

Steve Fulton

Chief Technical Officer, Naverus



Why Next-Gen isn't Now-Gen ... or is it?

ALPA Safety Conference
Washington, D.C.
Aug. 6, 2009



US Airspace Infrastructure Near Saturation Point



- ◆ The economic slowdown has given us some breathing room
- ◆ Delays common at busy airports
- ◆ Navigation procedures based on 50-year-old technology
- ◆ Processes based on legacy infrastructure

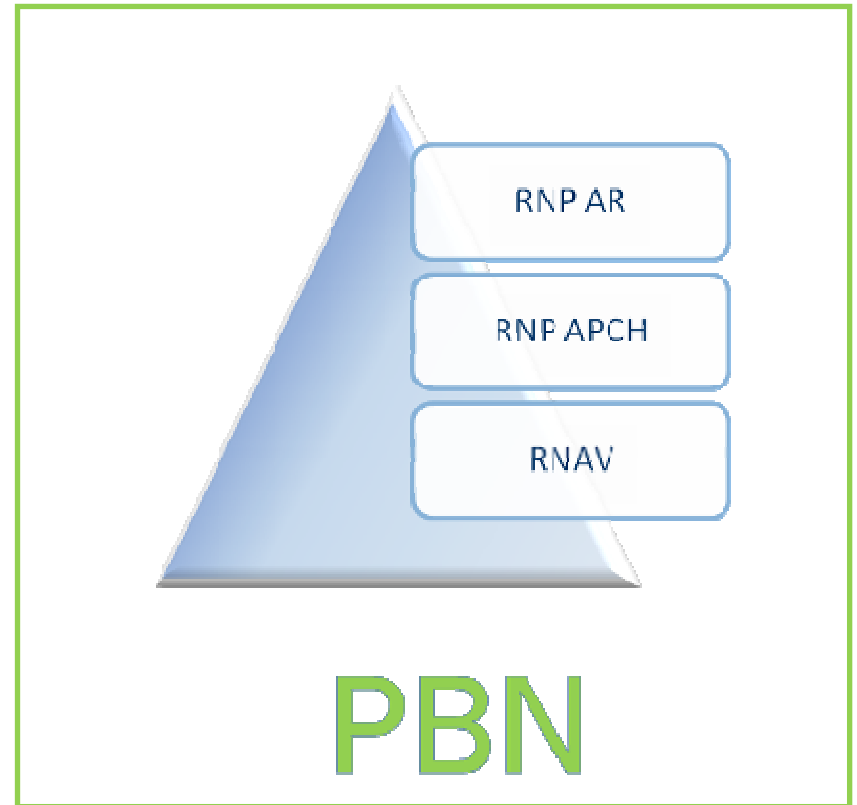
Universal Concerns are Driving Aviation Change



