North End:

Runway Configurations at LAX in 2020

Arnold Barnett

Some Background:

As built in the late 1950's, the LAX airfield consisted of two pairs of parallel runways separated by 700 feet, one on the South side of the airport and one on the North.

More background:

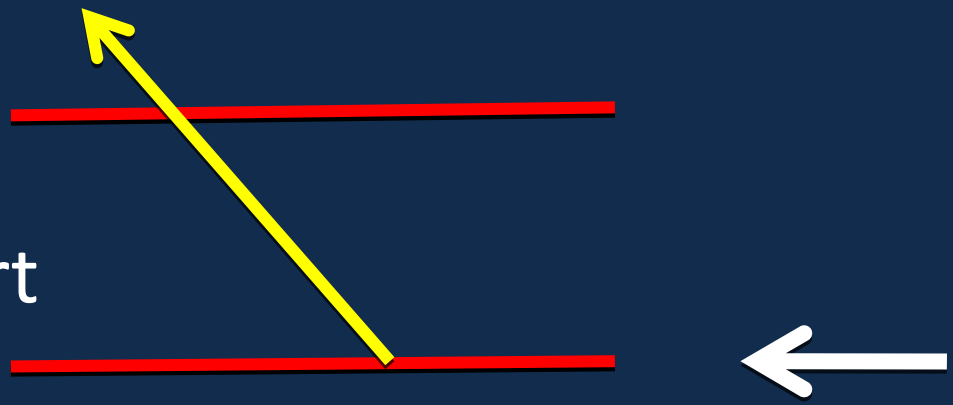
LAX has had more than its share of serious runway incursions and, in 1991, it suffered the worst runway collision in US aviation history.

For safety reasons, the South Airfield of LAX was reconfigured in 2007:

From:

Runways

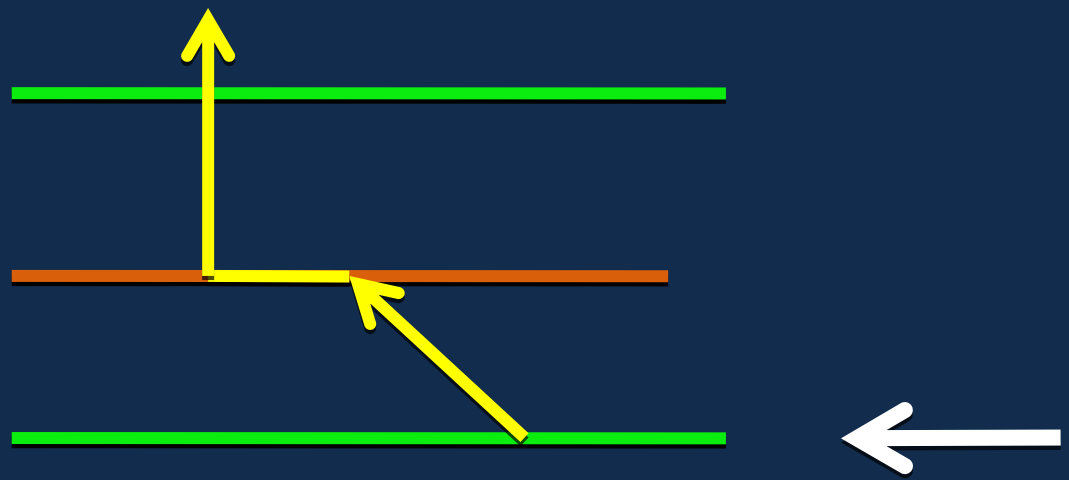
700 Feet Apart



To:

Runways

800 Feet Apart



But what if anything should happen to the North Airfield?

The issue is not straightforward, because a whole host of competing considerations come into play.

There have been five studies about the future of the North Airfield, all of which have recommended that the spacing between runways be increased by 340 feet (i.e., to 1040 feet) and that a centerline taxiway be placed between them.

Some parties have not been impressed with these studies. LA Councilman Rosendahl has described them as "irresponsible."

After some discussion, it was decided to commission another study, which it is hoped will be definitive.

The **North Airfield Safety Study** began in summer 2008. An Academic Panel was charged with devising, monitoring, and analyzing an experiment to be undertaken at Future Flight Central of NASA Ames, in collaboration with NASA colleagues.

