Civil Military Cooperation through FUA (Flexible Use of Airspace)

FUA

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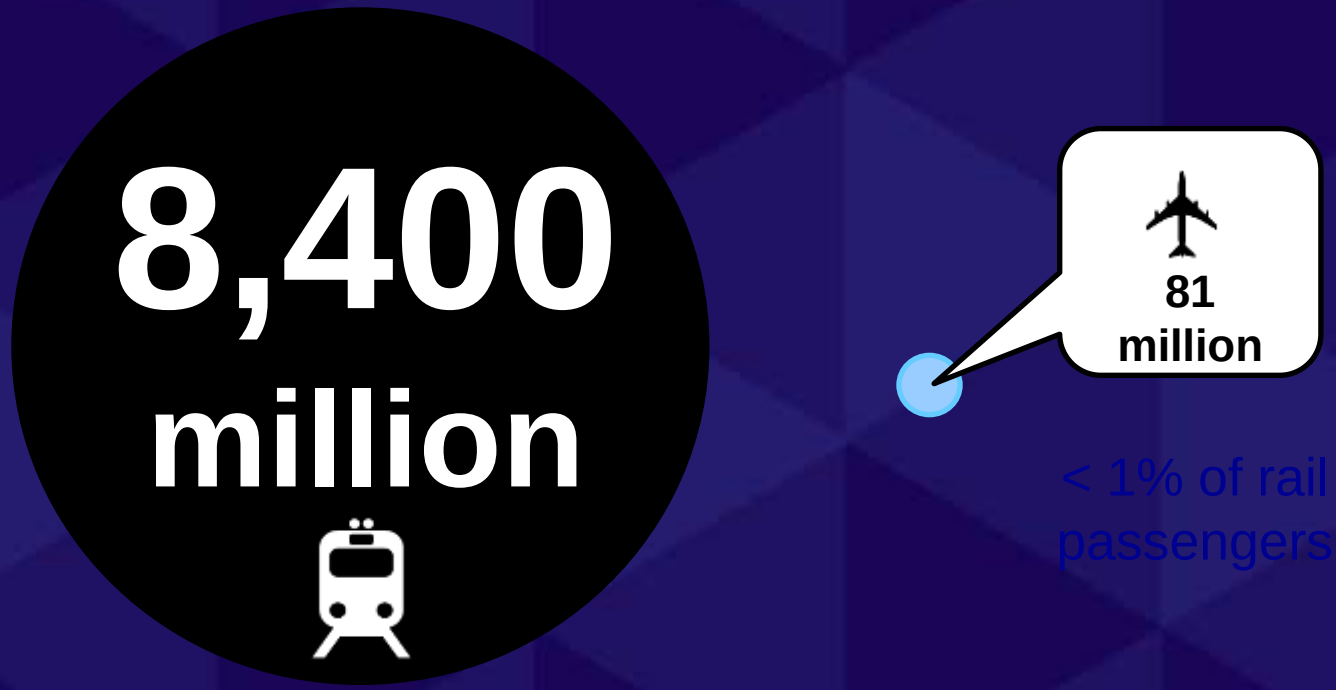
Why is airspace sharing necessary?

- **Over 300 million and growing** middle class driving consumption and fueling growth
- India is expected to become the 5th largest consumer economy by 2025 from the 12th largest in 2007
- **600 million** people expected to be in upper and middle income bracket **by 2025**

Source: McKinsey

Rail to Air Substitution Supportive of Demand

2015 Passengers



< 1% of rail passengers

Increasing Disposable Income

Changing Consumer Preference

Large Market Potential

Substitution from rail to air

IATA Forecast: 2016-2034

- The **five fastest-increasing markets** in terms of additional passengers per year over the forecast period (2016-2034) will be:
- China (758 million new passengers for a total of 1.2B passengers)
- US (523 million new passengers for a total of 1.16B billion)
- ***India (275 million new passengers for a total of 378 million)***
- Indonesia (132 million new passengers for a total of 219 million)
- Brazil (104 million new passengers for a total of 202 million)
- **India will displace the UK as the third-largest market world-wide in 2026**

