

Case Studies of RSA Improvements

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**Federal Aviation
Administration**

We are
Airports

RUNWAY SAFETY AREA (RSA) IMPROVEMENT PROGRAM

- In 1999 an aircraft in Little Rock, AR overran the runway with a non-standard RSA, struck a navigational aid and killed 11 people
 - RSA Program began in 2000 to Improve Runways and prevent such accidents from happening
 - RSA improvements were accelerated by 7 years as stand-alone projects
 - The FAA developed a schedule and financial plan to upgrade RSAs by the end of December 2015
 - The deadline to complete RSAs by the end of 2015 then became a congressional mandate in 2006 (PL 109-115)

RUNWAY SAFETY AREA (RSA) IMPROVEMENT PROGRAM

RSA IMPROVEMENT OPTIONS

- Construct or expand the RSA
- Modify or relocate the Runway
- Remove navigational aids and objects that do not belong (ATO)
- Implement declared distances
 - Guidance coming soon on use of declared distances for non-turbine powered (small) aircraft
- Install an Engineered Materials Arresting System (EMAS)
- Any combination of the above

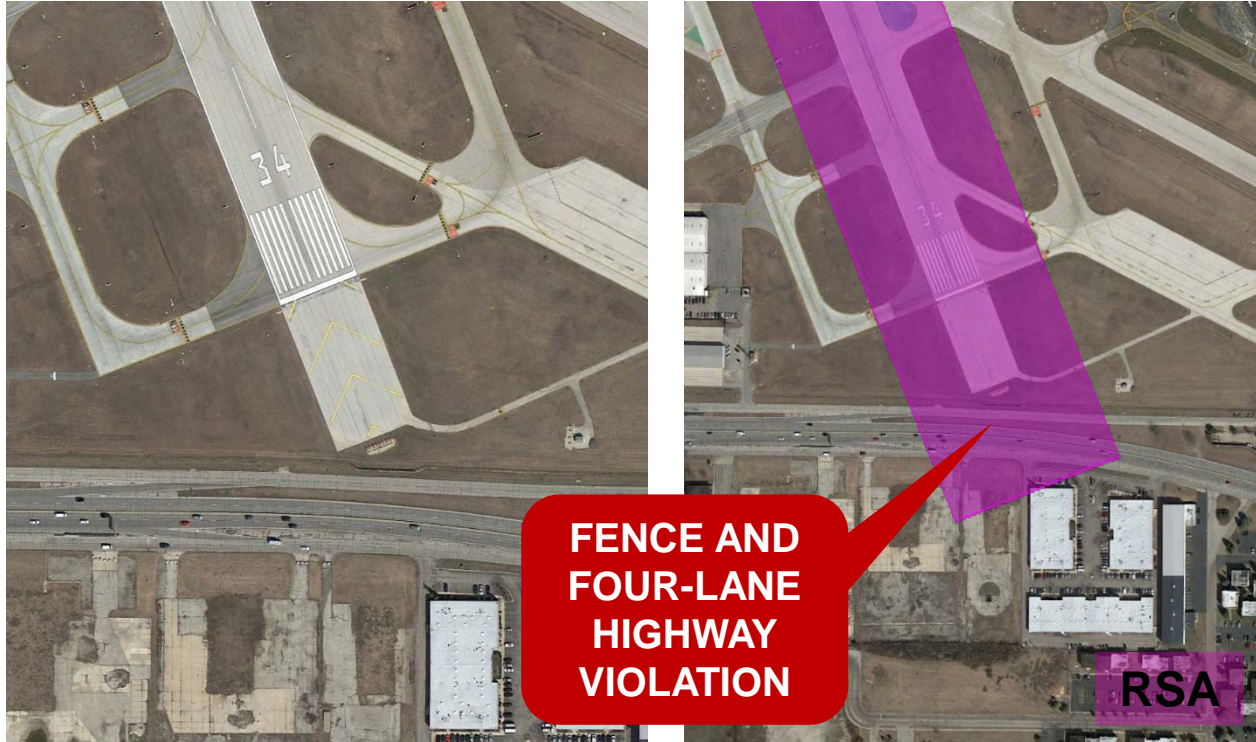


- Chicago Executive Airport (PWK) – Reliever Airport
- Three runways, including an ILS all-weather runway
- Total Based Aircraft: 189
- Total Operations: Approximately 77,000+



