Single Aircraft timed Air Races

Overview

Remarks by

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Former Race Director, Red Bull Air Race (RBAR)

To the

National Transportation Safety Board
January 10, 2012
Washington, DC

Intro

- Race Director RBAR- 5 years
  - RD responsibilities
    - Pre-Race
    - Race week

- Naval Aviator- 25 years
  - Commanding Officer TopGun's VFC-13/VFC-111
  - Graduate of Command Aviation Safety School
  - Aviator with most flight time in TopGun's Adversary Squadron history
    - 5,000+ hours in F/A-18, F-16N, F-14, F-5, A-4
  - Aircraft Carrier Landing Signal Officer



Presentation Overview

- Current status of RBAR and ARI
- RBAR Concept and History
- Aviation Safety Concept
  - Management & Aircrew
  - Maintenance
  - Miscellaneous
  - FSDO/FAA interaction

Current Status

- Red Bull Air Race

- Air Race Inc.

RBAR Concept and History

- RBAR started in 2003
- Over 6 years had 50 races in 27 different locations
- Worked with 15 different aviation regulatory bodies
  - USA (FAA), GERMANY (LBA), UK (CAA), SWITZERLAND (FOCA), BRASIL (INAC), HUNGARY (CAA), AUSTRALIA (CASA), AUSTRIA (AUSTROCONTROL), TURKEY (CAA), PORTUGAL (INAC), CANADA (Transport Canada), NETHERLAND (CAA), SPAIN (ENAC), FRANCE (DGCAC),....
- Accumulated over 10,000 runs in 50 races, annual warm-up camps and qualification camps
- International reach gave a unique comparison of different nation's approaches to aviation safety
- Formatted RBAR rules and regulations around the US/FAA guidelines and used those in all countries
- ZERO INJURIES to Spectators, Pilots and RBAR personnel in over 10,000 runs and 7 years

Sample RBAR Race Calendar for 2010


Rio de Janeiro, Brazil


Barcelona, Spain


Porto, Portugal


London, England


Perth, Australia


Budapest, Hungary


San Diego


New York


Monument Valley

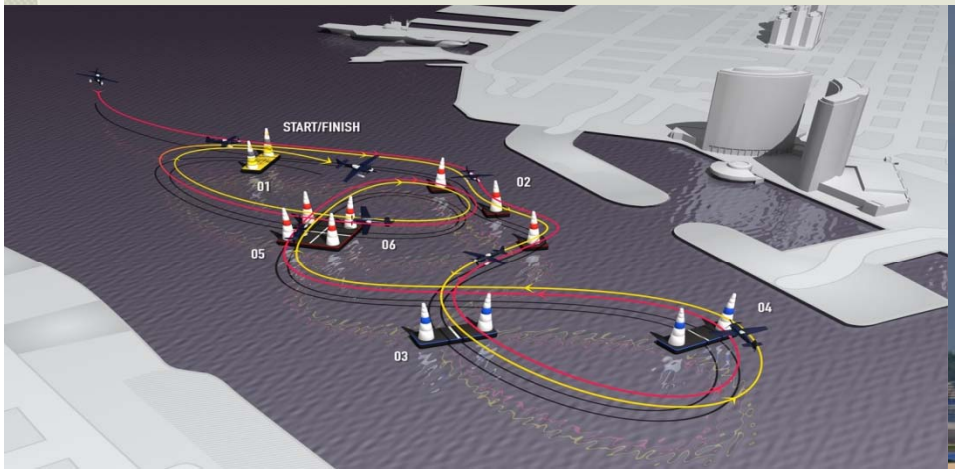

Detroit
GM
GMnext.com


San Francisco


Reno

Concept and History

- Single plane on track of air-filled pylons, time recorded, usually 70 sec
- Each track is uniquely designed for that location
- 200 KTS max airspeed
- RBAR created a new global aviation sport
  - Broadcast in over 180 countries
  - Over 400 million media recipients
  - Average of over 500,000 on-site spectators
- No prize money offered, deliberate for safety
- Safety was paramount for race and future of sport