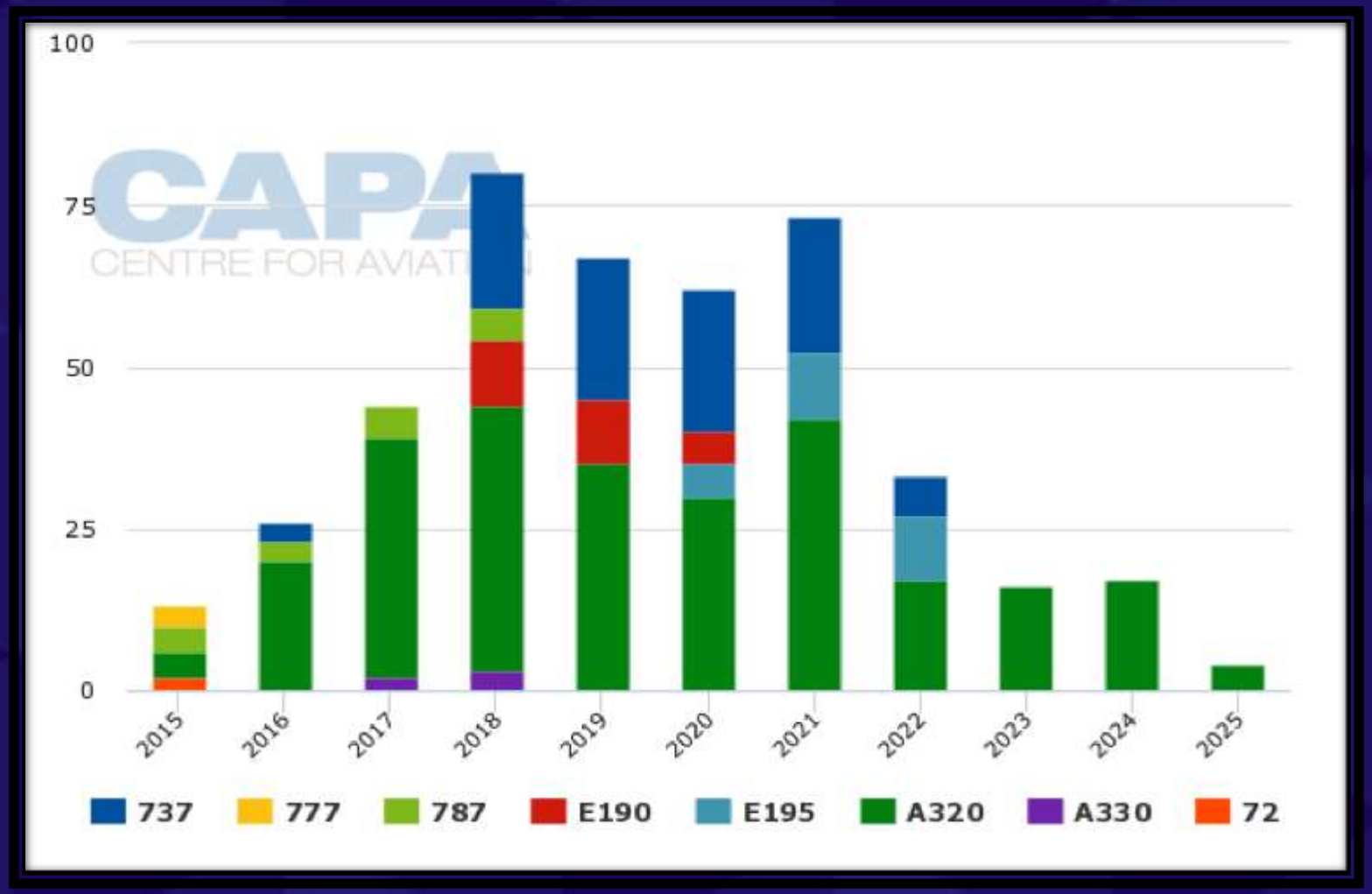
Other Forecasts

- **DGCA India, 2016:**

  Monthly DGCA reports show Indian passenger numbers growing 20 – 25% YOY

- **CAPA** forecasts YOY growth from 81 million pax in FY 16 to 100 million in FY 17 (23% growth)
- **Boeing** Current Market Outlook, October 2015: India will need **1740 new airliners by 2034**
- **Airbus:** India will need **1300 new airliners by 2032**

CAPA – AIRLINE A/C ADDITIONS 2015-2025



A Reasonable Prediction

- It would be fair to say that there will be 600 airliners operating in India by December 2018, 30 months from today
- A 50% increase from today's 440 airliners
- All using the same finite, limited Indian airspace

Effectively managing these numbers in the service of the travelling public is our challenge

Air Traffic Management: An Environmental Solution for Aviation

- Air Traffic Management (ATM) improvements represent the greatest near-term environmental opportunities for significant reductions in aviation fuel burn and CO2 emissions

➔ **By using more fuel efficient routes**

➔ **By more effectively sharing airspace between military and civil users**

Cutting flight times by one minute per flight on a global basis would save 4.8 million tons of CO2 every year (IATA)

Formation of NHLAPB & NAMAC

October 2013:

- Formation of **National High Level Airspace Policy Body (NHLAPB)** for airspace
  - Chaired by Secretary, Ministry of Civil Aviation
    - With representation from Ministry of Defence, Indian Air Force, Indian Navy, Indian Space Research Organization, Airports Authority of India and Directorate General of Civil Aviation
  - **National Airspace Management & Advisory Committee (NAMAC)** in early 2014
    - Includes Airline Members

Flexible Use of Airspace

1. The FUA Concept provides the Air Traffic Management (ATM) system with the potential to increase capacity

2. FUA came into existence to manage increasing traffic flow – both civil and military

3. The FUA Concept allows the maximum shared use of airspace through enhanced civil/military co-ordination

4. Concept strives for airspace segregation that is temporary and based on real use for a specified time period

Benefits Reaped Due To Implementation of FUA

CDR 1 — Permanently plannable during the times published in AIP

- Expected to be available for most of the time
- Plannable in the same way as all permanent ATS routes
- In the event of short notice unavailability, re-routing around active TSA on ATC instructions

CDR 2 — Non-permanently plannable

- Daily allocated to respond to ATS capacity imbalance
- Plannable only in accordance with daily AUP/CRAM
- Part of pre-defined routing scenario

CDR 3 — Not plannable

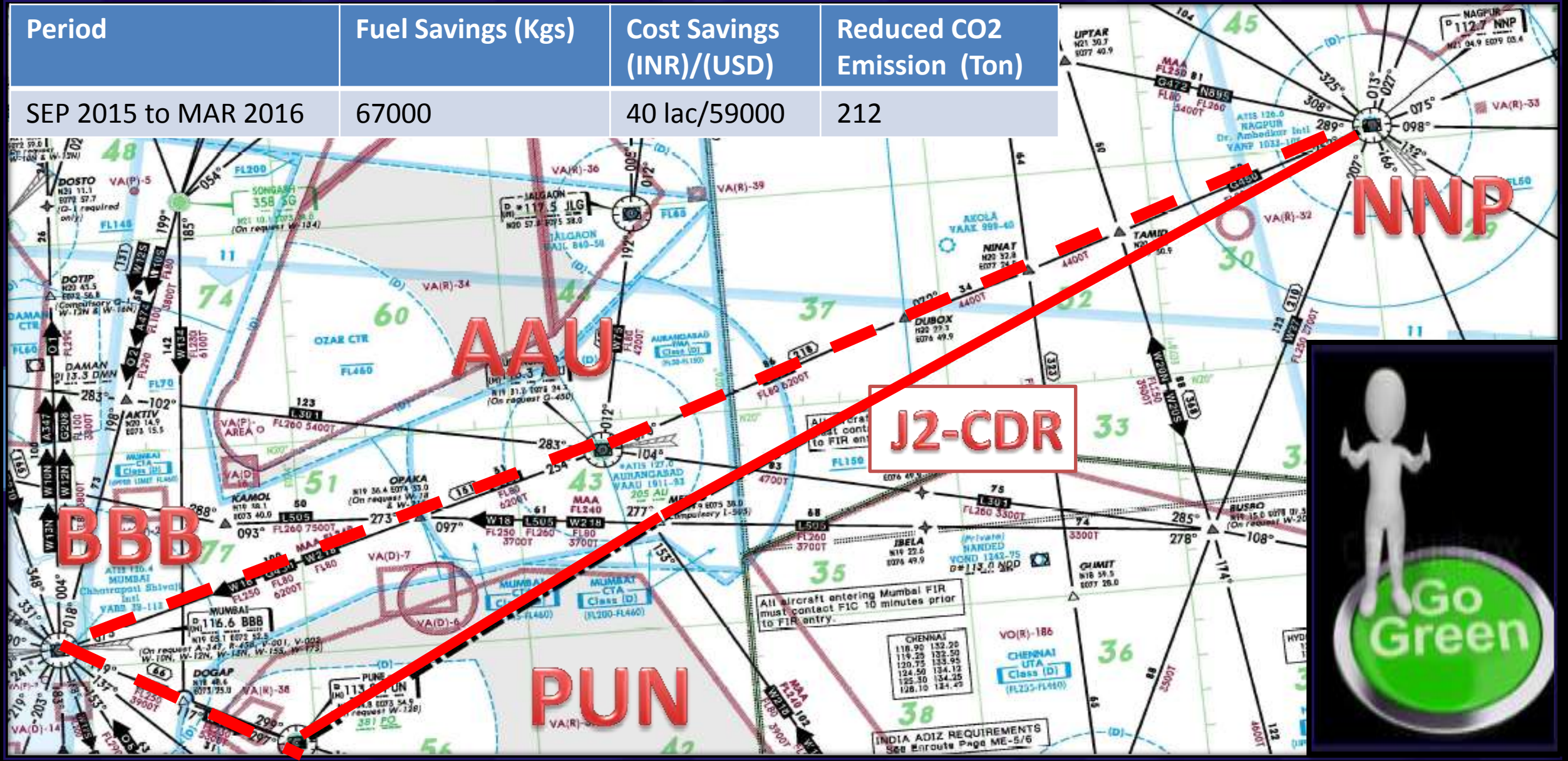
- Usable on ATC instructions only
- Used as short notice routing

