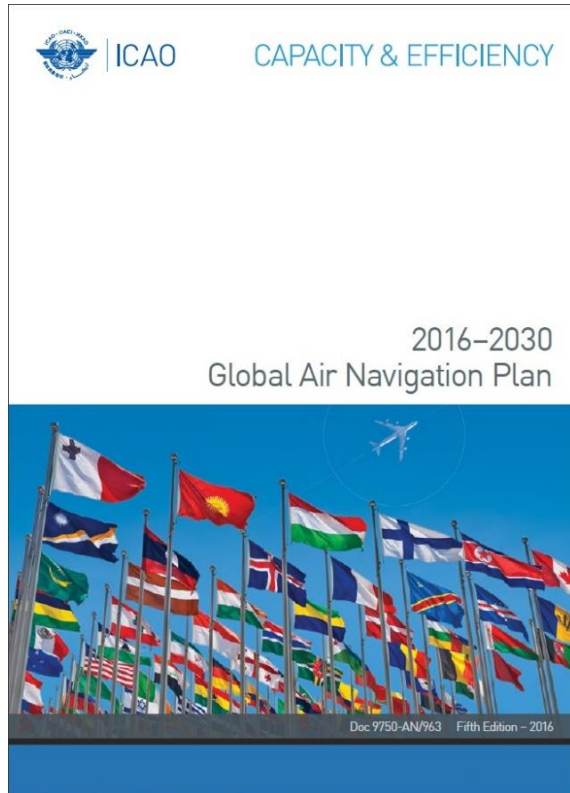




# The benefits-led approach to delivering transport outcomes in New Zealand's aviation system

Scott Earley – NSS Programme Coordinator

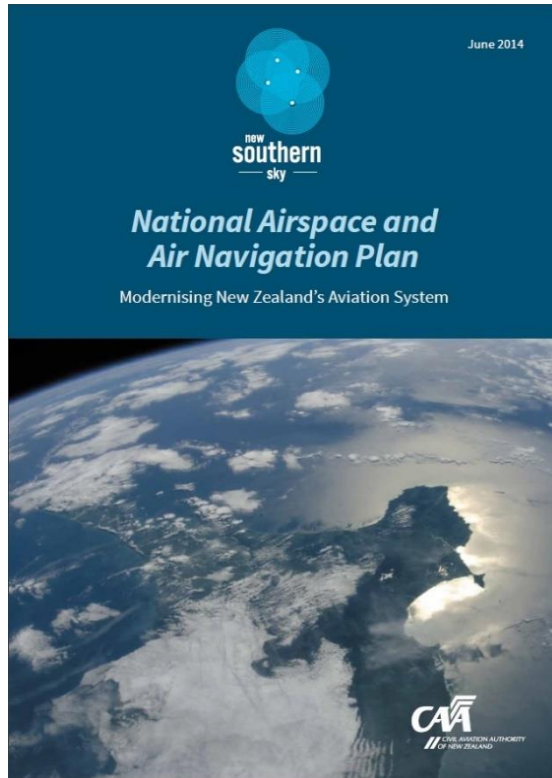
# Why NSS? The Global Perspective



- **Global Air Navigation Plan** – sustaining and growing the benefits of air travel is a priority for International Civil Aviation Organisation (ICAO).
- **Why** – to sustain and improve safety, reduce emissions, make air travel cheaper and more accessible to people (hint: benefits)
- This wider perspective may chime with some people: *We are part of the global community.*

*The global aviation system is in a sustained period of generational change.*

# NZ Inc. the National Perspective



- The New Southern Sky Programme and the '**National Airspace and Air Navigation Plan**' (NAANP) is New Zealand's response to ICAO's Global Air Navigation Plan. Produced in 2014.
- The change programme described within the NAANP is set to deliver **safety, environmental, economic** and **social** benefits to everyone in New Zealand.
- Whole of aviation system involved – not just airlines and major airports – part of a wider national system.