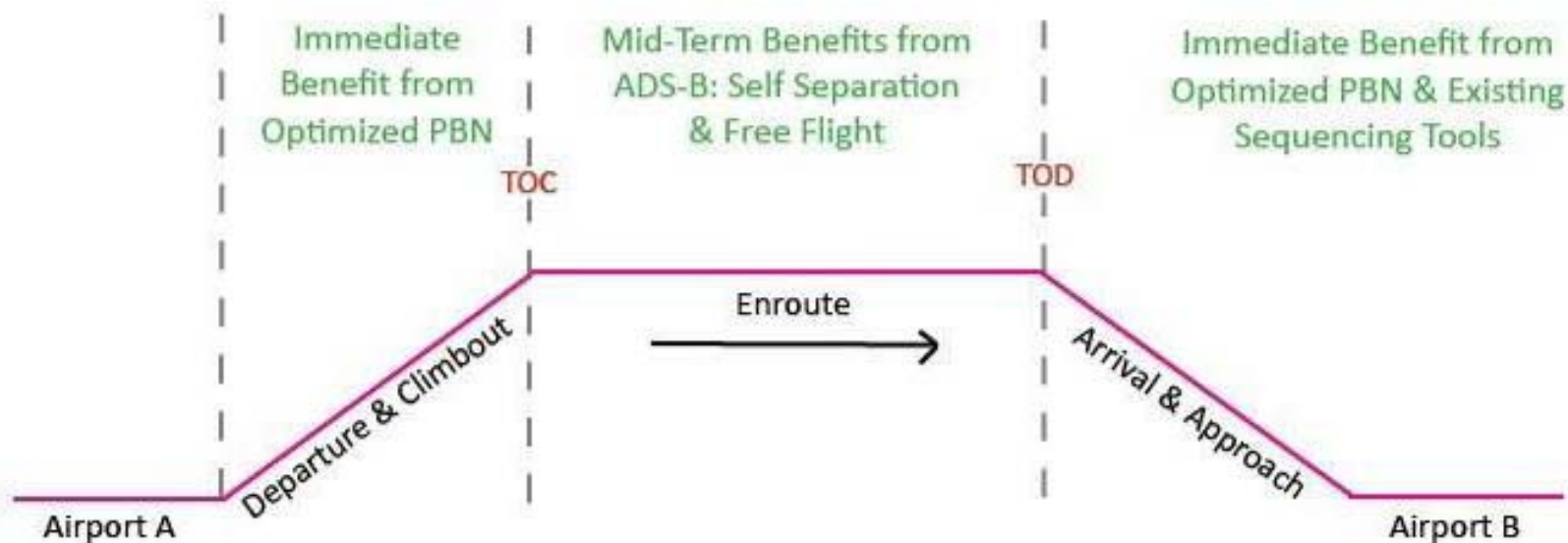
- Flight Delays
- Climate Change Issues

- Aircraft Noise
- Fuel Prices

PBN is Central to FAAs NextGen Technologies



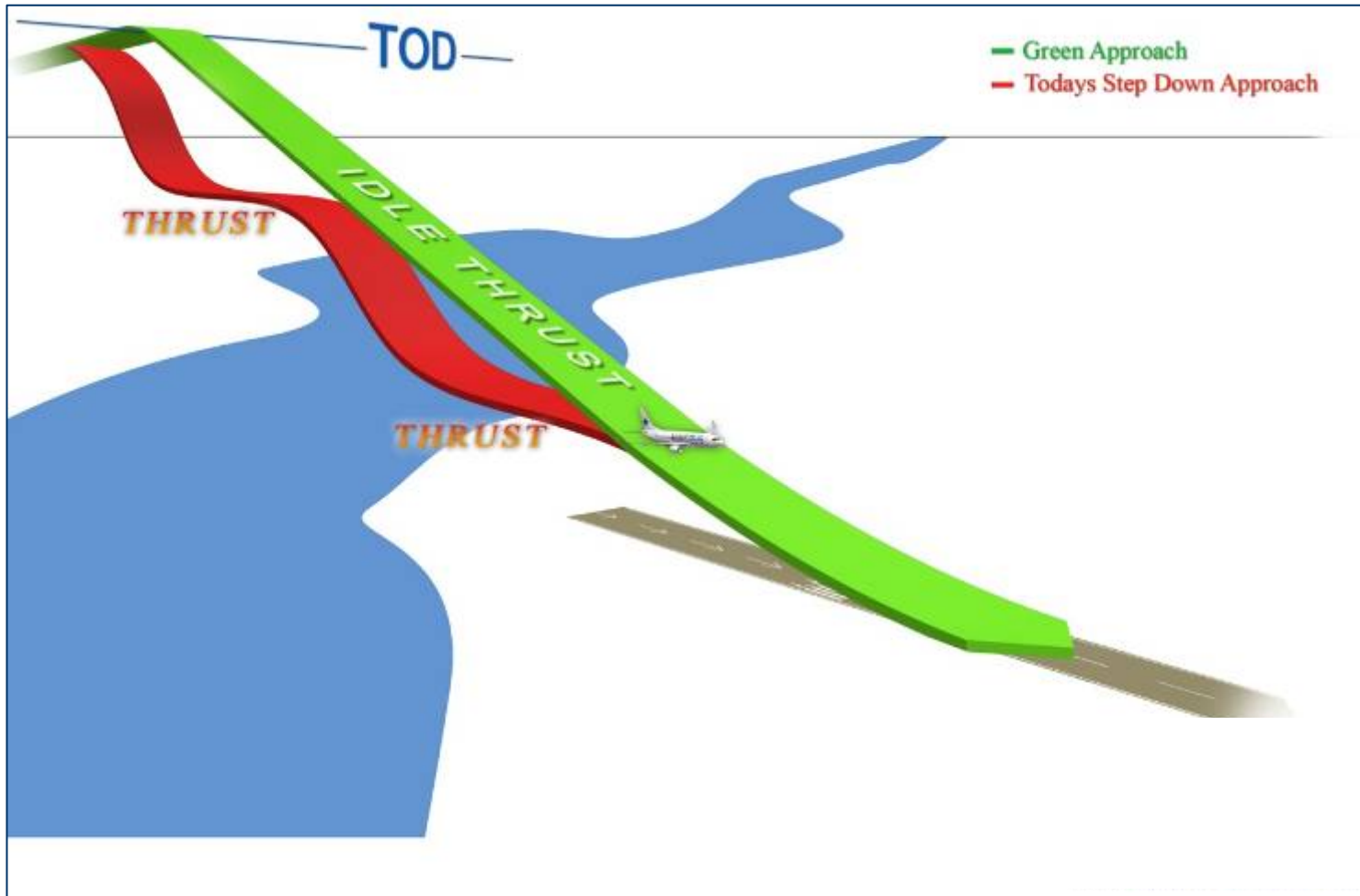
Optimized PBN Can Provide Immediate Benefit for Arrivals and Departures