Conditional Route J1-CDR 2 Kolkata - Jaipur

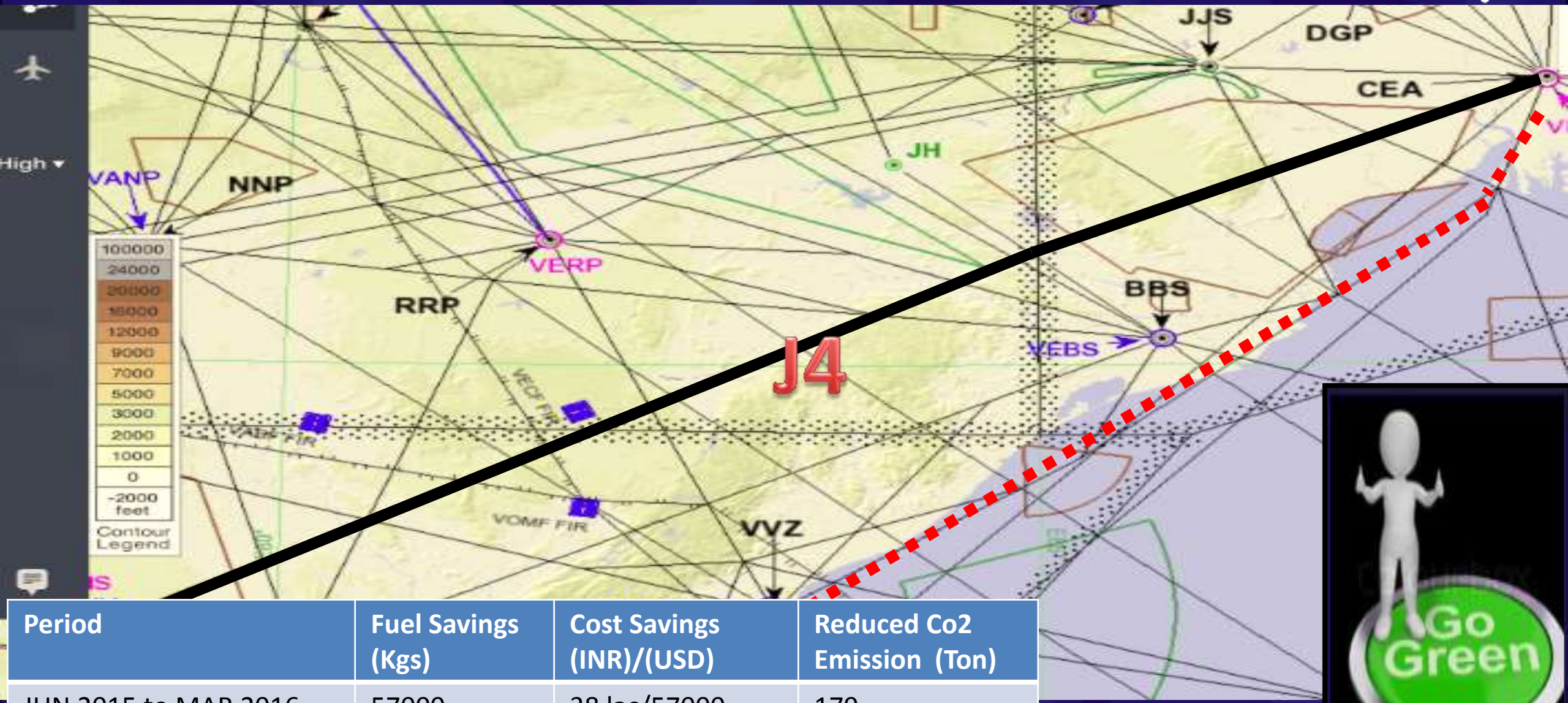
Period	Fuel Savings (KG)	Cost Savings (INR)/USD	Reduced CO2 Emission (Ton)
NOV 2014 to MAR 2016	748000	4.75 Cr/ 0.7 Million	2400

Conditional Route J2-CDR 2 Nagpur -Pune

Period	Fuel Savings (Kgs)	Cost Savings (INR)/(USD)	Reduced CO2 Emission (Ton)
SEP 2015 to MAR 2016	67000	40 lac/59000	212