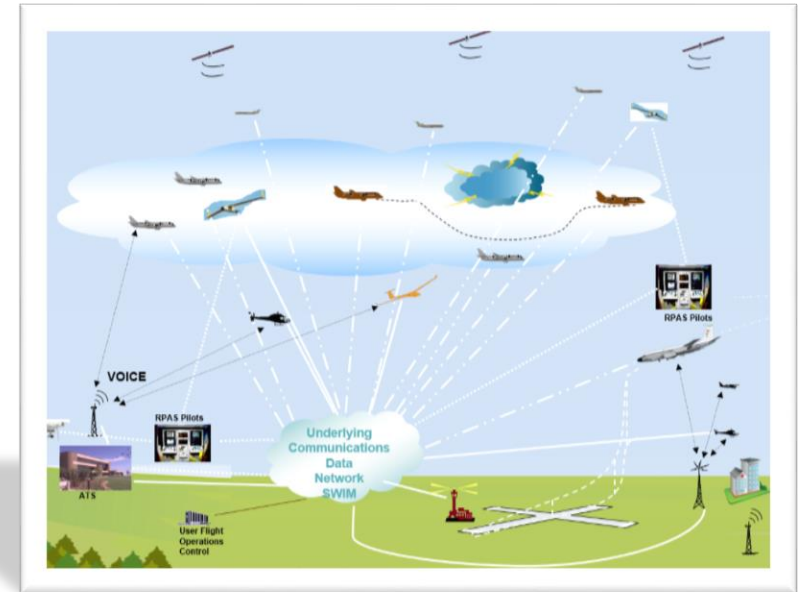
*In the aviation system has simply 'evolved' over time...*

# NSS Blueprint Looking Ahead

- The ‘**Concept of Operations 2023**’ (CONOPs) is New Zealand’s vision of the future operating environment – most importantly, it’s a **stakeholder view**.



The aviation system is being upgraded systematically through coordinated and collaborative capability delivery



2014

2023

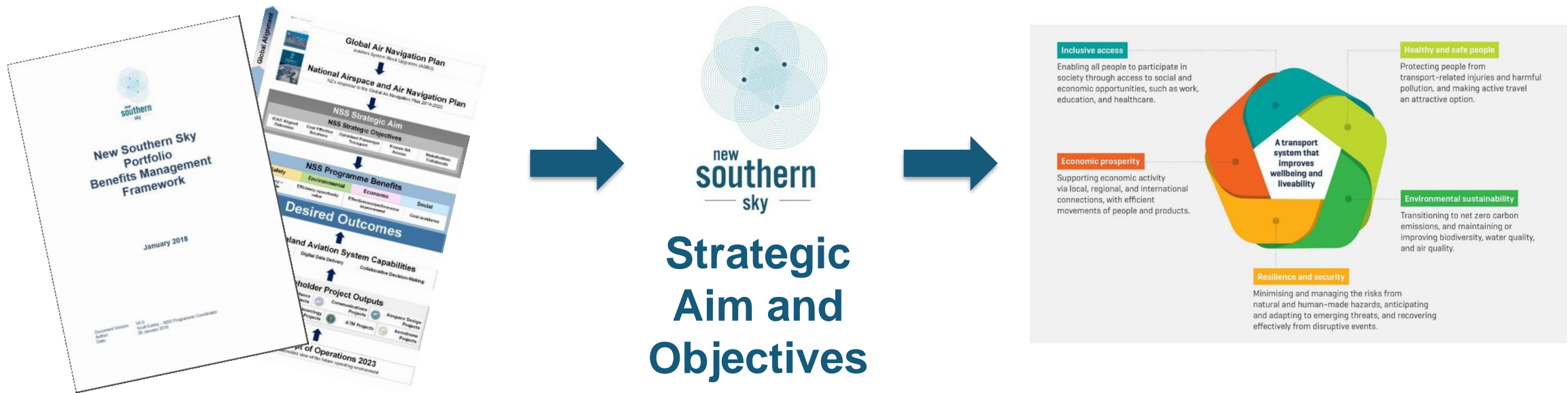
Benefits Management Principle:  
“Start with the End in Mind”

new  
southern  
sky



# The Benefits Management Framework...

- The NSS Benefits Management Framework governs how the programme contributes to the Transport Outcomes Framework.



- Outcomes** we seek are closely tied to the **Benefit**. Outcomes are difficult to measure therefore we seek the measure the benefit associated with the outcome instead...

Benefits Management Principle:  
“Apply effective governance”

