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中国民用航空局
空中交通管理局
Air Traffic Management Bureau. CAAC

Civil/Military ATM Cooperation and Flexible Use of Airspace Webinar

Online

20th -21st Nov 2024

This event is jointly organised with

EU-CHINA APP | EU-ROK APP | APP EU-Japan | EU-SOUTH ASIA APP | EU-ASEAN SCOPE APP | Funded by the European Union | EASA European Union Aviation Safety Agency | EUROCONTROL | PANSA

EU - Asia Aviation Partnership Projects (APP)

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Application of Conditional Route in China

Peng Jiayi
ATMB.CAAC

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ATC Working Experience in BJ ACC
Engineer of ASMC.ATMB
Internal Auditor
Master of Public Administration, BUAA

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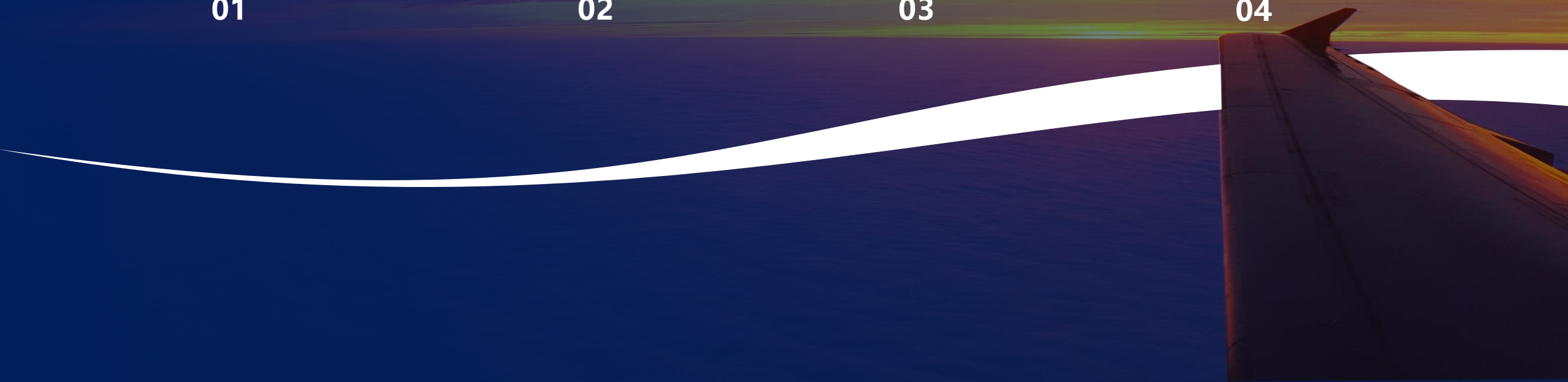