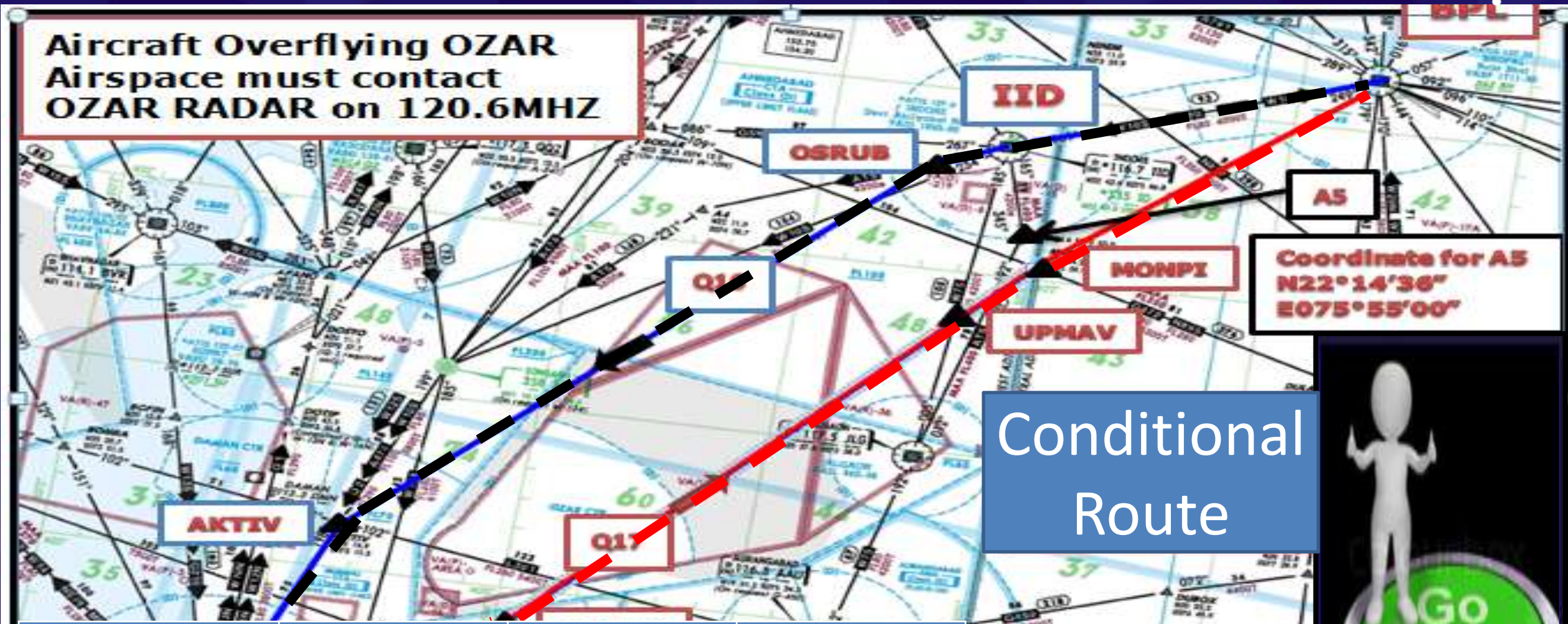


Conditional Route J4-CDR2 Kolkata-Hyderabad



Period	Fuel Savings (Kgs)	Cost Savings (INR)/(USD)	Reduced Co2 Emission (Ton)
JUN 2015 to MAR 2016	57000	38 lac/57000	179

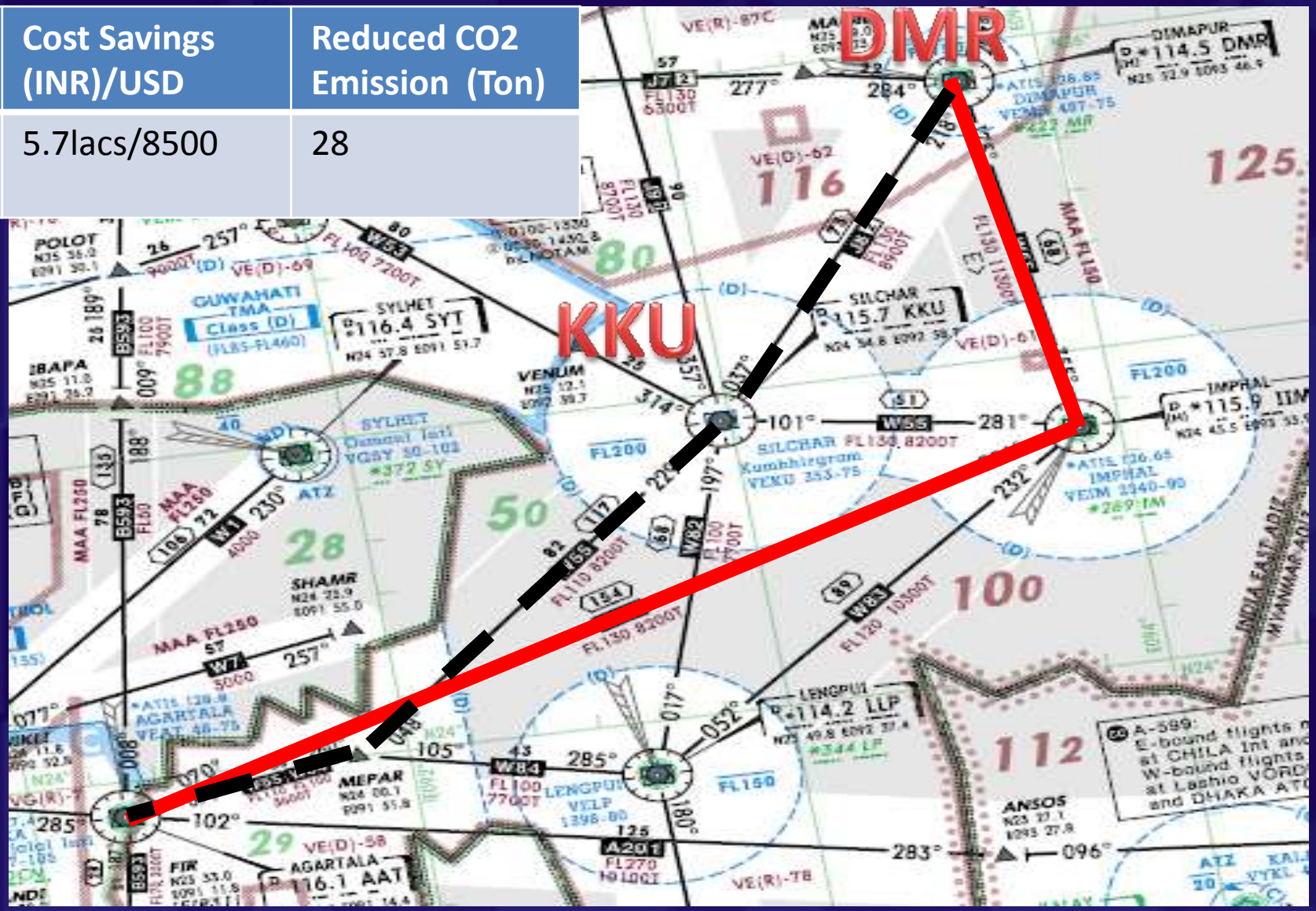
Q16 & Q17 Route Overflying OZAR Airspace



Period	Fuel Savings (Kgs)	Cost Savings (INR)/(USD)	Reduced CO2 Emission (Ton)
MAR 2015 to MAR 2016	3,70,000	2.4Cr/0.3 Million	1147

Conditional Route J8-CDR2 Dimapur - Kumbhigram

Period - Only Sundays	Fuel Savings (Kgs)	Cost Savings (INR)/USD	Reduced CO2 Emission (Ton)
OCT 2015 to MAR 2016	8000	5.7lacs/8500	28