Aviation Safety Concept

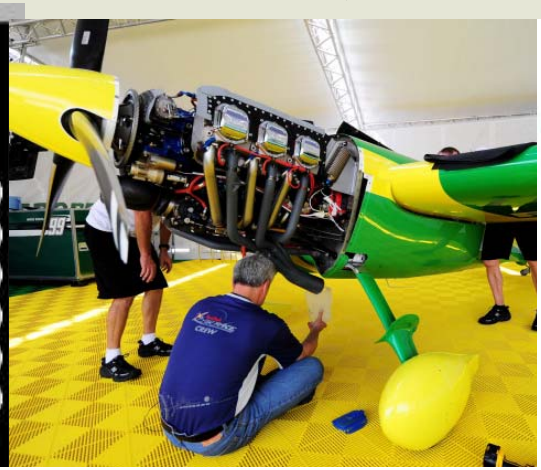
- Aircrew
- Aircraft
- Environment

Management & Aircrew

- **Management**
  - Hand picked from around the world
  - Aviation licensed experts as Race Director, Technical Director, Judges (Stewards), Mechanics (Technicians)
  - Supervision by FAI (*Fédération Aéronautique Internationale*)
    - World governing body for air sports in addition to aeronautics and astronautics world records
- **Pilots**
  - Max number was 15
  - Stringent pre-requisites for application
  - Licensed and experienced aerobatic pilots from around the world with applicable surface waivers
  - Extensively trained in course flying (syllabus)
  - Qualified as Air Race pilot with race license, valid for 1 year
  - Specific Air Race flight physical (sporting medical), valid for 1 year
- **Intense oversight, Both Pilots and Management supervised by:**
  - TV (onboard, tailcam, outside cameras)
  - Telemetry(GPS, G values, Airspeed)
  - Daily alcohol breathing tests
  - Mandatory Brief and Debrief
  - Strict adherence to rule book and sanctioning

Aircraft

- Aircraft used; Edge 540, MXS-R
- Oil testing every flying day
- Manufacturers work with RBAR, Audits of Manufacturers
- All Maintenance and modifications have comprehensive oversight (for safety & sport); before each race Technical Director/Stewards check:
  - All documentation (aircraft and aircrew)
  - Test-flying program (any mod from prior race)
  - Telemetry checked during test flight
  - PARC FERME (aircraft weight and balance check, engine check and any modifications checked) prior to and after each race
- Future: working on many developments (Taller pylons, Monocoque cockpits, Parachute for the plane,,,,)