Benefits to Airport Community



✦ Reduced Noise & Emissions



WestJet At Kelowna



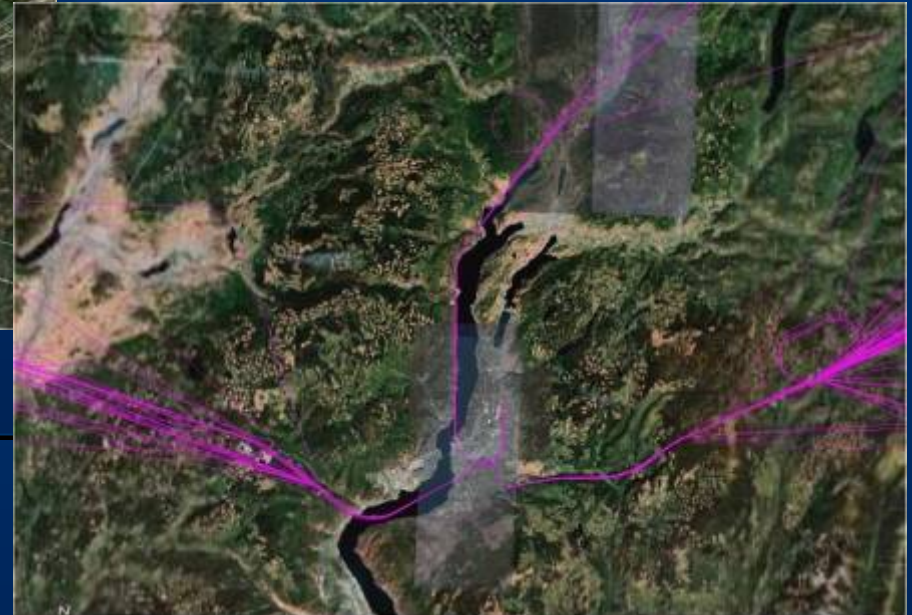
Actual Flight Tracks Before RNP



116 arriving flights, RWY 34, Kelowna,
British Columbia, Canada / flown by WestJet