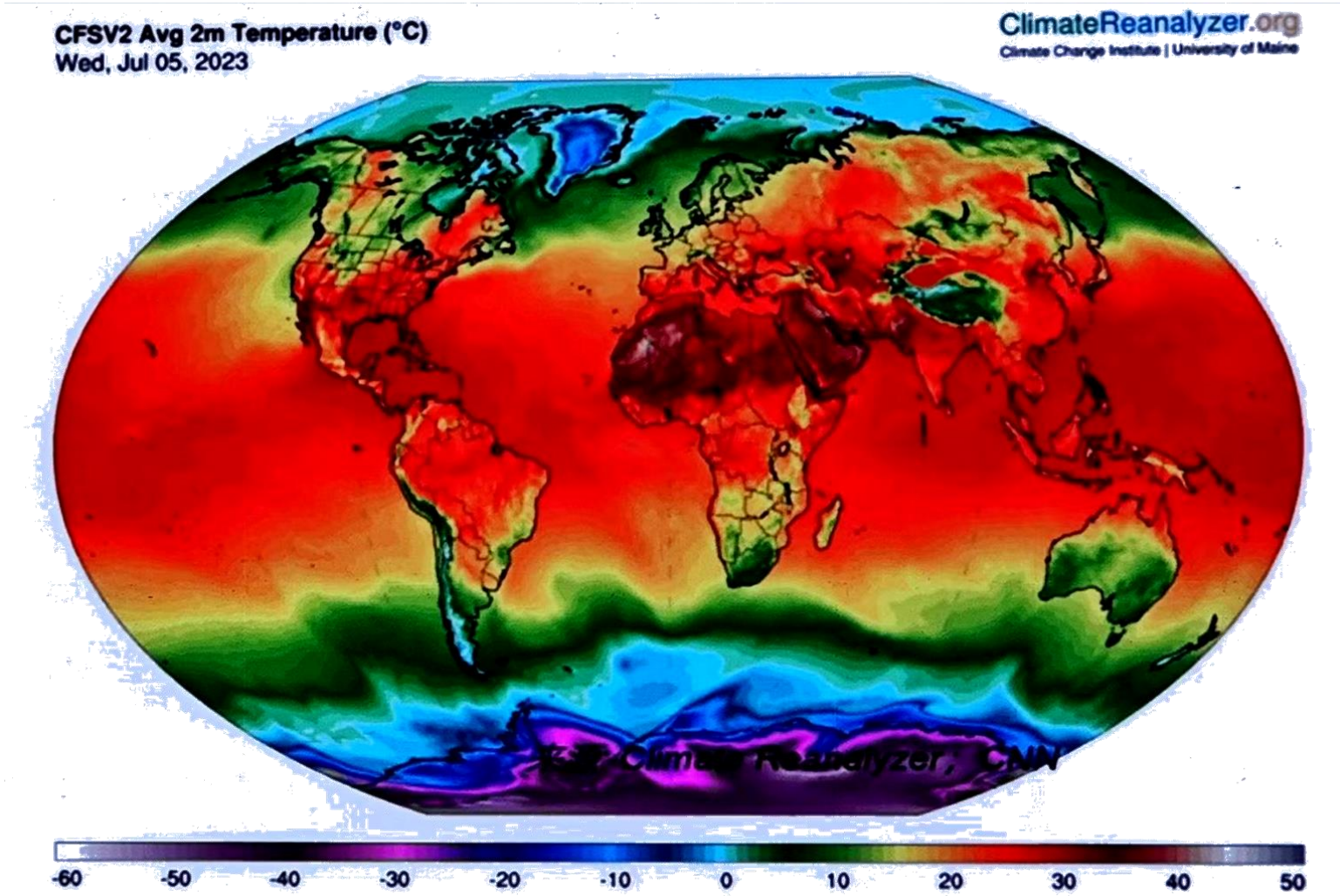
CFSV2 Avg 2m Temperature (°C)
Wed, Jul 05, 2023
ClimateReanalyzer.org
Climate Change Institute | University of Maine
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50