# Demonstrating and Measuring Contribution

## Strategic Objectives

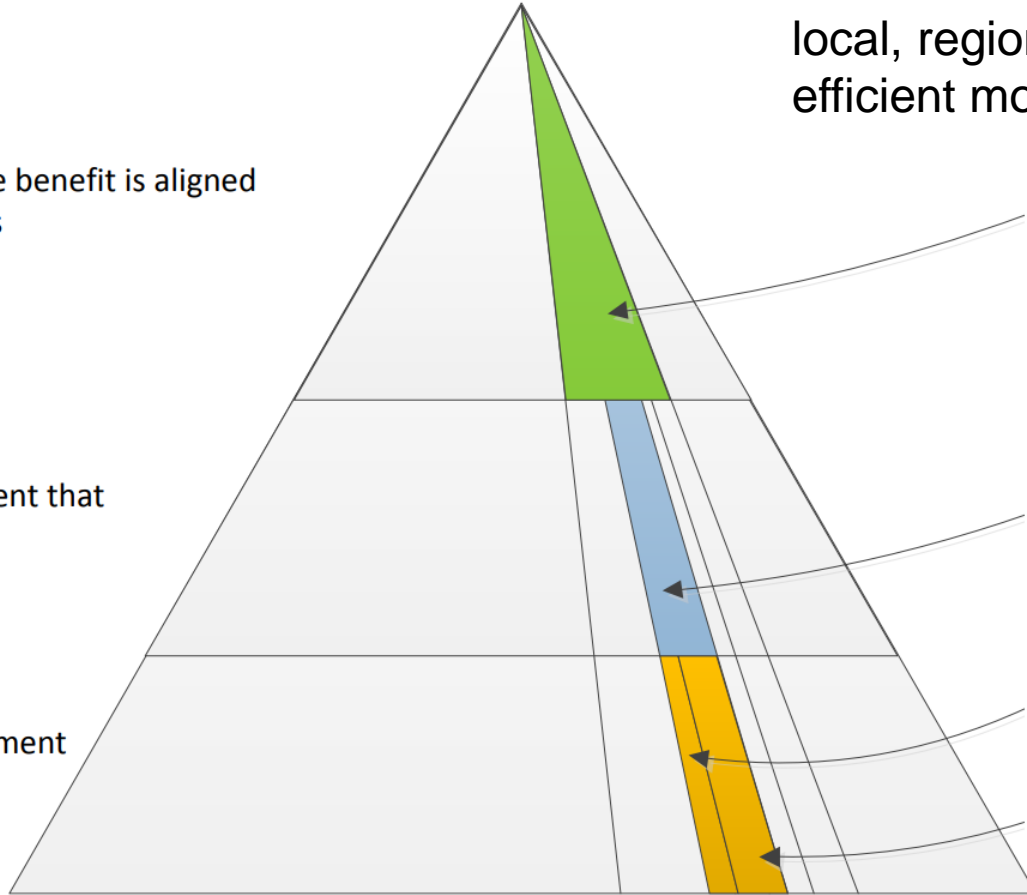
The strategic objectives the benefit is aligned to and contributes towards

## Benefit Description

The meaningful improvement that will be created

## Benefit Measures

The measure that provides evidence that the improvement has been delivered



**Economic prosperity:** Supports economic activity via local, regional, and international connections, with efficient movements of people and products.

S1. To optimize passenger transport efficiencies

B1. Reduce fuel burn

M1. Fuel savings of \$22.84M over a 20yrs period by reducing tracked miles through PBN

Benefits Management Principle:  
“Align Benefits with Strategy”

# Benefit Identification and Classification



## Safety Benefits

e.g. APV (Quantitative - often non-monetary)



## Economic Benefits

e.g. Flight efficiency, fuel saving, ADOC (Qualitative – monetary)



## Environmental Benefits

e.g. CO2, Noise (Qualitative – monetary and non-monetary)



## Social Benefits

e.g. PVT, reliability (Qualitative - monetary and non-monetary)

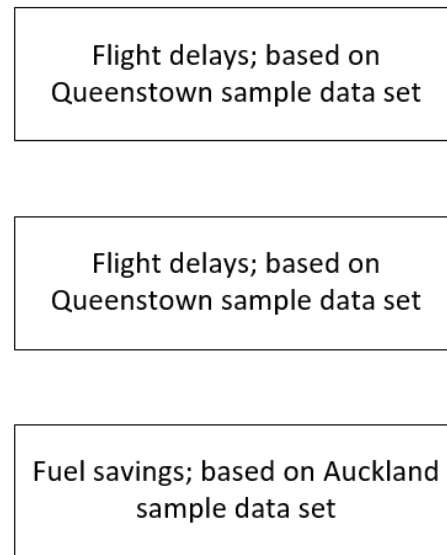
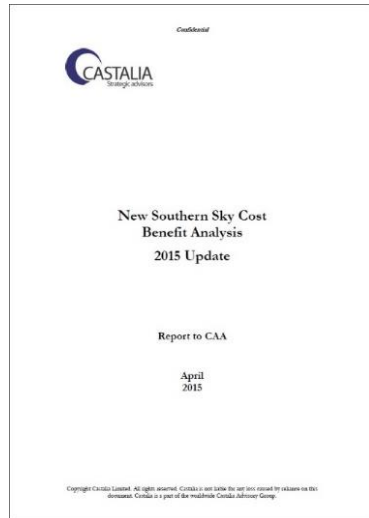