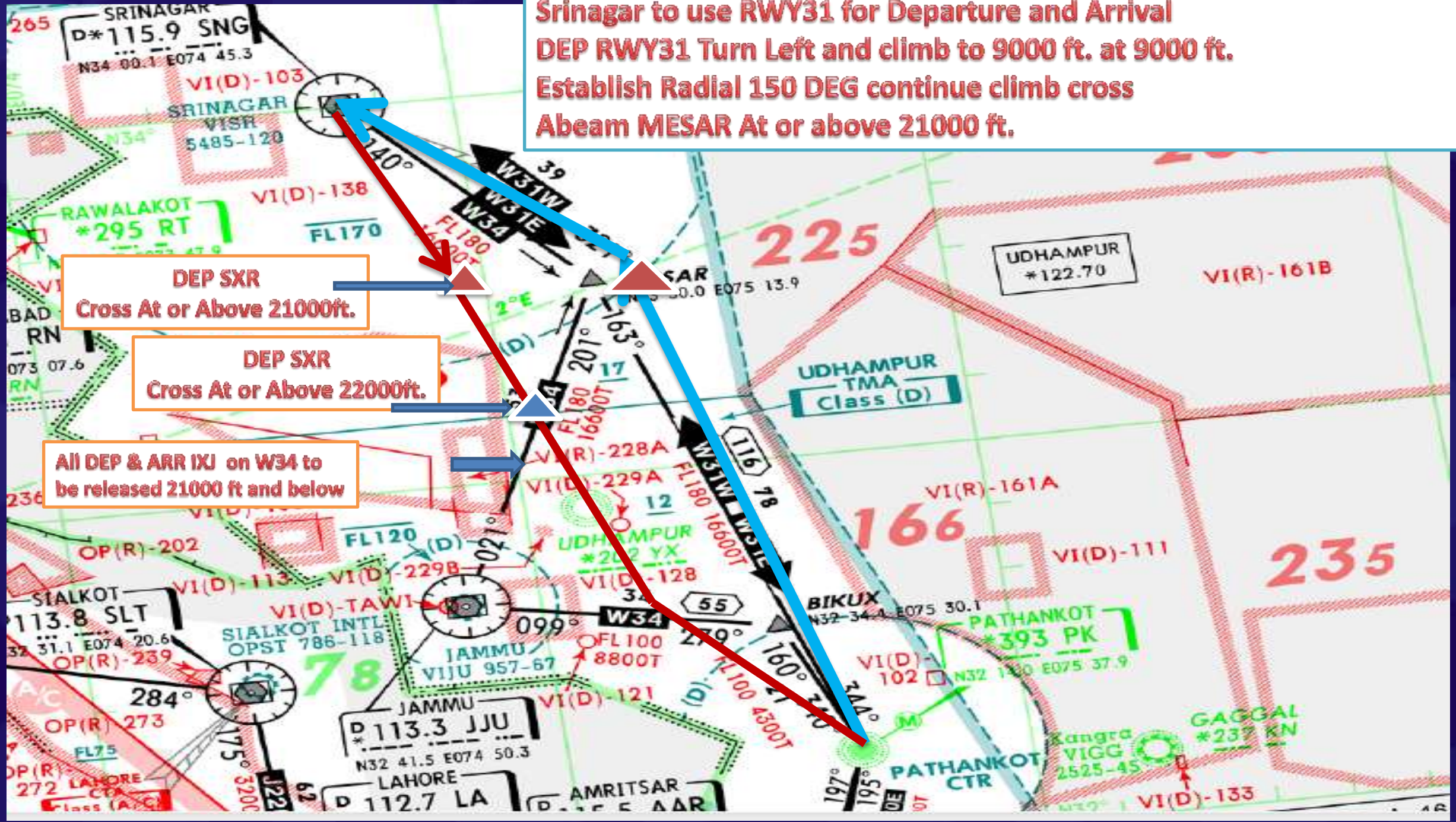


CO2 Reduction and Fuel Savings (The MAGIC of saving 100Kg per flight)

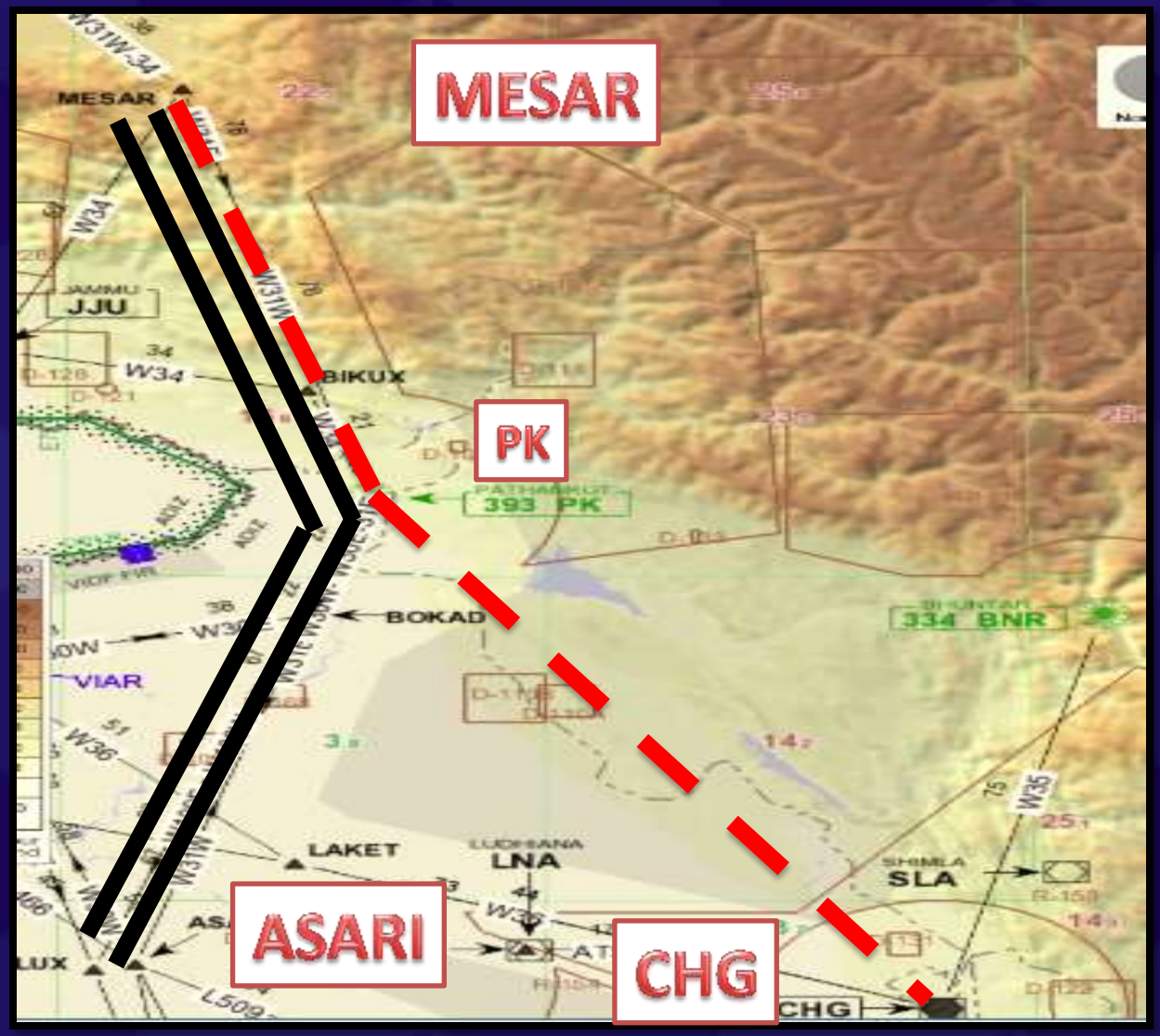
APR 2016			
No. of Flights/Year	Fuel Saving /Year/ (Tons)	Fuel Savings /Year (INR)/USD	CO2 Reduction/Year (Tons)
245,000	24,500	116 Cr/17.4 Million	77,200