Environment

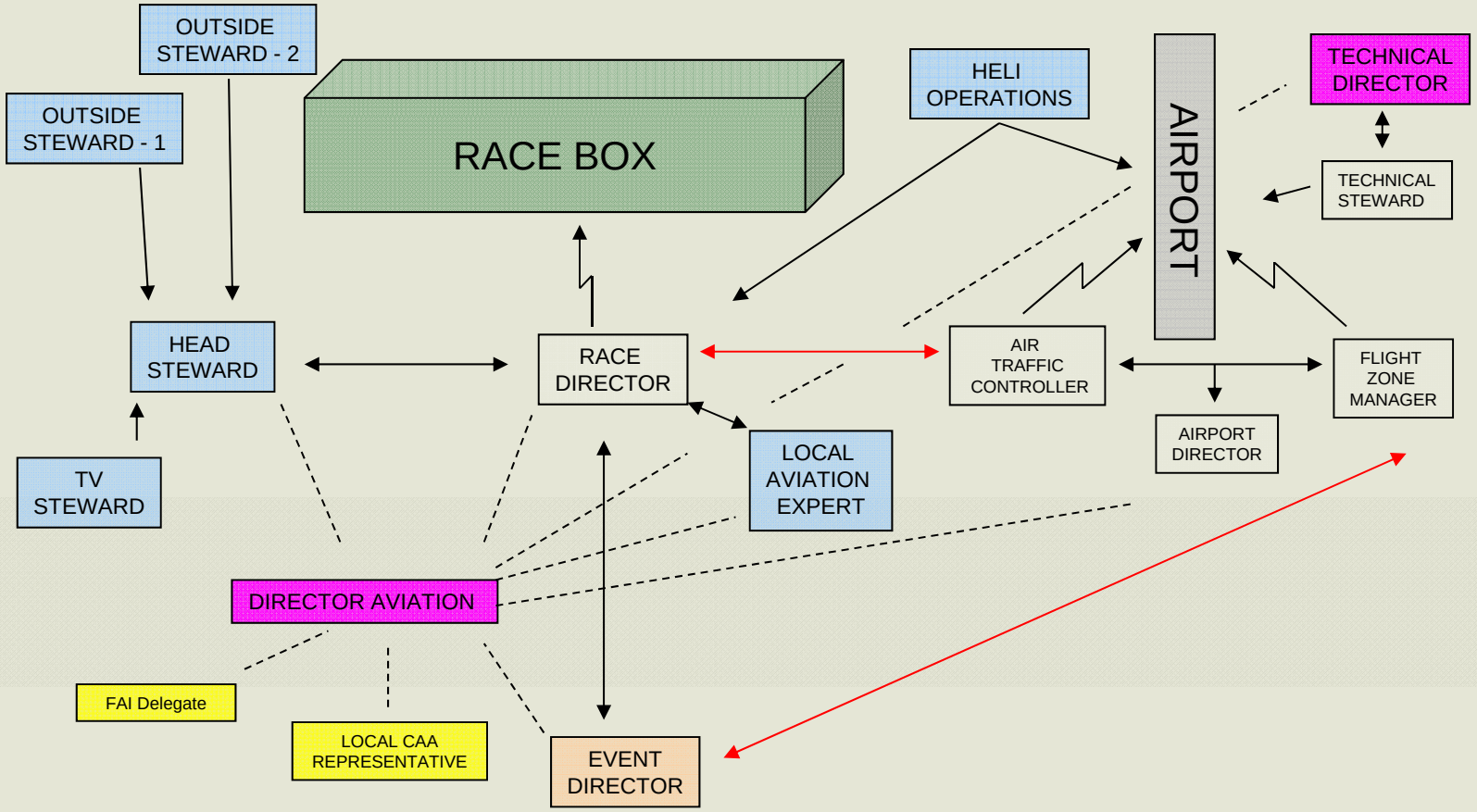
- ONGOING GATE DEVELOPMENT AND TESTING
  - 65 ft high inflatable nylon pylons
  - 5th generation of pylon
  - Cone-shaped, sturdy for weather
  - 15 seconds to inflate, PSI monitored

Environment

- Race Tower
  - Nerve center of Air Race
  - 70 ft high tower, 5 levels
- Telemetry and TV's used to observe:
  - Speed, G values and Safety lines
- 3 Levels of supervision of Race
  - Race Director, Technical Director, Stewards
  - Director of Aviation and FAI Safety Delegate
  - National Aviation Authority