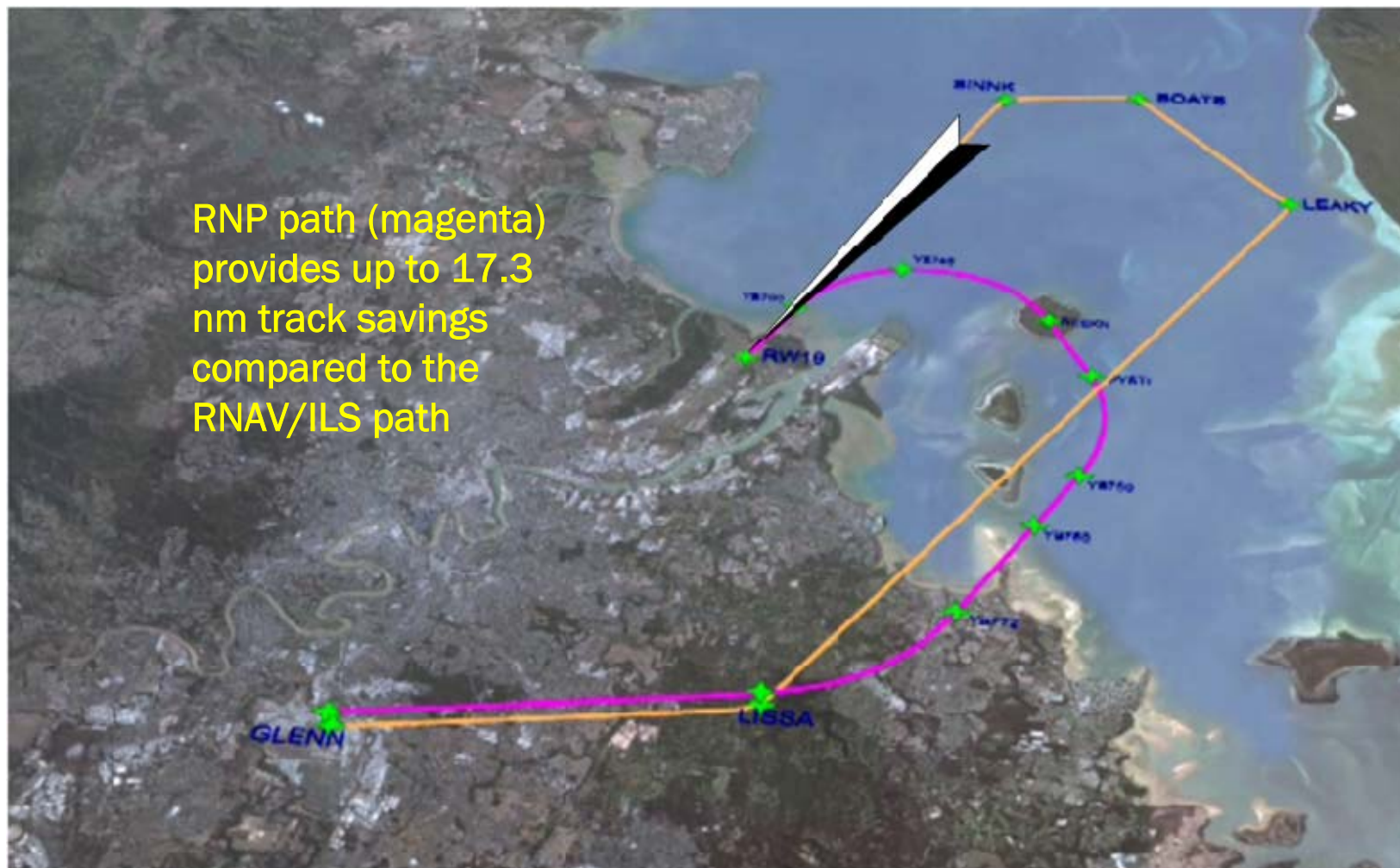
These RNP paths are 31 and 41
nautical miles shorter than the
non-RNP paths. That means less
fuel burn and lower emissions.

Actual Flight Tracks After RNP



128 arriving flights, RWY 34, Kelowna,
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At Brisbane ... It's PBN For Everyone ... Today!



Providing Immediate Benefits to Airlines



✦ Fuel & Time Savings

Brisbane, Australia **10-1**
RNAV (RNP) RWY 01 & 19 **YBBN / BNE**
BRISBANE INTL

RNAV (RNP) RNV 01/RNV 19	Apt. Elev. 13' TDZE 11'	Date of Entry into Service: January 2006	Operated by:
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	RNP Track	NM Saved	Fuel Saved (kg)	CO2 Reduced (kg)
1	DAYBO RWY 01	13.1	Average of 124 kg per Approach	Average of 390 kg per Approach
2	DAYBO RWY 19	4.9		
3	AMITY RWY 01	12.8		
4	AMITY RWY 19	8.9		
5	AMBERLEY RWY 01	Nil		
6	AMBERLEY RWY 19	17.3		

The Benefits Don't Stop at Fuel and Emissions



Noise Impact is Dramatically Reduced



-  50 dBA
-  55 dBA
-  60 dBA
-  65 dBA
-  70 dBA
-  75 dBA
-  80 dBA
-  85 dBA
-  90 dBA
-  95 dBA
-  100 dBA

Now, Airservices Australia is building systemwide RNP Network



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Nationwide network of green flight paths – a world first

San Diego, U.S. & Canberra, Aus. – June 24, 2009: Airservices Australia and Naverus have signed a contract that will lay the foundation for the world's first nationwide Performance-based Navigation (PBN) network, delivering significant reductions in aircraft emissions and noise, reduced flight miles and substantial fuel savings.