APR 2015			
No. of Flights/Year	Fuel Saving /Year/ (Tons)	Fuel Savings /Year (Rs)	CO2 Reduction/Year (Tons)
210,000	21,000	155 Cr/23.2 Million	66,200

What more can be done with Civil Military Cooperation?


Srinagar to use RWY31 for Departure and Arrival
DEP RWY31 Turn Left and climb to 9000 ft. at 9000 ft.
Establish Radial 150 DEG continue climb cross
Abeam MESAR At or above 21000 ft.
DEP SXR
Cross At or Above 21000ft.
DEP SXR
Cross At or Above 22000ft.
All DEP & ARR IXJ on W34 to
be released 21000 ft and below
SRINAGAR
D*115.9 SNG
VI(D)-103
SRINAGAR
VISR
5485-120
RAWALAKOT
*295 RT
VI(D)-138
FL170
W31W
W31E
W34
UDHAMPUR
*122.70
VI(R)-161B
UDHAMPUR
TMA
Class (D)
VI(R)-161A
VI(D)-111
VI(R)-228A
VI(D)-229A
VI(D)-229B
VI(D)-TAW1
VI(D)-128
VI(D)-121
OP(R)-202
OP(R)-239
OP(R) 273
SIALKOT
113.8 SLT
SIALKOT INTL
OPST 786-118
JAMMU
VIJU 957-67
JAMMU
113.3 JJU
LAHORE
112.7 LA
AMRITSAR
BIKUX
PATHANKOT
*393 PK
PATHANKOT
CTR
Kangra
VIGG
2525-45
GAGGAL
*237 KN
VI(D)-133
225
166
235
78

Direct Route Between PK and CHG

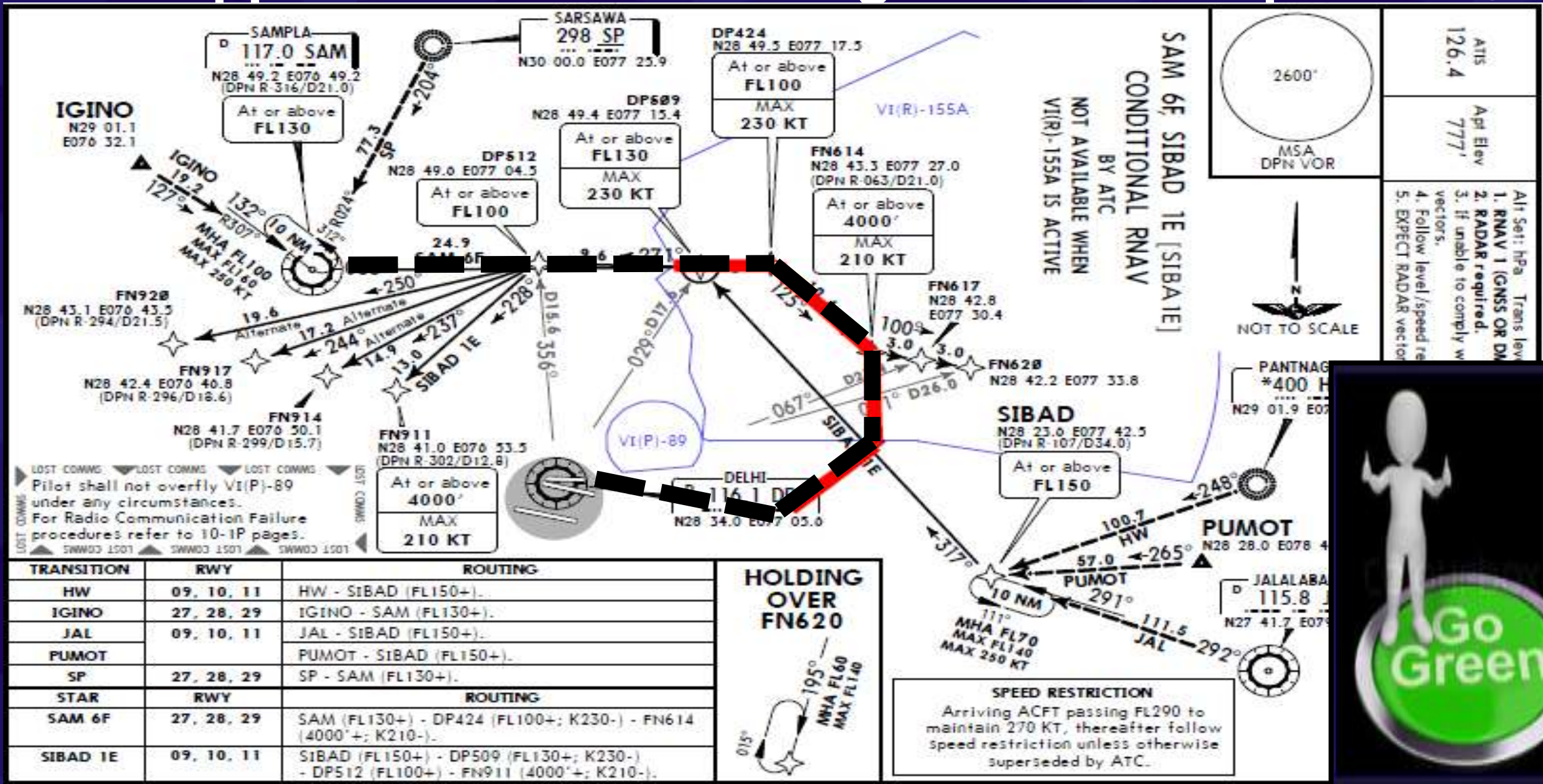


There is only one route to fly to/from Jammu and Srinagar.