Runway Safety Area (RSA)

Prior to 2015 RSA improvement



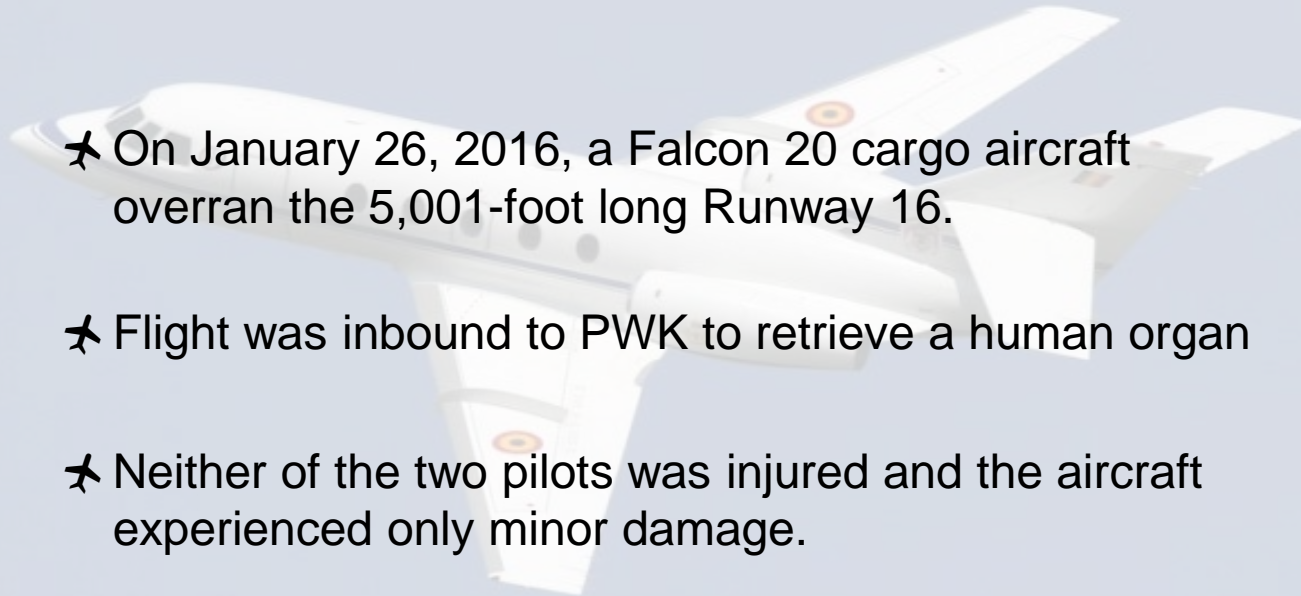
Runway Safety Area (RSA)