*Benefits Management Principle:  
“Manage Benefits from a Portfolio Perspective”*

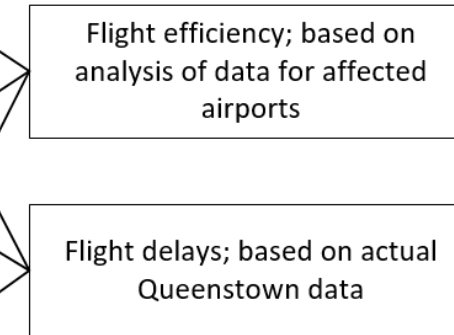
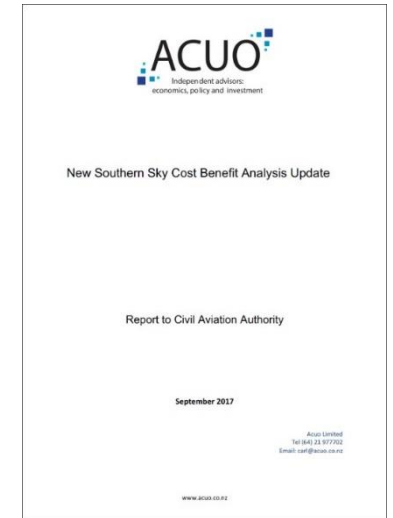


# Evidence Based Benefit Measurement

## 2014/2015 Castalia Analysis



## 2017 Acuo/Mahino Analysis



Analysis was limited to extrapolation of discrete data sample sets

Benefit measures at the national level

Analysis used real data extracted from the ATM system (evidence)

Benefits Management Principle:  
“Manage Benefits from a Portfolio Perspective”

# NSS Capability Delivery

## Components: RNAV/RNP

Moving to Performance-Based Navigation

### Conventional Routes

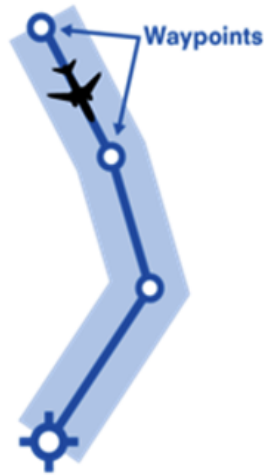
Today's airways connect ground-based navigation aids



Limited Design Flexibility

### RNAV

Area Navigation (RNAV) routes follow defined "waypoints"



Increased Airspace Efficiency

### RNP

Required Navigation Performance (RNP) routes within specified "containment area"



Optimize Use of Airspace

Source: Federal Aviation Administration

## Capability

Enables

## Benefits

Performance Based Navigation

CHANCE OF BEING DIVERTED AWAY FROM QUEENSTOWN IN BAD WEATHER:

**-17%**

Increased Passenger Safety with APV

CO2 Reductions (kg)

Airline Direct Operating Costs (NZ\$)

Fuel Savings (kg)

Passenger Value of Time (PVT) savings (NZ\$)

Reduced noise flight profiles (dB)

# Safety Benefit Analysis proxy measures



- Instrument approaches with lateral guidance **25 times safer** than circling/visual approaches
- Approaches with vertical guidance (APV) **8 times safer** than legacy non-precision approaches
- Since PBN implementation in NZ, and additional **2.2 million passengers** protected by vertical guidance
- PBN procedures facilitate traffic flow – **reduce conflict** between aircraft and holds/diversions (ADS-B and ATM are part of this)

# NSS benefit delivery infometric



Benefits delivery through new **Performance Based Navigation, Surveillance and Air Traffic Management** technologies



#### Safety Benefits

2.2M more passengers per annum better protected by aircraft approach paths with vertical guidance.



#### Environmental Benefits

4.8M Kg less CO2 per annum.



#### Economic Benefits

\$128M in direct benefits (costs avoided).



#### Social Benefits

Supporting increased numbers of domestic and international passengers through major airports.



#### Wider Economic Benefits

National benefit of **\$904M** over 20 years.

#### Continuous descent PBN approach

Reduced power settings, less noise, more fuel efficient, more environmentally friendly



#### Conventional step-down approach

More engine noise, less fuel efficient, less environmentally friendly

- Evidence based – significant and positive
- High degree of certainty in the results – Minister briefed
- Additional work required around noise – acoustics specialists supporting current PBN trials
- Additional work on A-CDM – engagement underway