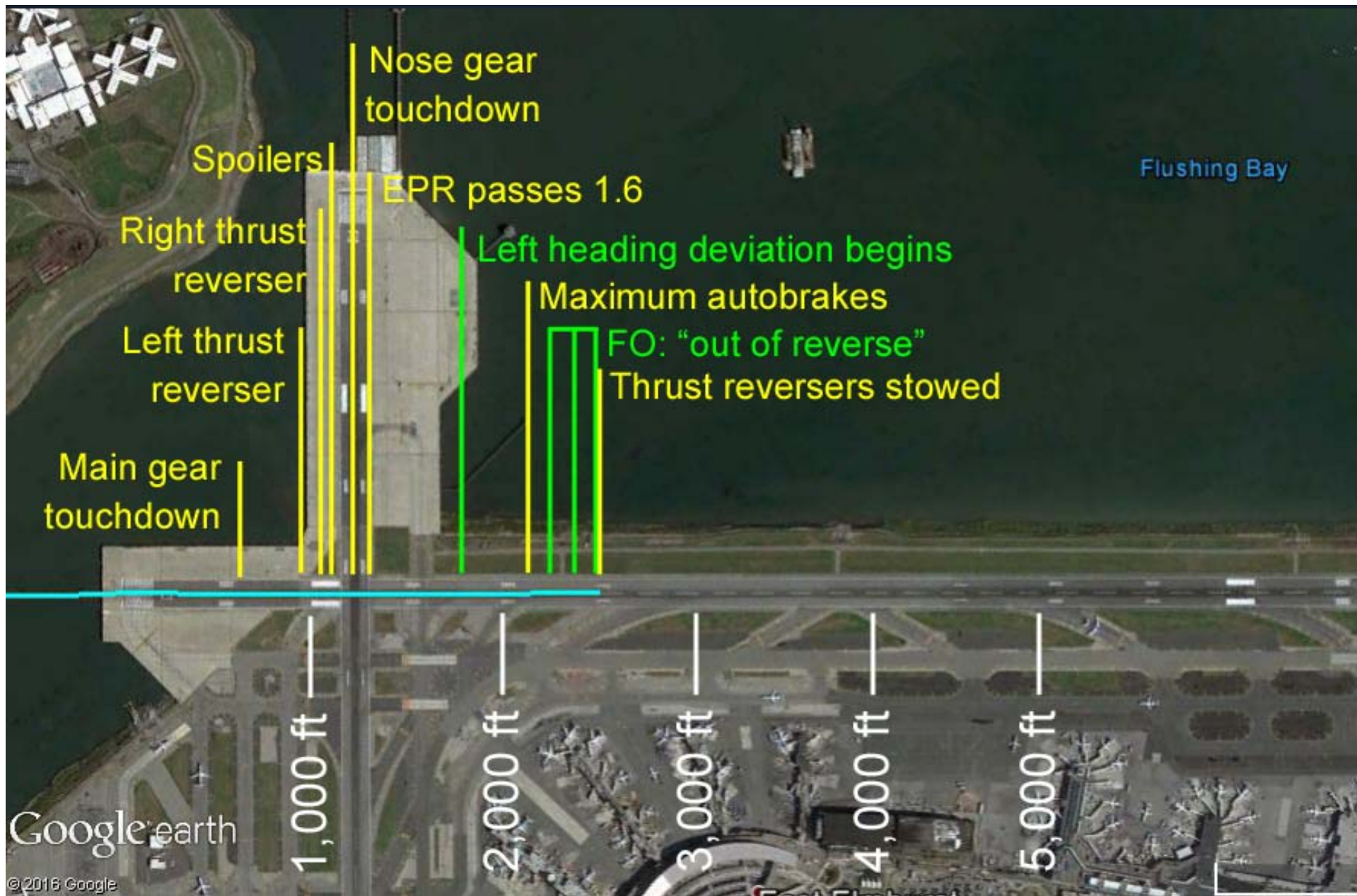


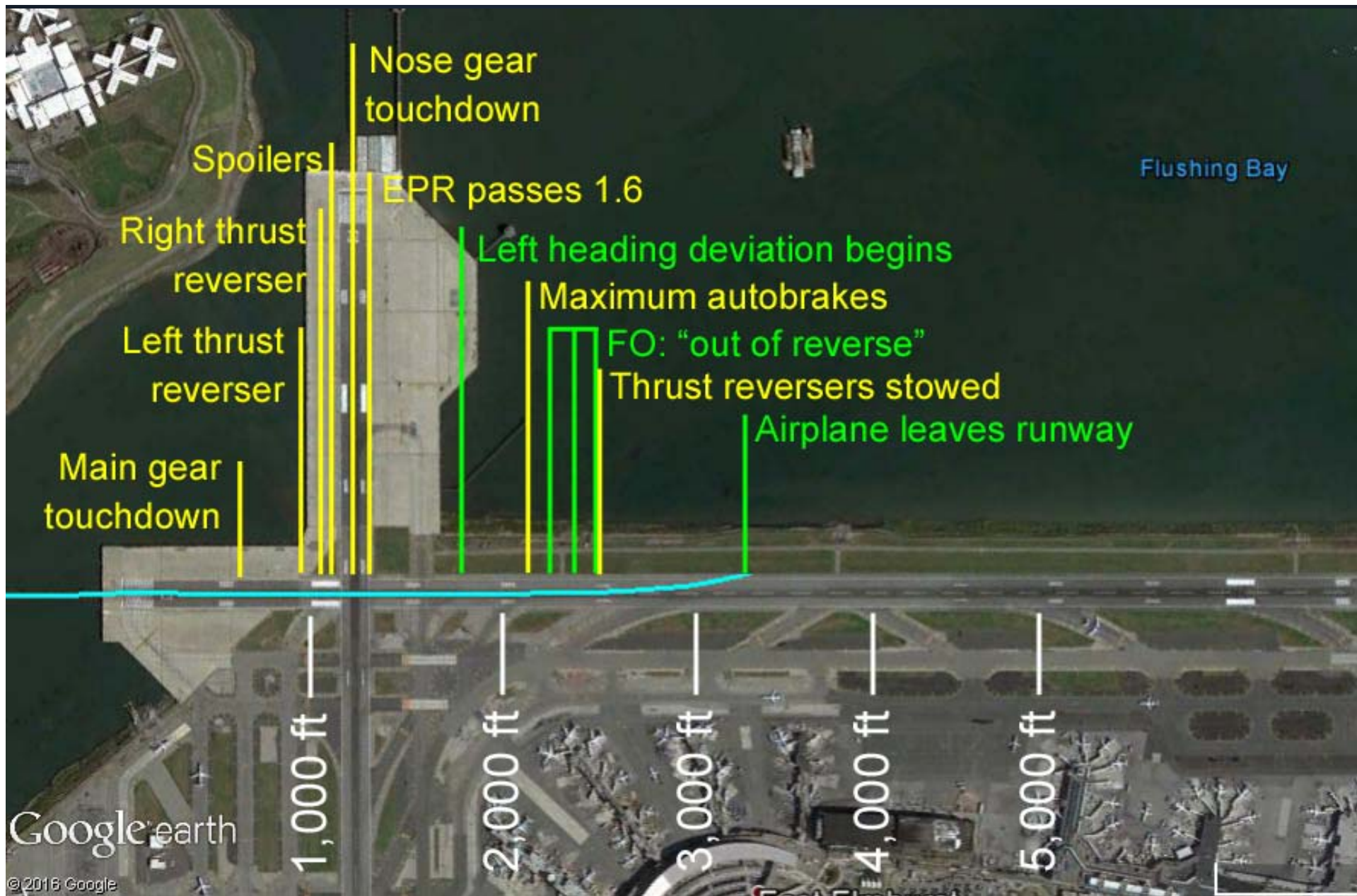


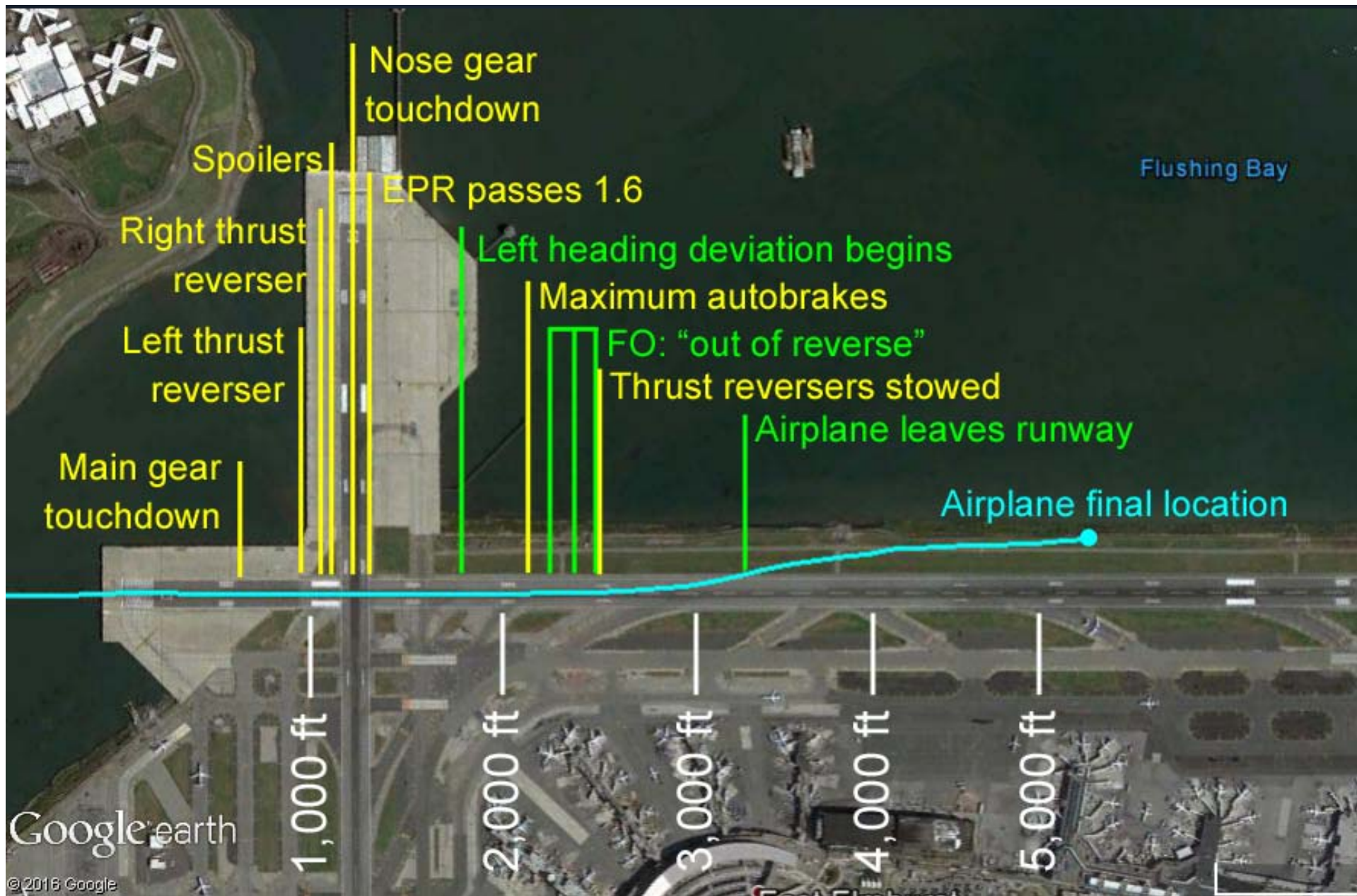










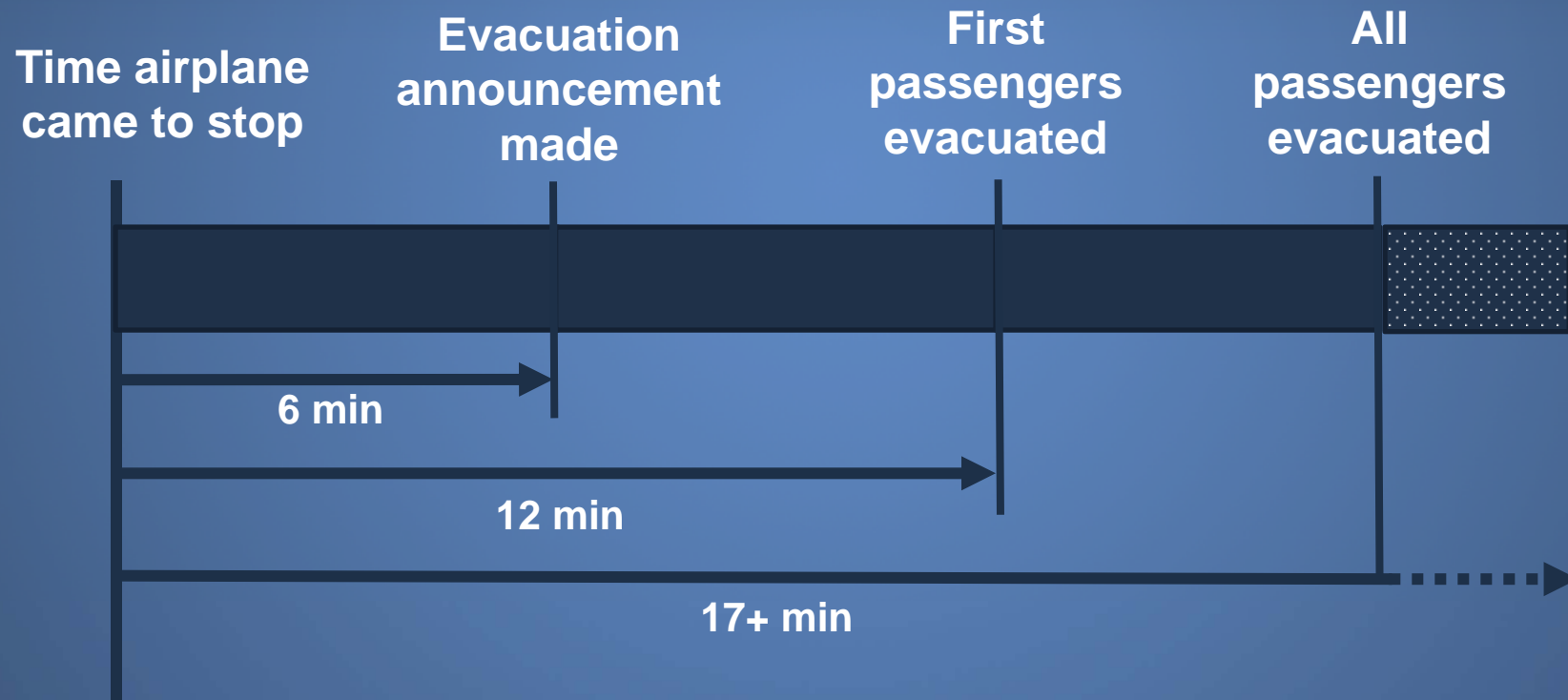




Pre-evacuation Events

- Loss of interphone and public address system
- Flight attendants left assigned exits
- First responder told first officer that airplane should be evacuated
 - Fuel leaking from left wing
- Flight crew did not notify flight attendants about fuel leak
- Initially only right overwing exits to be used

Evacuation Timeline



Videos

Recent Recommendations

- Require 14 Code of Federal Regulations Part 121 operators to provide (1) guidance that instructs flight attendants to remain at their assigned exits and actively monitor exit availability in all non-normal situations in case an evacuation is necessary and (2) flight attendant training programs that include scenarios requiring crew coordination regarding active monitoring of exit availability and evacuating after a significant event that involves a loss of communications.