Airservices CEO Greg Russell and Naverus CEO Steve Forte explained that the initiative was the first of its kind in the world to more than 170 world air traffic control delegates who gathered yesterday at the Civil Air Navigation Services Organisation (CANSO) Annual General Meeting in San Diego, California.

In a groundbreaking move, Airservices Australia, the national air traffic control organization, and Naverus, a global PBN solutions provider, will develop Required Navigation Performance (RNP) procedures (a form of Performance-based Navigation) for arrival and departure flight paths at up to 28 major airports around Australia over the next five years.

Appropriate collaboration and consultation will occur with all affected stakeholders, including the

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Why Not Do the Same Thing in the U.S.?



Excuse # 1: U.S. Traffic Density Requires Different Kinds of Solutions



It's true that very busy airports such as O'Hare, Kennedy, Atlanta, DFW and LAX present unique challenges ...

But ... !

There are More than 600 US Commercial Airports Brisbane-sized or Smaller



Portland · Milwaukee
Nashville · Anchorage · Kansas City · Raleigh/Durham
Houston-Hobby · Dallas-Love · Indianapolis · Pittsburgh
San Antonio · Oakland · Buffalo · San Jose · New Orleans · Columbus
Sacramento · Orange County · Jacksonville · Rochester · Richmond · Omaha
Burbank · Hartford · Dayton · Des Moines · Oklahoma City · Syracuse
Louisville · Kahului/Maui · Grand Rapids · Norfolk · Ontario · Providence · Harrisburg · Burlington
Fort Myers · Albany · Pensacola · Kona/Hawaii · West Palm Beach · Boise · Tulsa · El Paso
Manchester · Teterboro · Fort Wayne · Greensboro · Green Bay · Tucson · Charleston
Knoxville · Charleston · Shreveport · Fairbanks · Spokane · Lihue/Kauai Hartford/Springfield
Westchester County · Denver · Columbus · Greenville/Spartanburg · Nantucket · Midland/Odessa
Wilkes-Barre/Scranton · Colorado Springs · Columbia · Cleveland · Northwest Arkansas
Saginaw · Kalamazoo · Portland, ME · West Chicago · Detroit-Willow Run · Bedford
Bethel · Long Beach · Madison · Wichita · Tyler · Ketchikan Savannah · Billings
Gainesville · St. Thomas · Fresno · St Paul · Huntsville/Decatur · Hyannis
Santa Barbara · Jackson · Mobile · Orlando-Metro · Lexington
Cedar Rapids · Kansas City · Tallahassee · Abilene · Rome
North Philadelphia · Jackson · Hilo/Hawaii · Myrtle Beach
Atlanta/Fulton County · Akron/Canton
Fort Lauderdale
San Diego

Tampa
Austin
Albuquerque
Birmingham
Reno · Little Rock
Kotzebue
Juneau
Moline

In the US: Lots of planning.... lots of testing... lots of time goes by...



Why Not Benefits Now?

RNAV/RNP foundation of achieving NextGen technologies benefit

Procedures begin to pay back upon implementation

RNP paths "enable" Sequencing, Merging & Spacing, CDA's, Closely-spaced Parallel Approaches