In case connectivity between PK and CHG is made available and the traffic is bifurcated from DPN so that inbound traffic to Jammu and Srinagar follows DPN-PK-SNG and Outbound traffic follows SNG-PK-CHG-DPN

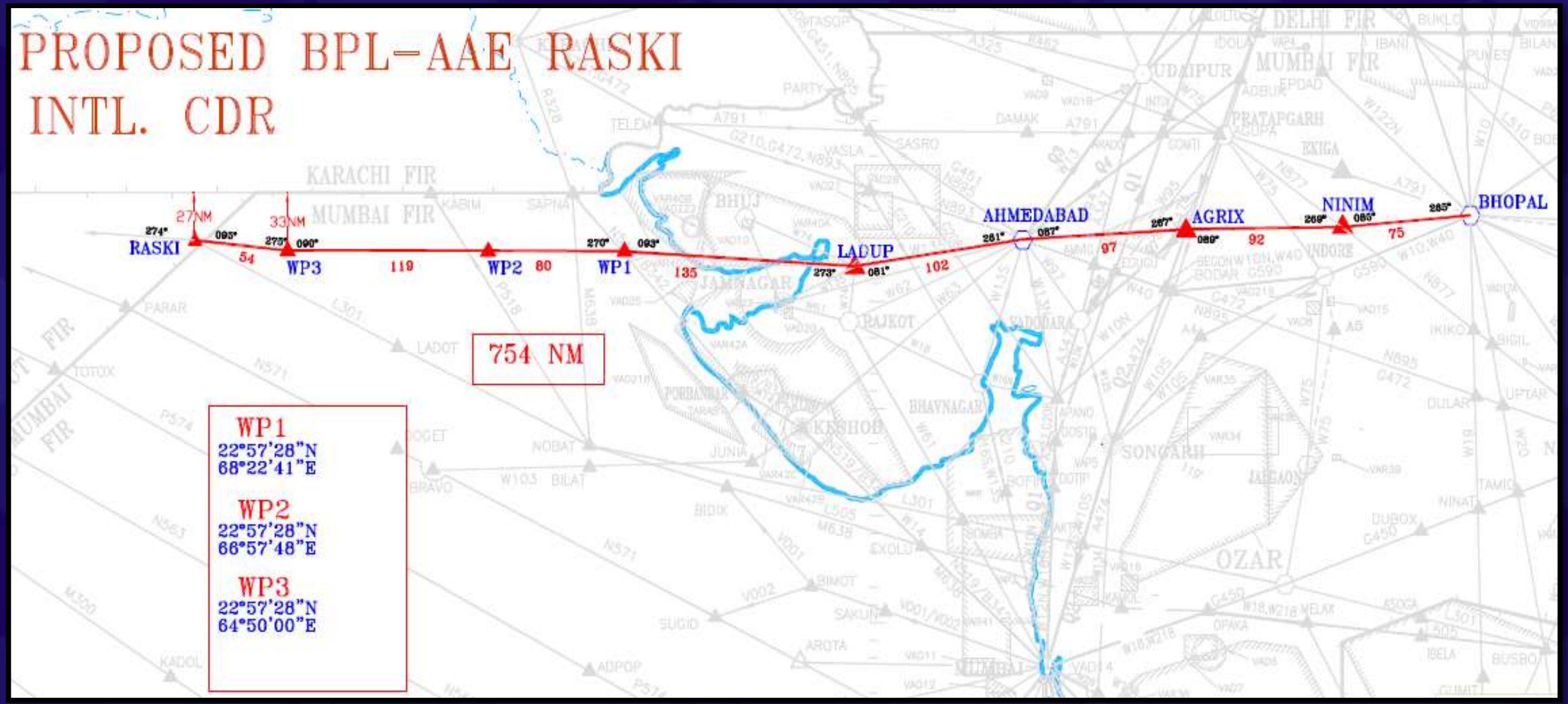
This will not only ease the traffic density but also help all Airlines in getting optimum level hence less fuel burn and less CO_2 emissions.

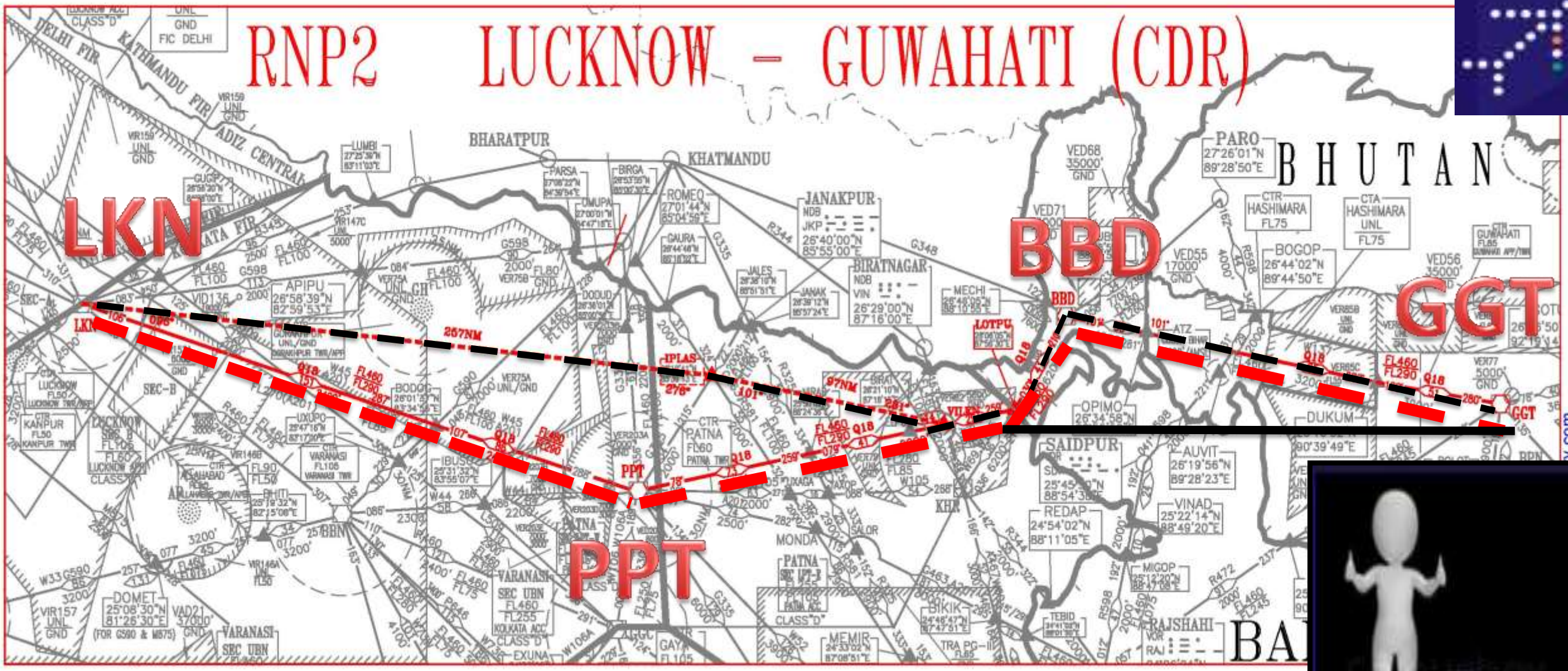
Approach Corridor Through Hindon Airspace