After improvement

EMAS
INSTALLED
OCTOBER
OF 2014

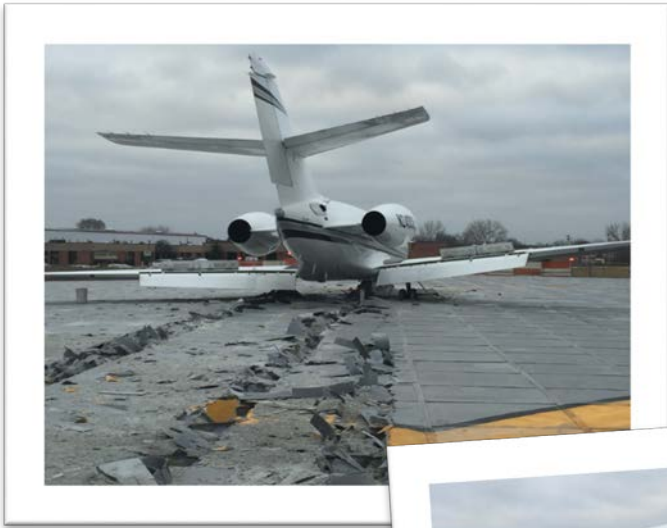


Runway Excursion



- ✈ On January 26, 2016, a Falcon 20 cargo aircraft overran the 5,001-foot long Runway 16.
- ✈ Flight was inbound to PWK to retrieve a human organ
- ✈ Neither of the two pilots was injured and the aircraft experienced only minor damage.





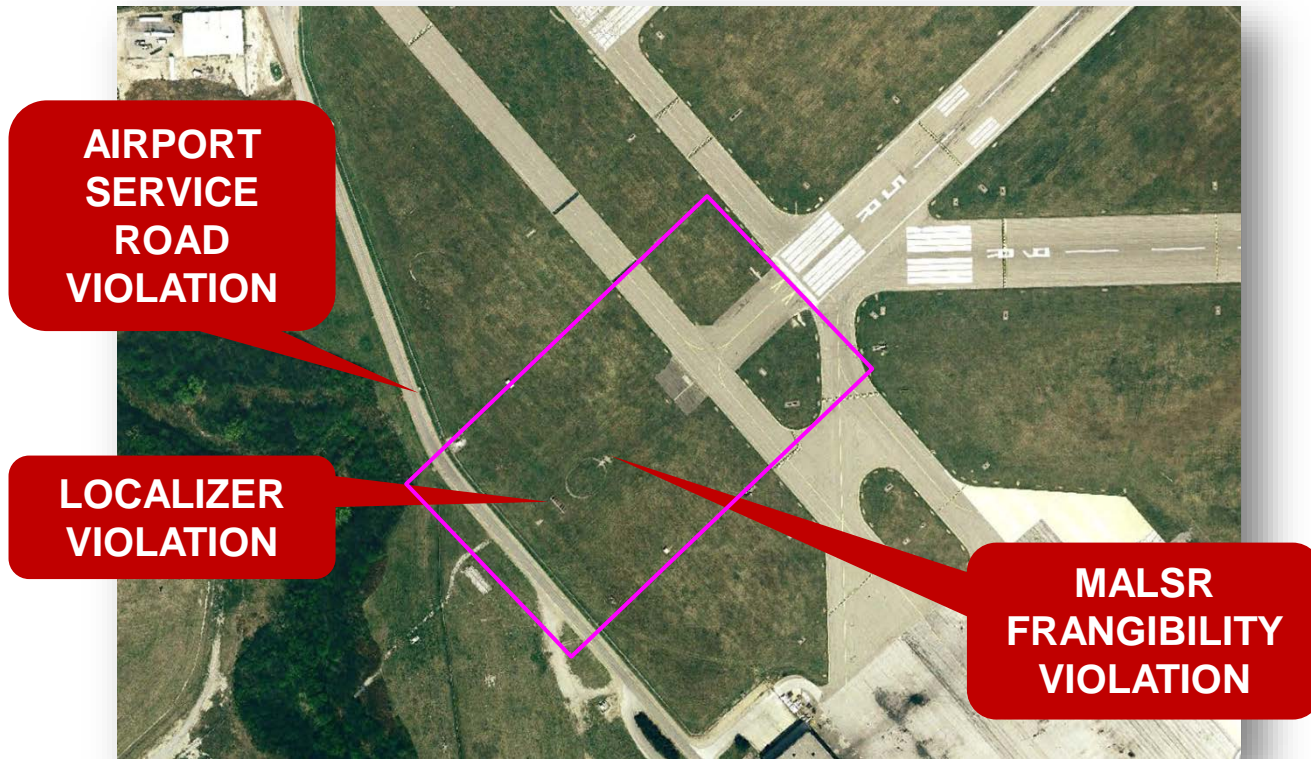


- Willow Run Airport (YIP) – Class IV Part 139 Airport
- Four runways, including an ILS all-weather runway
- 210 based aircraft & over 60,000 annual operations
- Willow Run Airport typically handles over 200 million pounds of cargo annually