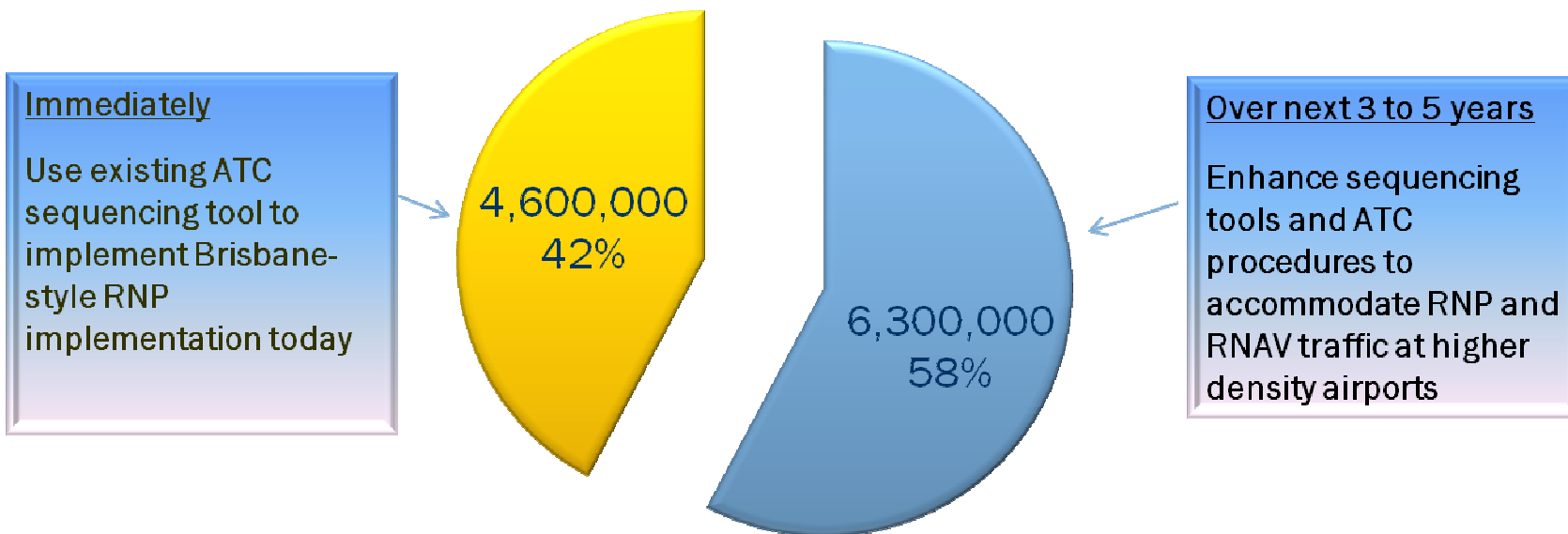
Brisbane trials prove validity of RNP implementation in mixed-equipage environment

A Modest Proposal for Implementing RNP NowGen



U.S. Airport Flight Operations/Year

- More Traffic than Brisbane - Some Development Required
- Traffic Equivalent to, or less than Brisbane - RNP-AR Ready to Implement





- ✦ **Naverus believes RNP NowGen is achievable today in the U.S.**
 - › 42% of U.S. traffic today could be getting Brisbane-like RNP benefits
 - › The rest could be phased in as sequencing capability evolves
 - › Every year we wait costs us unknown \$millions in fuel cost
- ✦ **We can leverage existing ATC sequencing tools to start... and adapt ATC processes and software to sequence denser traffic environments**
 - › Deploying precise, predictable PBN paths is the precursor to follow-on Next-Gen technologies
- ✦ **This is not a science project!**
 - › It's happening in Brisbane
 - › It's happening in Canada
 - › It should be happening here!