TRANSITION	RWY	ROUTING
HW	09, 10, 11	HW - SIBAD (FL150+).
IGINO	27, 28, 29	IGINO - SAM (FL130+).
JAL	09, 10, 11	JAL - SIBAD (FL150+).
PUMOT		PUMOT - SIBAD (FL150+).
SP	27, 28, 29	SP - SAM (FL130+).
STAR	**RWY**	**ROUTING**
SAM 6F	27, 28, 29	SAM (FL130+) - DP424 (FL100+; K230-) - FN614 (4000'+; K210-).
SIBAD 1E	09, 10, 11	SIBAD (FL150+) - DP509 (FL130+; K230-) - DP512 (FL100+) - FN911 (4000'+; K210-).

Proposal for BPL-AAE-RASKI





No. of Flights per month	570
Saving Per Flight Distance	11 NM

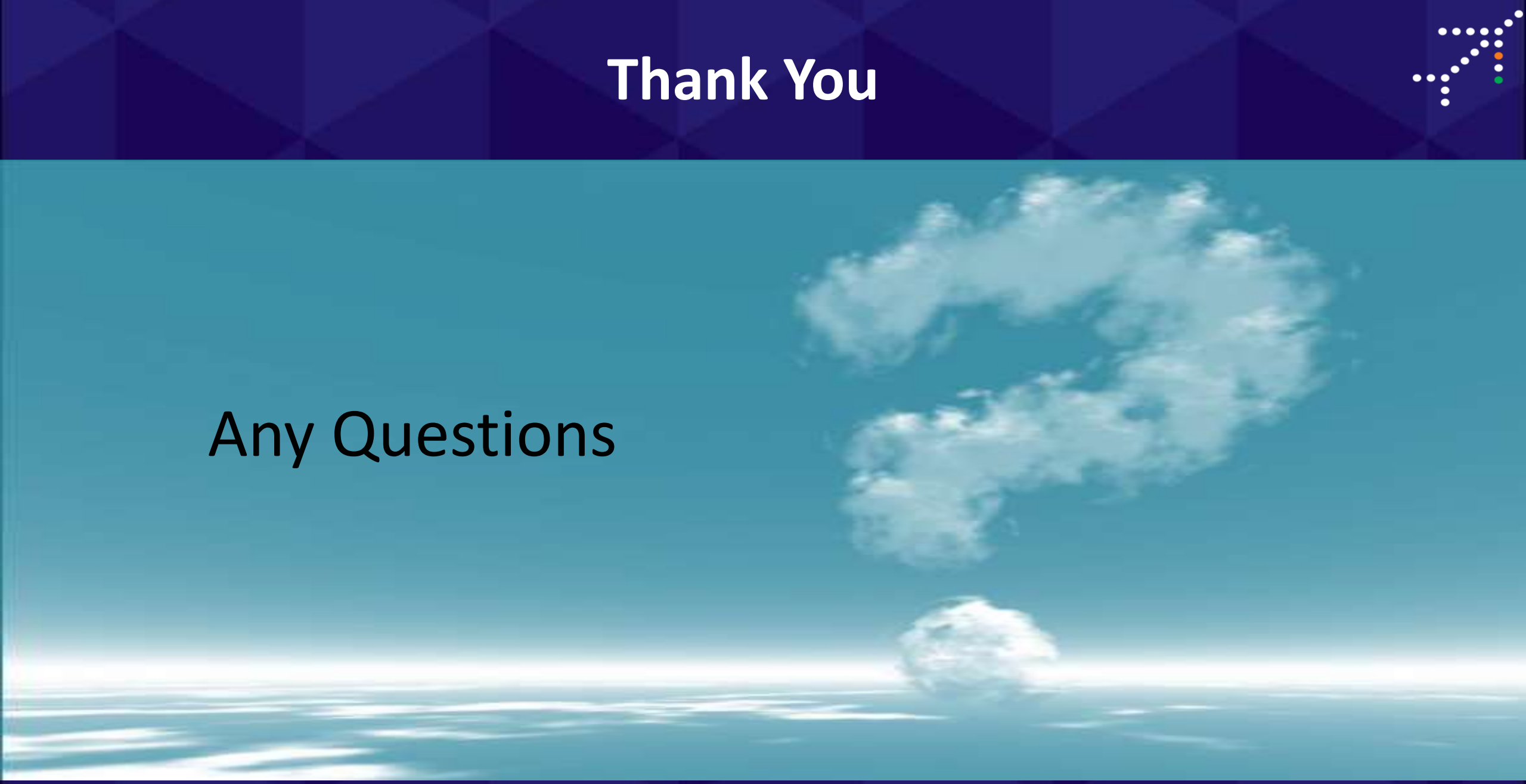
Predicted Fuel Saving/Year=4,51,400 Kgs

Reduced CO2 Emissions= 1425 Ton

Controllers FAM Flights

1. Every year airlines as a best practice take civil controllers for familiarization flights to different airports
2. 80 controllers were approved in 2015
3. 100 controllers on domestic flights and 20 for international flights have been approved in 2016
4. We would be extremely pleased to welcome Air Force/Navy controllers in our cockpits

Thank You



Any Questions