Runway Safety Area (RSA)

Prior to RSA 2009 improvement



Runway Safety Area (RSA)

After improvement



Runway Excursion

- ✈ On March 8, 2017, a MD-83 aborted takeoff on Runway 23L and overran the departure end of the runway
- ✈ Aircraft was carrying the University of Michigan men's basketball team to Big 10 Tournament
- ✈ The aircraft came to rest approximately 1,100 feet from the runway end, along the extended runway centerline
- ✈ **1 minor injury reported**
- ✈ Aircraft significantly damaged







DCA CONSTRAINTS

- 860 Acre (Peninsula)
- Potomac River (East)
 - Roaches Run (North)
 - Four Mile Run (South)
- **GW Memorial Pkwy (West)**
 - National Park Service



DCA RSA Program

- **Runway 1/19 (BEFORE)**
 - Runway 1
 - 700' Overrun (Non-Standard)
 - 600' Undershoot
 - Runway 19
 - 1,000' Overrun
 - 600' Undershoot



DCA RSA Program

- **Runway 1/19 (BEFORE)**
 - Runway 1
 - 700' Overrun (Non-Standard)
 - 600' Undershoot
 - Runway 19
 - 1,000' Overrun
 - 600' Undershoot
- **Two Alternatives**
 - Runway 1 EMAS
 - Extend Runway South 300'
 - Apply Declared Distances



DCA RSA Program

- **Runway 1/19**
 - Extended 300' to 7,169'
 - Declared Distance 6,869'
 - LDA/ASDA/TODA/TORA
 - 700' Overrun/Undershoot
 - Public Perception Concerns
 - NO AIRPORT EXPANSION
 - \$30M with \$18M AIP



DCA RSAs

- Runway 1/19
- **Runway 15/33 (BEFORE)**
 - GW Parkway North
 - 100' – 270' (Blast Fence/Path)
 - Potomac River South
 - 0' - 500' (Edge of River)
 - Multiple Alternatives
 - GW Parkway (Non-Starter)
 - Shift Runway into River
 - How Far?
 - EMAS/Declared Distances?
 - Bridge Deck vs Fill?



DCA RSAs

- Runway 1/19
- **Runway 15/33**
 - Shift Runway 270' South
 - Into Potomac River



DCA RSAs

- Runway 1/19
- **Runway 15/33**
 - Shift Runway 270' South
 - Into Potomac River
 - 70 Knot EMAS – RWY 33
 - Protect GW Pkwy