Recent Recommendations

- Develop best practices related to evacuation communication, coordination, and decision-making during emergencies through the establishment of an industry working group and then issue guidance for 14 Code of Federal Regulations Part 121 air carriers to use to improve flight and cabin crew performance during evacuations.

Asiana Flight 214, B777

San Francisco, CA

July 6, 2013



Accident Summary

- 3 pilots, 12 flight attendants, and 291 passengers
- 3 of the 291 passengers were fatally injured
- Airplane struck seawall short of runway and destroyed by impact forces and fire
- Flight originated from Incheon International Airport, Seoul, Korea

Video

Southwest Flight 31, Boeing 737

Nashville, TN

December 15, 2015



Accident Summary

- 2 pilots, 3 flight attendants, and 133 passengers
- 9 passengers received minor injuries
- Airplane substantially damaged
- Flight originated from Houston-Hobby Airport, Houston, Texas

Pre-evacuation Events

- Normal landing
- During taxi- abrupt stop, loud noises, unusual attitude
- No response from Flight Deck
- Passengers began to move about cabin
- F/As began commands “Heads Down, Stay Down”

Pre-evacuation Events (cont.)

- Lead F/A attempted to communicate with flight crew - no response
- F/As initiated evacuation
- Multiple unsuccessful attempts to contact flight crew
- Evacuated passengers through L2, R1, R2

Dynamic International Airways, Flight 405, Boeing 767-200ER Fort Lauderdale, FL October 29, 2015



Accident Summary

- Caught fire while taxiing enroute to Caracas, Venezuela
- 2 pilots, 9 flight attendants, and 90 passengers
- 1 passengers received serious injuries
- Remaining 89 passengers and 11 flight crew received minor injuries or not injured

Pre-evacuation Events

- Fire left engine nearing end of runway
- Aircraft stopped, 1 second later 2R door opened with right engine running
- Passengers evacuated into a at 45° slide/raft due to engines running

Pre-evacuation Events (cont.)

- 1 passenger seriously injured after being blown over by running engine
- F/A seated at 1R moved to last row right side aisle because 1R jumpseat was inoperative (non-procedure)

Pre-evacuation Events (cont.)

- 1R F/A operated the 2R door
- Bypassed the FA seated at 2R
- Lead FA tried notifying cockpit via interphone, but unsuccessful

Allegiant Airways, Flight 864, MD-80, St Petersburg, FL June 8, 2015.



Accident Summary

- 2 pilots, 4 flight attendants, and 139 passengers
- 1 passengers received serious injuries
- 2 passengers and 1 F/A received minor injuries
- Flight enroute to Hagerstown, MD

Pre-evacuation Events

- During climbout, smoke fumes in cabin
- Emergency- return to PIE
- Stopped on runway
- Evacuated using all slides

Pre-evacuation Events (cont.)

- Smoke/fumes dissipated upon landing
- F/As did not attempt to relay info to Flight Deck
- Flight deck did not communicate with F/As
- Commanded evacuation

Recurring Evacuation Issues

- Other accidents with similar evacuation issues
 - Inadequate evacuation communication, coordination, and decision-making
- FAA efforts to address issues insufficient
- Breakdowns in communication can lead to serious consequences

Conclusions

- Lack of procedures for crew communication without operative communication systems
- Inadequate communication, coordination, and decision-making regarding evacuations

Conclusions

- Failures in coordination and communication may not always lead to adverse outcome
- Given the unpredictability of ambiguous situations, inappropriate crew responses could be detrimental
- Need to identify ways industry can facilitate effective and consistent crew responses



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