Who are the members of this Academic Panel?

Mike Ball	(U of Maryland)
Arnie Barnett	(MIT), Panel Chair
George Donohue	(George Mason U)
Mark Hansen	(Berkeley)
AmedeoOdoni	(MIT)
Toni Trani	(Virginia Tech)

Primary Aim of North Airfield Safety Study:

To estimate as specifically as possible the level of future safety associated with each of several alternate configurations of the LAX North Airfield.

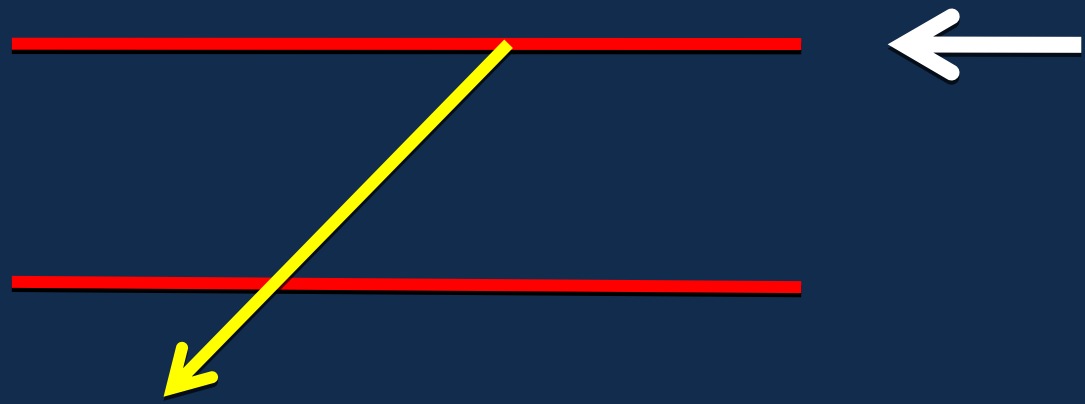
Auxiliary Aim:

To provide useful information about the capacity implications of the various configurations, in light of projections about LAX traffic levels in 2020.

What possible configurations of the North Airfield will the Panel and its NASA colleagues investigate?

In essence, there are four.