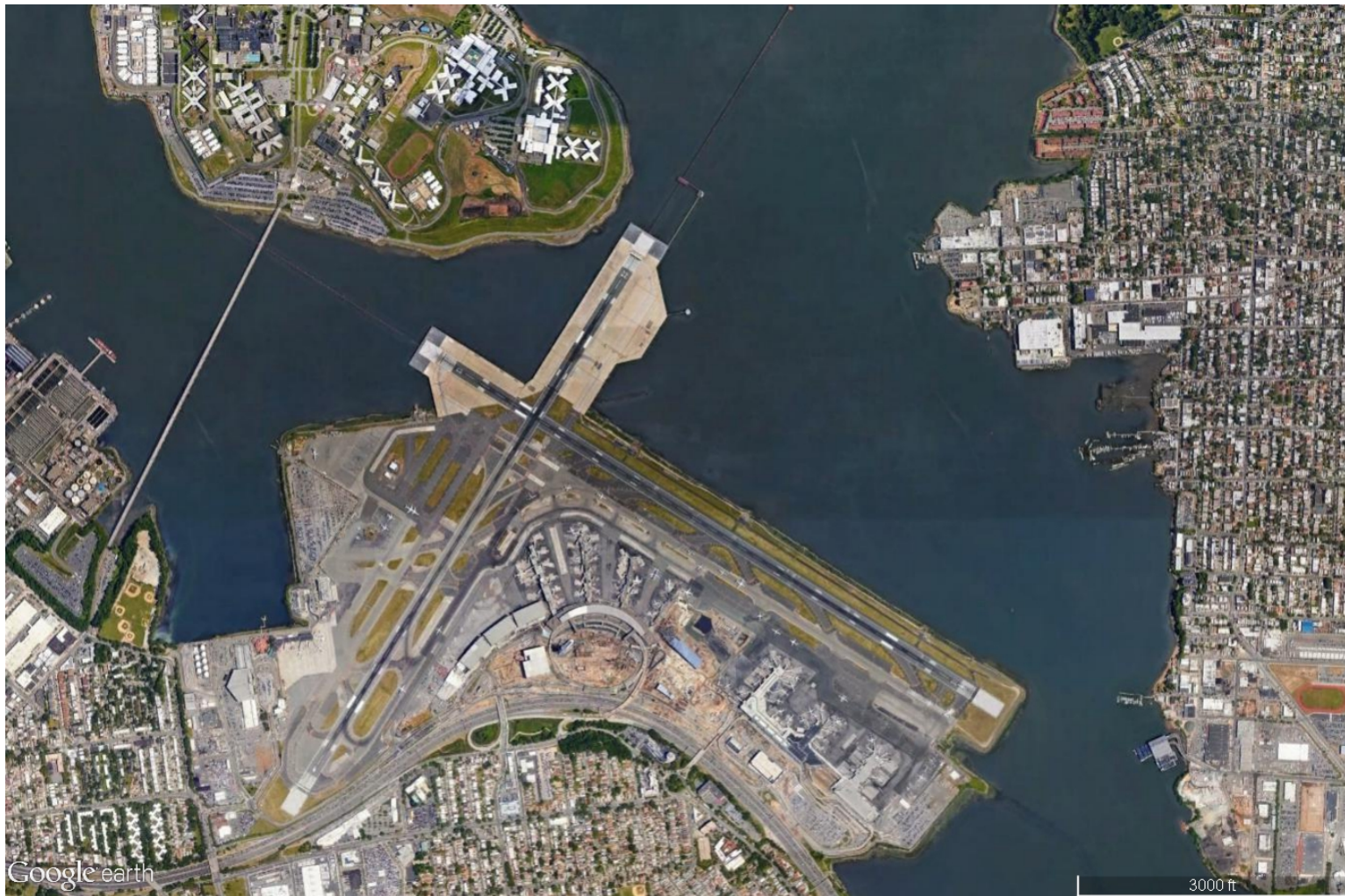


DCA RSAs

- Runway 1/19
- **Runway 15/33**
 - Shift Runway 270' South
 - Into Potomac River
 - 70 Knot EMAS – RWY 33
 - Protect GW Pkwy
 - 40 Knot EMAS – RWY 15
 - Protect River
 - Non-Standard Undershoot
 - \$40M with \$20M AIP



LGA Airport Aerial Image



Eastern Flight 3452: Aircraft position after exiting EMAS



Continental Flight 795: Aircraft aborted takeoff RWY 13 overran the end of the runway and went over the dike coming to rest just before the water.