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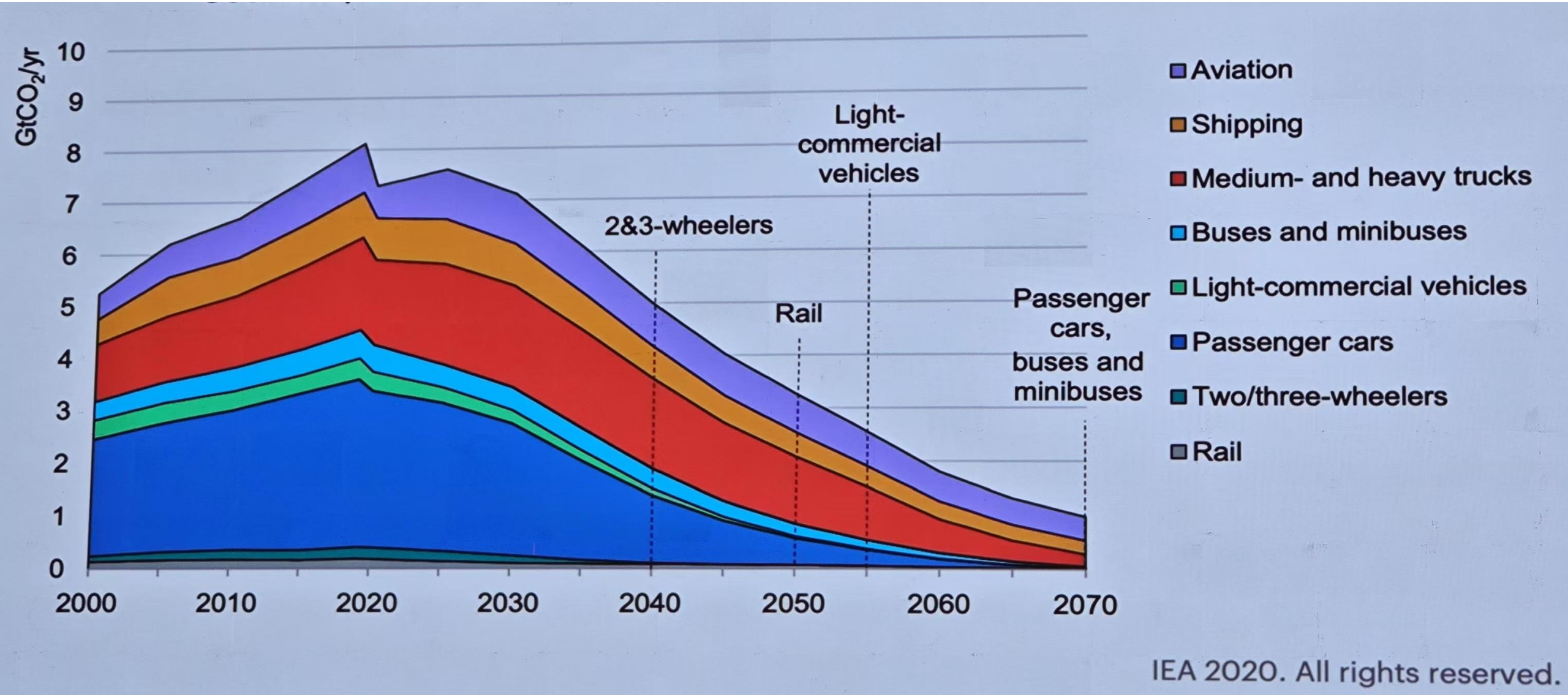
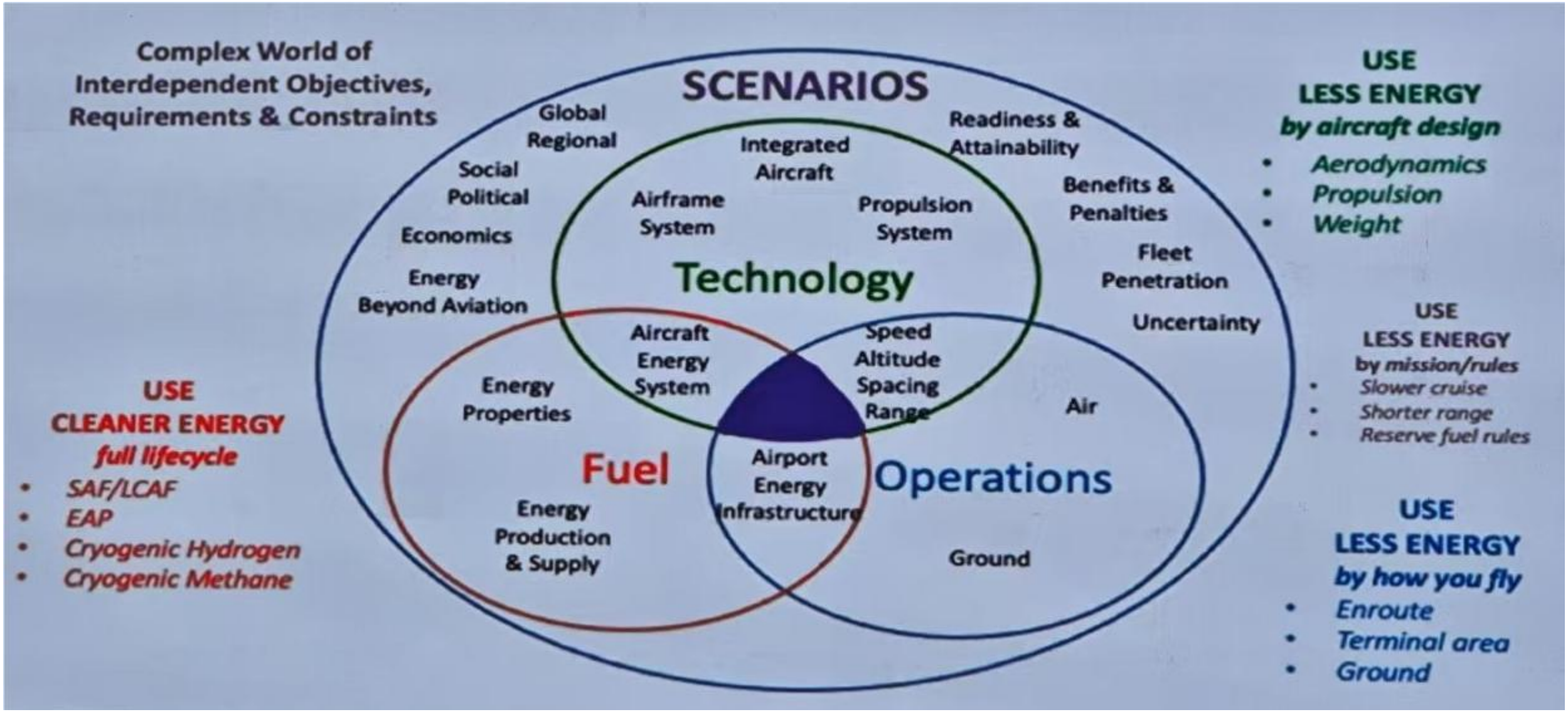
CHINA'S ACTION PLAN