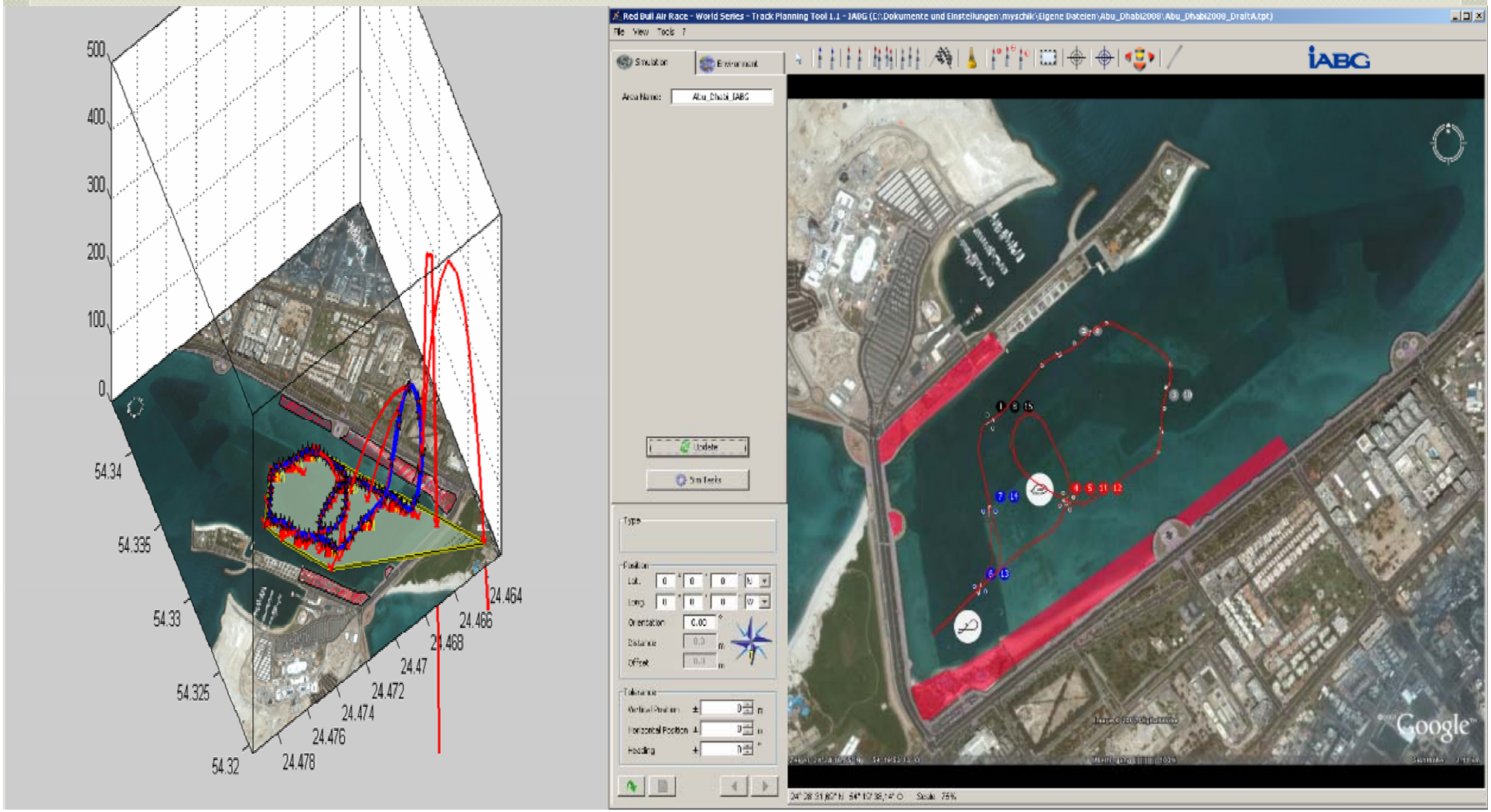
Environment

- Communications



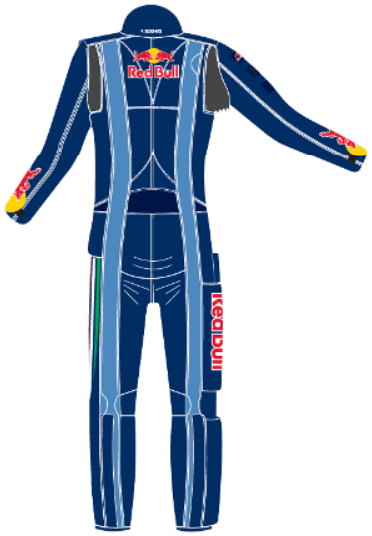
Environment

- Track planning software to calculate improved safety lines and vectoring.



Environment

- Special GLOC training. Pilots utilize an independent anti–G Suit, the Libelle G-Suit
  - AUTOFLUG GmbH, German company
  - 4 tubes filled with fluid, different from standard pneumatic anti-G suit
  - Independent from aircraft
  - Can refrigerate for heat fatigue
  - Used in EuroFighter



Environment

- Helicopter Operations
  - Same aircrew every race
  - SAR Helo (aircrew, over water crash (hoist), spectators)
  - Airspace and race box management
  - Photographer (airborne visual inspection, mishap)

Environment

- Annual requirements(all Pilots):
  - Warm-up/refresher week
  - Requalification flying in track, RD observed
  - All safety lectures
  - ACE equivalent requal
  - Sporting Medical flight physical
  - Rule Books Review (Sporting Rules, Track & Airport, Locations, Qualifications, Maintenance)
  - Crisis Manual Review
  - Risk Management Review