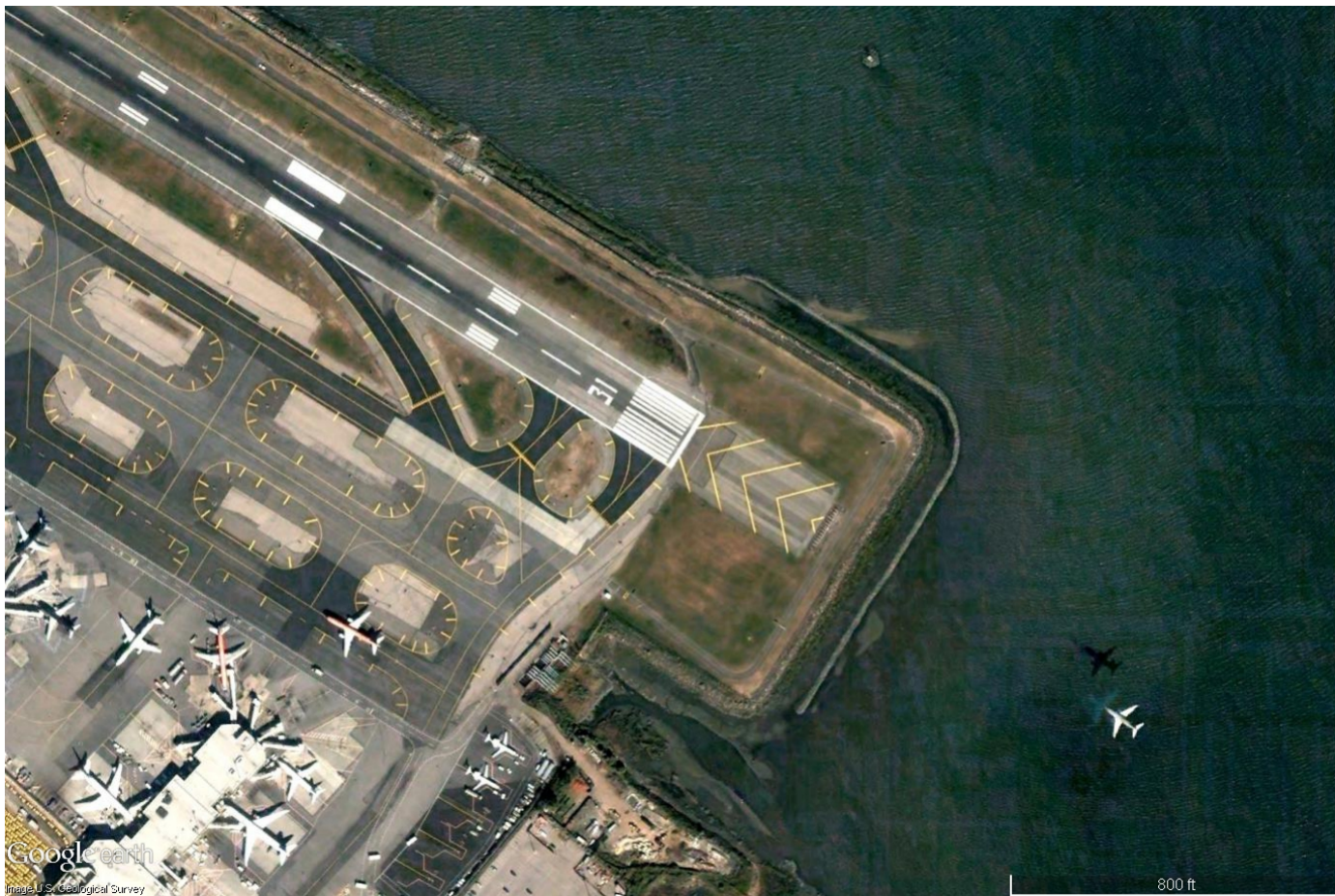
USAir Flight 5050: Aircraft aborted takeoff RWY 31 went over end of runway deck and crashed into approach light towers/water.