to Limit and Reduce CO_2 Emissions from International Aviation





Source:CAMIC

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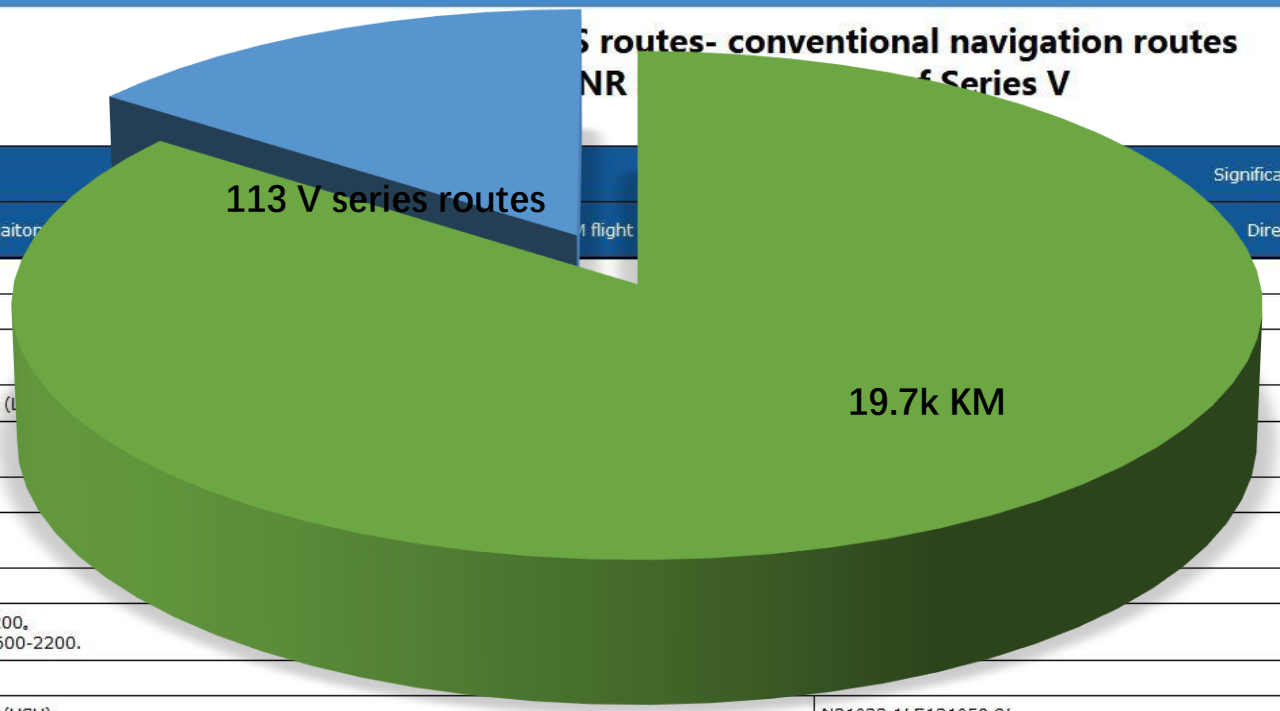
PART 01
Introduction