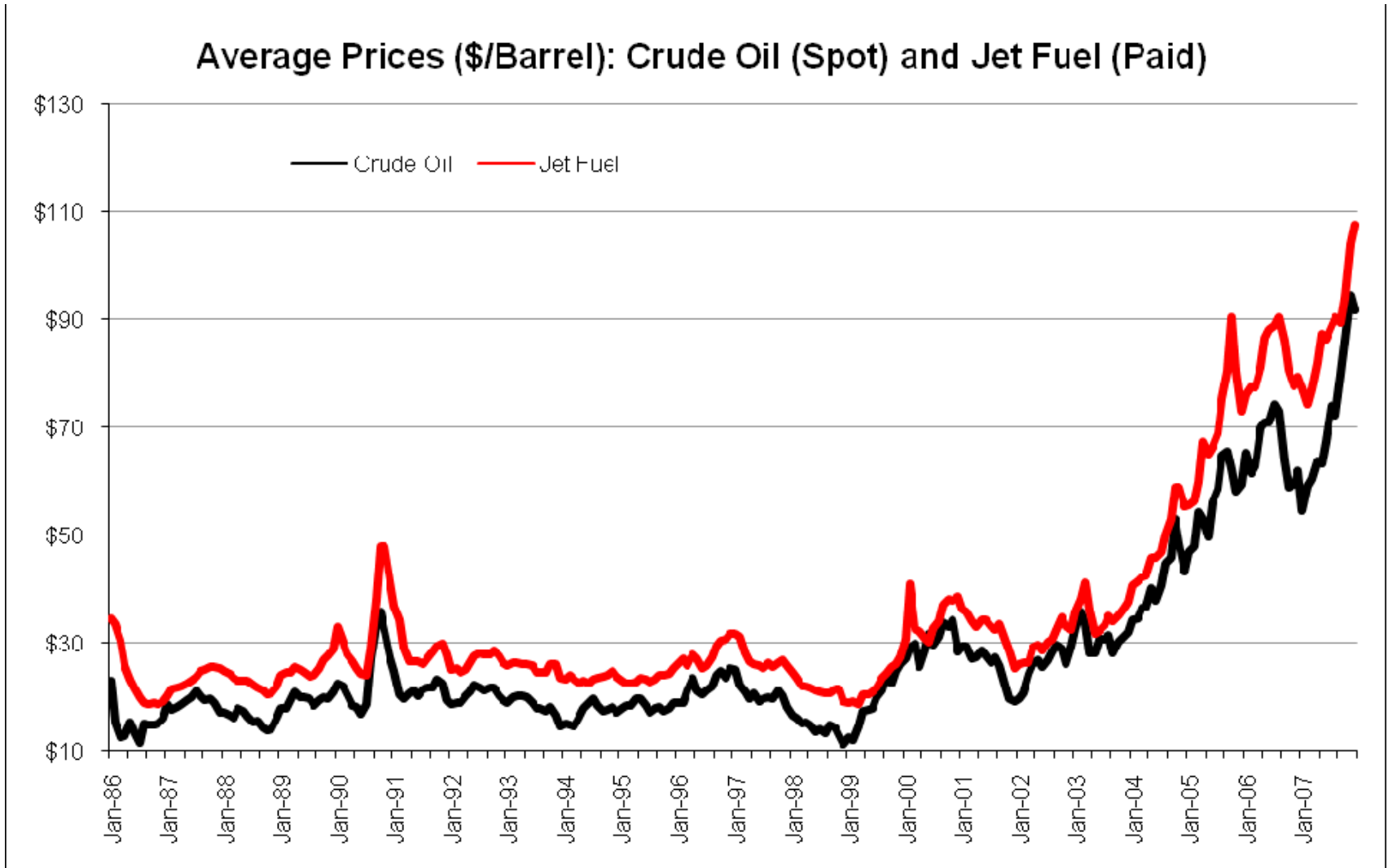
Broad Assumptions:

- 42% of traffic in US operates at Airports with Brisbane-like traffic density or less
- More than 30% of traffic at these airports is currently capable of RNP-AR
- At least one-minute flight time could be saved on each RNP operation

Resulting Benefits:

- CO₂ Reduction of at least 177,000 metric tons per year
- Jet fuel savings of at least 18.3 million gallons per year
(that equates to \$36+ million a year at \$2/gallon)

Jet Fuel Price Trend Means Increasing Benefits Over Time



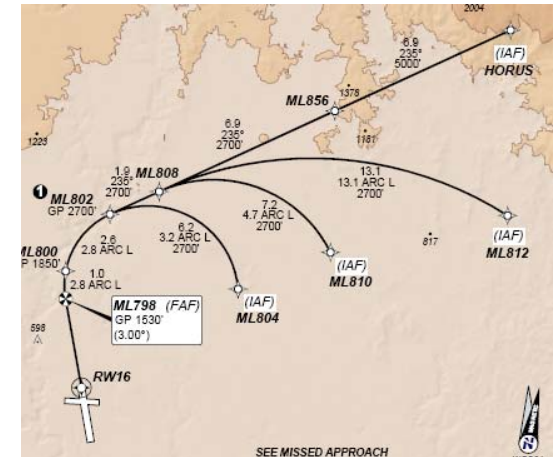
Source: Fuel Cost and Consumption Report U.S. Majors, Nationals & Large Regionals— All Services December 2007

Designing a PBN Path is Just the Beginning



✦ Successful implementation can be difficult

- › A unique set of skills and experience is required
- › Collaboration required from multiple stakeholders
 - Airlines/Operators
 - Air Traffic Control organizations
 - Regulators and other governmental entities
 - Communities



✦ The work is not complete once the path is in place

- › Ongoing maintenance and continuous improvement is necessary
- › Operators must have RNP Availability Forecasting and NavData Verification in place

✦ Naverus understands all of this...because we have lived it

- › Naverus has the demonstrated history of developing PBN for all stakeholders in Australia, China, Canada, South America and Europe