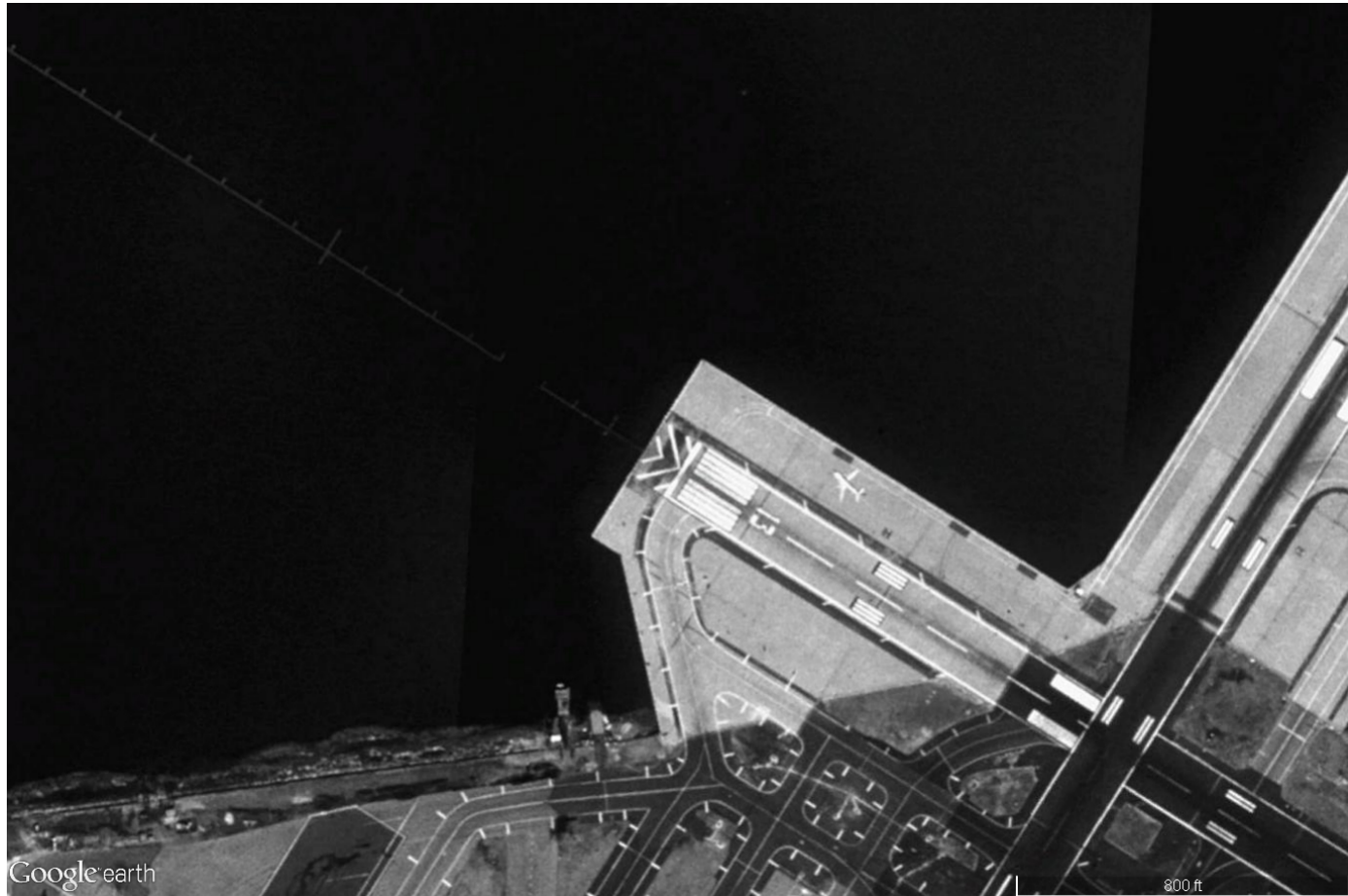
RWY 13 Overrun prior to RSA Improvements



RWY 13 Overrun after RSA extension (no EMAS)