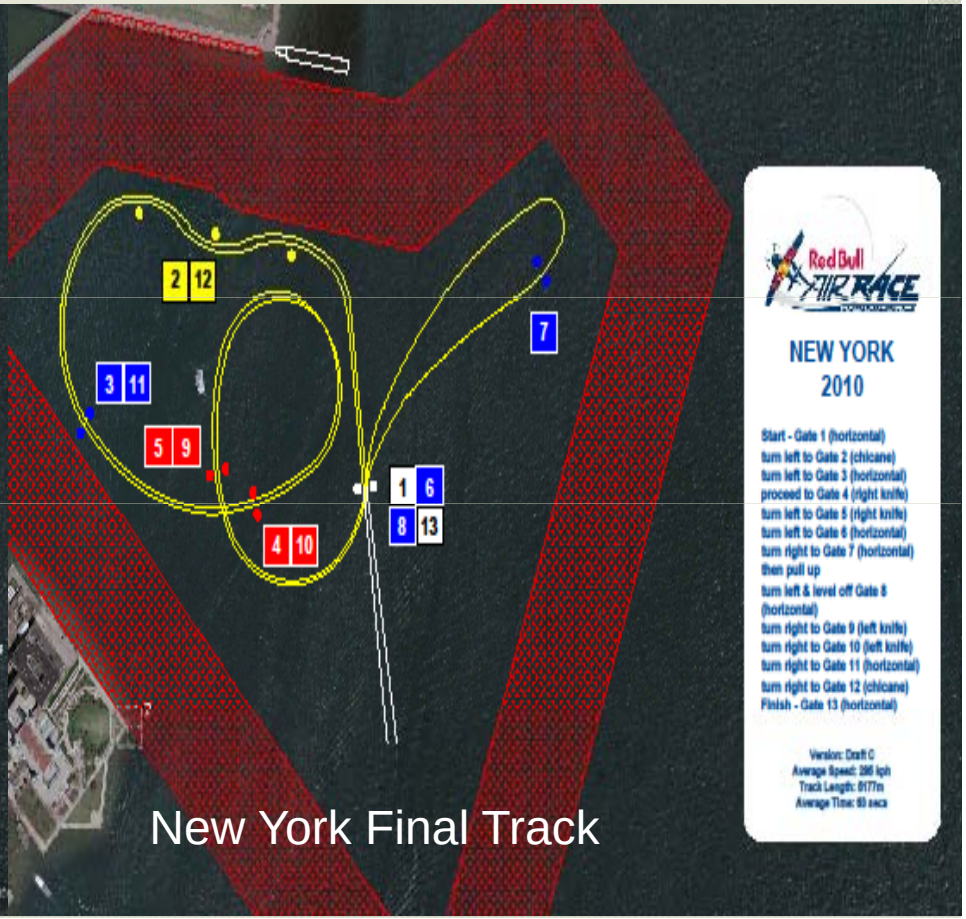
FSDO/FAA Interaction

- Every Air Race has extensive interaction, approval and coordination with local FSDO, FAA, ATC:
  - Initial site inspection
  - Permit process
  - Track Planning, design and approval
  - Documentation (Aircrew & Aircraft)
  - On-site race week approval FAA & FSDO
  - Constant oversight at track and Race Airport
  - Real time interaction, solution based