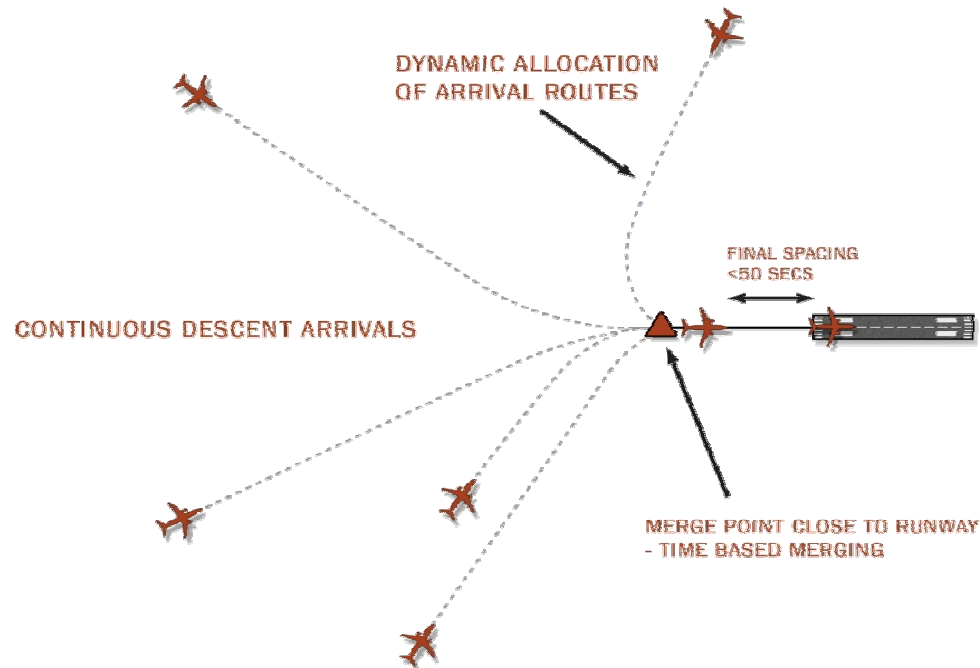
“Private sector partnerships and participation will be needed to expedite the FAA’s transition from legacy systems to NextGen technologies,”

Former FAA Administrator Bobby Sturgell in a speech to the Air Traffic Controllers Assoc. in November 2008

The Time For RNP NowGen Is Now



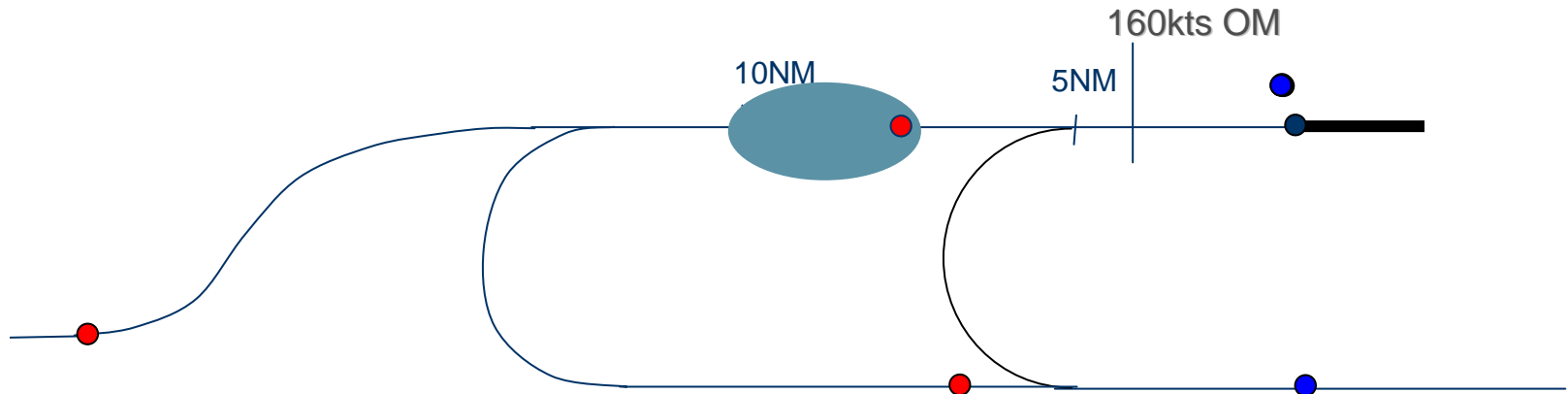
- ✦ Implementation is possible today
- ✦ The benefits are real and proven
- ✦ Technology is available and ready today



Where We're Headed ... An Optimized System



It's time to take the first step ... We'll never reach the goal, until we do.



Thank You



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