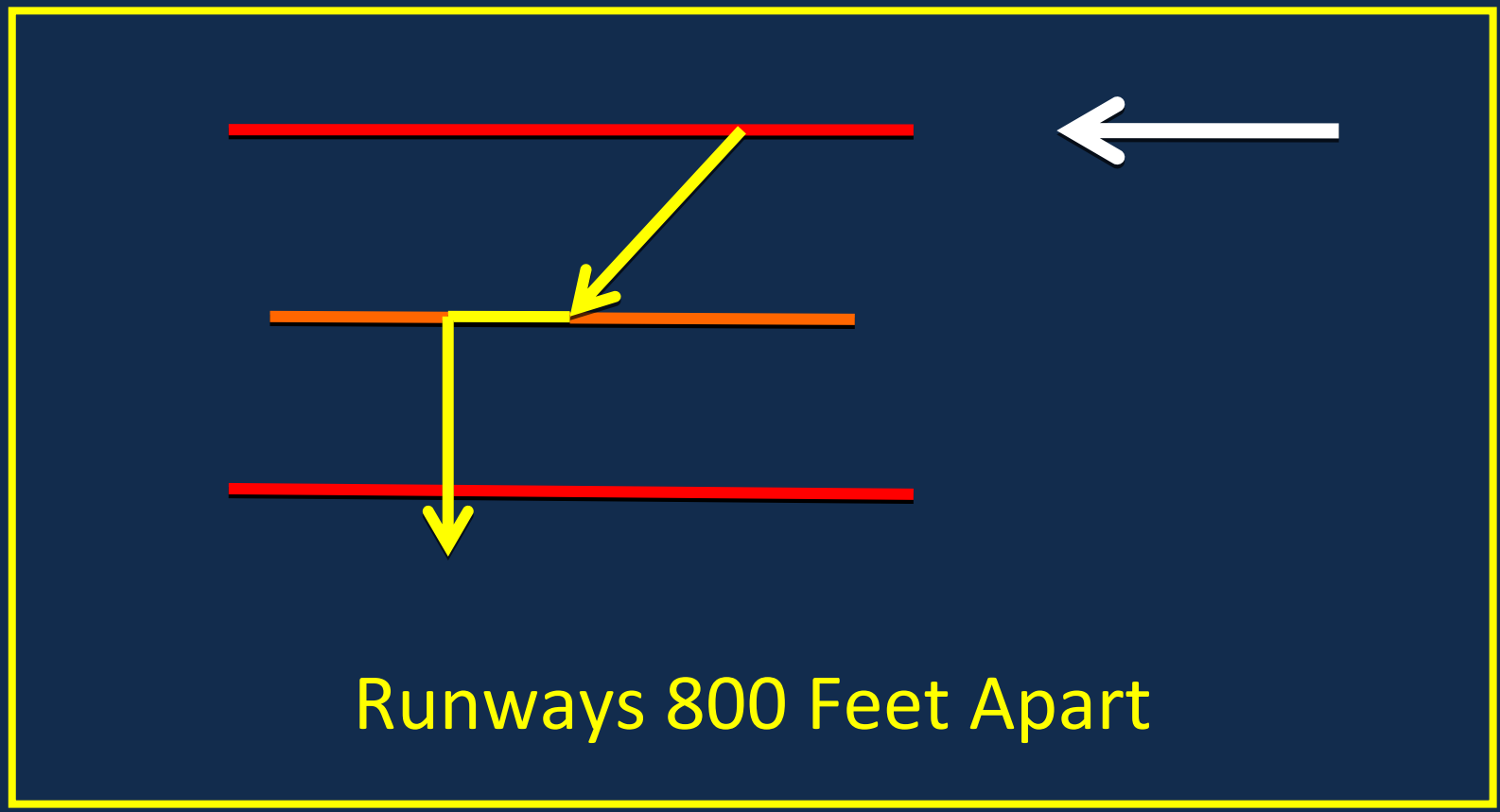
Configuration 1: Status Quo



New technologies like ASDE-X radar and Runway Status Lights would apply.

Runways 700 Feet Apart

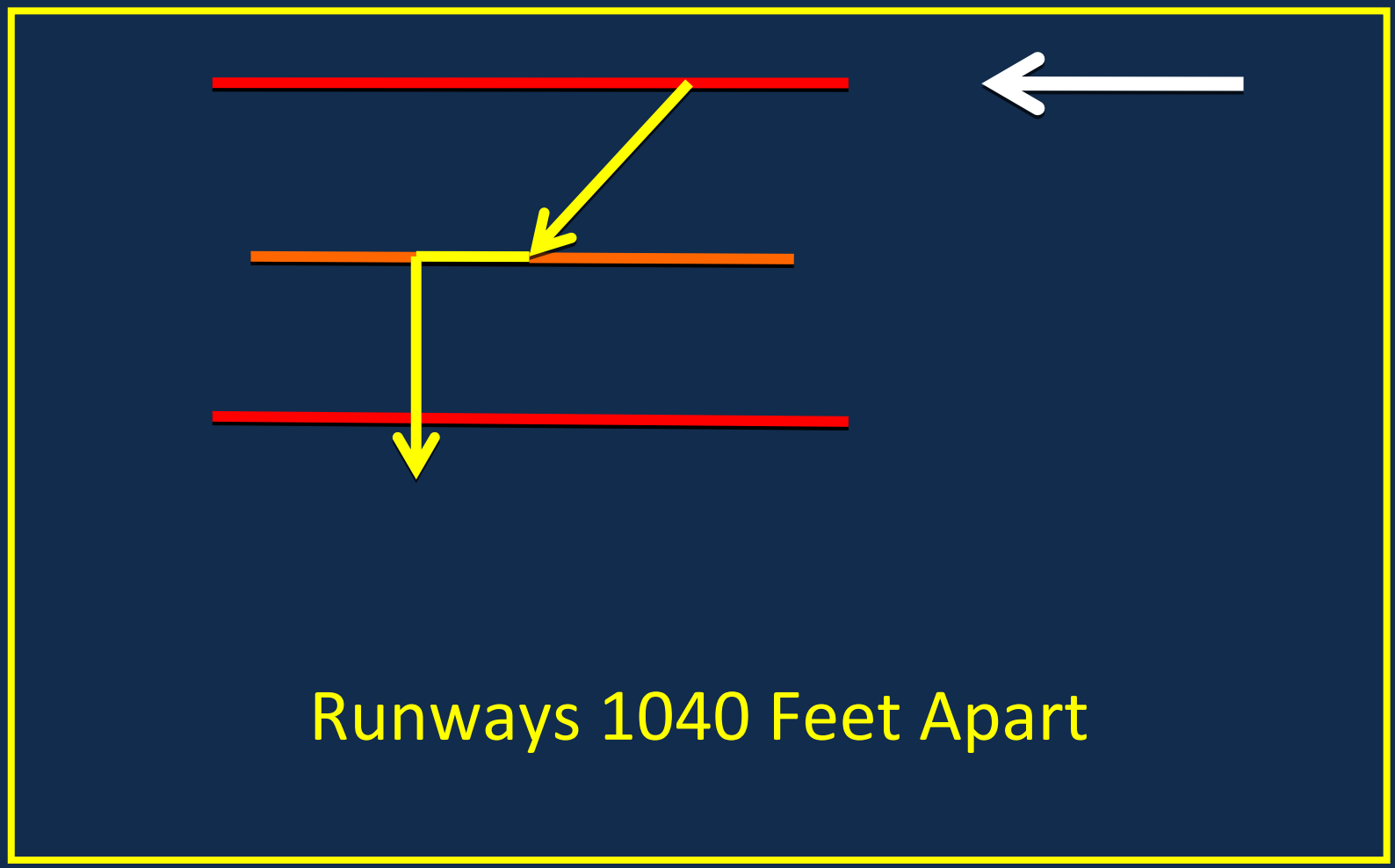
Configuration 2: Mirror Image of South Airfield