RWY 31 Overrun prior to RSA Improvements

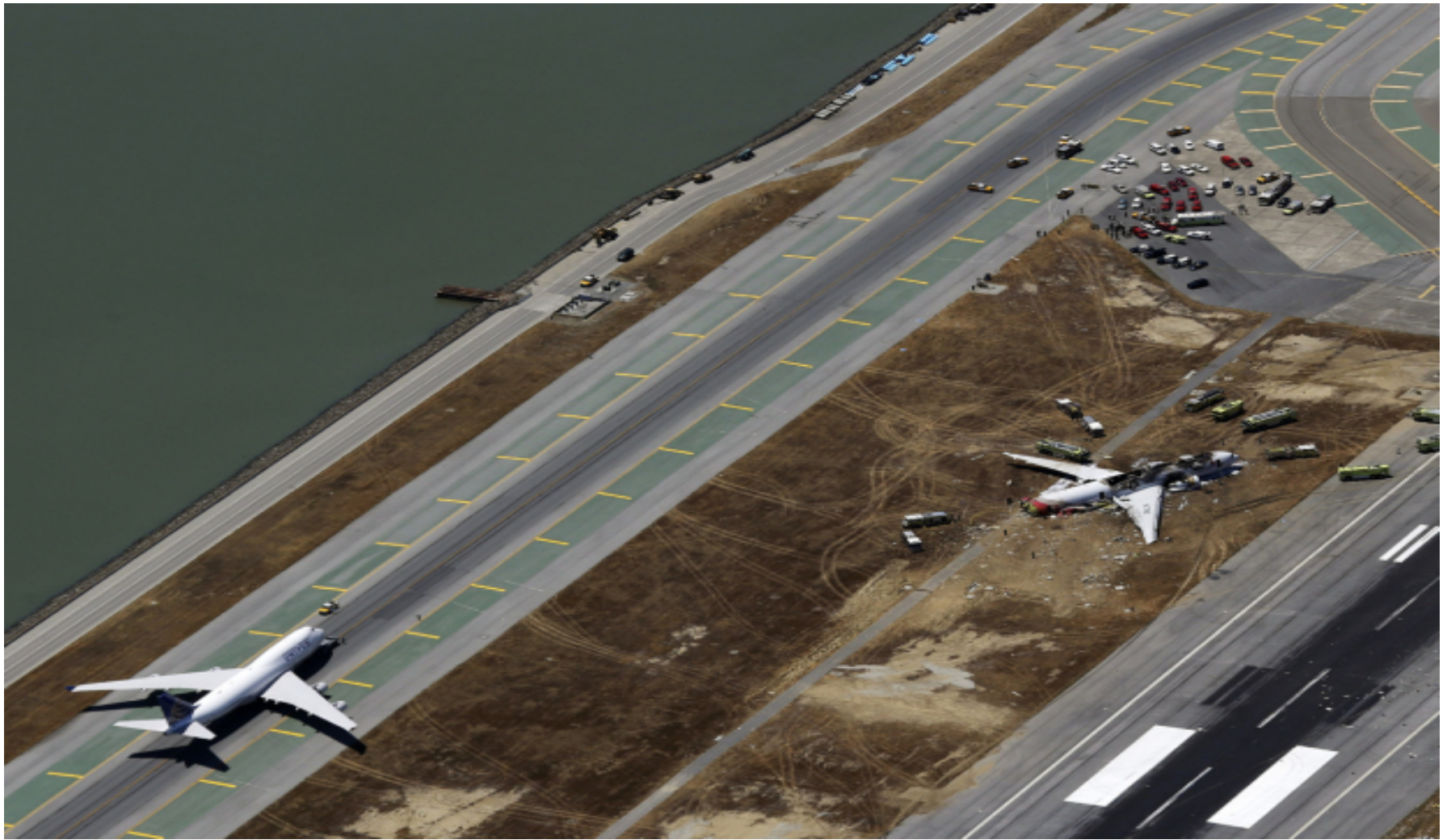


RWY 31 Overrun after RSA Improvements



RSA Work is NEVER in Vain!

Asiana Flight 214, San Francisco International Airport, July 6, 2013



Federal Aviation
Administration