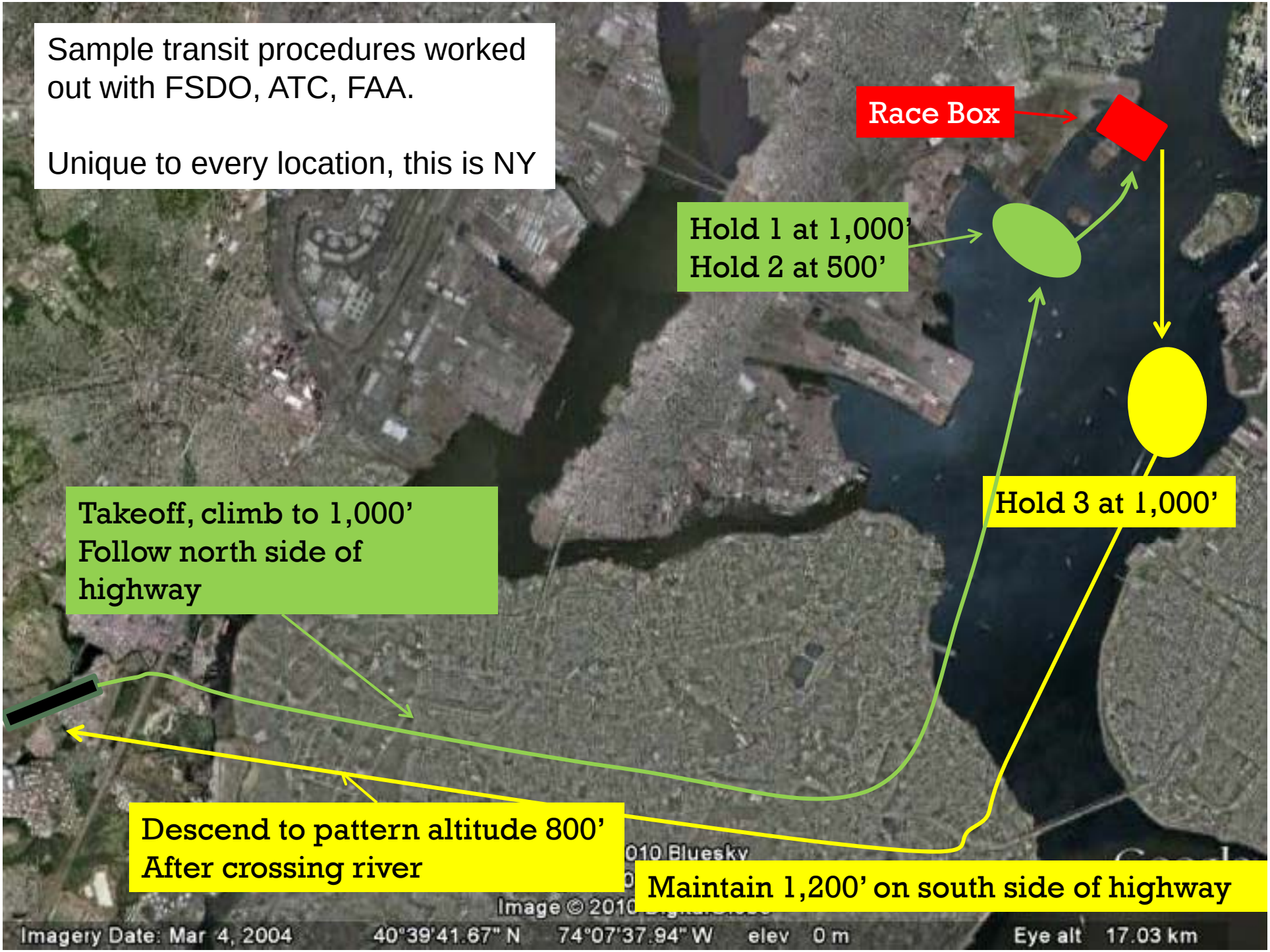
Course Design Process

- Many variables
- Work with FAA to achieve result

New York Proposed Track



New York Final Track


Sample transit procedures worked out with FSDO, ATC, FAA.
Unique to every location, this is NY
Race Box
Hold 1 at 1,000'
Hold 2 at 500'
Hold 3 at 1,000'
Takeoff, climb to 1,000'
Follow north side of highway
Descend to pattern altitude 800'
After crossing river
Maintain 1,200' on south side of highway
Image © 2010
Imagery Date: Mar 4, 2004
40°39'41.67" N
74°07'37.94" W
elev 0 m
Eye alt 17.03 km

Other sample track designs

Name	Location	Bearing	VAR
00001	24° 28' 16.7" N 54° 19' 31.9" E	245/065	
00002a	24° 28' 21.6" N 54° 19' 38.5" E		
00002b	24° 28' 23.9" N 54° 19' 42.4" E	240/060	
00002c	24° 28' 26.1" N 54° 19' 46.3" E		
00003a	24° 28' 23.3" N 54° 19' 54.8" E		
00003b	24° 28' 19.1" N 54° 19' 54.1" E	190/010	
00003c	24° 28' 14.9" N 54° 19' 53.5" E		
00004	24° 28' 10.9" N 54° 19' 42.6" E	280/100	
00005	24° 28' 01.6" N 54° 19' 30.8" E	200/020	
00006	24° 28' 08.5" N 54° 19' 31.9" E	180/000	

Questions?

Perth, Australia mishap and rescue

- Only mishap in over 50,000 races
- Accelerated stall
- No injuries to pilot or spectators
- Rescue within 60 seconds
- Verified our Mishap plan