Configuration 3: Only One North Runway

This runway would handle arrivals and departures of nearly all very large aircraft.

Configuration 4: Move Runways An Additional 340 Feet Apart



At Future Flight Central, human-in- the-loop simulations involving actual pilots and controllers can take place, in “virtual reality” cockpits and control towers.

In August 2009, each of the four configurations was tested in about 12 distinct hours of simulation.

- Across these 12 hours, there was variation in:
- Visibility Condition (VFR Day, IFR Day, VFR Night)
- Level of Group VI traffic (Airbus 380, B-747-800)

- **Overall traffic level was high based on 2020 projections. South Airfield operations also considered.**

Some Details about the Simulation:

To learn as much as possible about safety, we deliberately introduced certain "anomalies" into the operations and saw how well they were handled.

Example: Missed Exit

A landing aircraft goes past its planned exit taxiway, and **remains on the runway** when the plane behind it is about to land.

Example: Read-Back Error

A pilot misunderstands a message from air traffic control, and repeats it incorrectly.

(E.g., pilot says “UA 626 cross 24-L” instead of “UA 626 hold short of 24-L”

In introducing anomalies, we faced a balancing act:

We needed enough anomalies that we could make statistically reliable statements about the responses, yet we could not introduce so many that pilots and controllers would believe they were trapped in a chamber of horrors.

We conducted both written and oral surveys among the pilots and controllers, to gain their perspectives about the configurations that they encountered.

Sample Question for Pilots:

In comparison with landings you have performed at other major US airports in similar visibility conditions , how difficult were the landings during this run?

(Score from 1: Much Less Difficult than Usual to 6: Much More Difficult than Usual)

Sample Question for Pilots and Controllers

During this run, did you observe any condition that you consider a substantial safety hazard?

(If yes, then follow-up oral session to find out what happened.)

Sample Question for Controllers:

How often during this run was your instruction or response to an aircraft delayed because you were too busy?

(Score from 1: Never to 6: Extremely Often)

While the NASA/FFC simulations are vital to the North Airfield Safety Study,they are not the entirety of the study.

Examples of Other Sources of Relevant Data:

- FAA analyses about the accident-prevention effectiveness of ASDE-X Radar and Runway Safety Lights
- Historical information about runway excursions
- Recent experience on the LAX South Airfield

So, what happened in the simulations?

Stay tuned.