eAIP THE PEOPLE'S REPUBLIC OF CHINA

AIP AMDT SUPs AICs NOTAM DOWNLOAD

CH

- ENR PART 2 EN-ROUTE (ENR)
  - ENR 0
  - ENR 1 GENERAL RULES AND PROCEDURES
  - ENR 2 AIR TRAFFIC SERVICES AIRSPACE
  - ENR 3 ATS ROUTES
    - ENR 3.1 General rules
    - ENR 3.2 ATS routes- conventional naviga
      - ENR 3.2.1 Air routes of Series A
      - ENR 3.2.2 Air routes of Series B
      - ENR 3.2.3 Air routes of Series G
      - ENR 3.2.4 Air routes of Series R
      - ENR 3.2.5 Air routes of Series V
      - ENR 3.2.6 Air routes of Series W
    - ENR 3.3 ATS routes- area navigation rou
      - ENR 3.3.1 Area navigation routes
      - ENR 3.3.2 Other Rules
        - ENR 3.3.2.1 Implementation of a r
        - ENR 3.3.2.2 RVSM Policy and Proce
        - ENR 3.3.2.3 Implementation of Str
        - ENR 3.3.2.4 Data link Routes with
        - ENR 3.3.2.5 M503
    - ENR 3.4 Helicopter routes
    - ENR 3.5 Other routes
    - ENR 3.6 En-route holding
  - ENR 4 RADIO NAVIGATION AIDS/SYSTEMS
  - ENR 5 NAVIGATION WARNINGS
  - ENR 6 EN-ROUTE CHARTS



routes- conventional navigation routes
NR f Series V

Navigation specificaton		flight	Significant Point Coordinates	Direction of segment	Controlling unit , Remarks
V1					
PIDOX					
RNAV2				↓↑	Beijing ACC
滦县 Luanxian VOR/DME (L					
RNAV2				↓↑	Beijing ACC
UPSAT					
RNAV2				↓↑	Beijing ACC
PAMDA					
倒用V1航线的时间为1600-2200。 Available during time of 1600-2200.					
V2					
横沙 Hengsha VOR/DME (HSH)			N31°22.1′ E121°50.8′		
RNAV2	360°/180° 57	1 232		↓↑	Shanghai ACC
UDOXI			N31°52′37″ E121°47′06″		
RNAV2	360°/180° 154	600		↓↑	Shanghai ACC
ODULO			N33°15′09″ E121°37′14″		
V3					
POMOK			N31°27′00″ E121°07′00″		
RNAV2	079°/259° 118	845		↓↑	Shanghai ACC
FKVUT			N31°45′25″ E122°18′27″		

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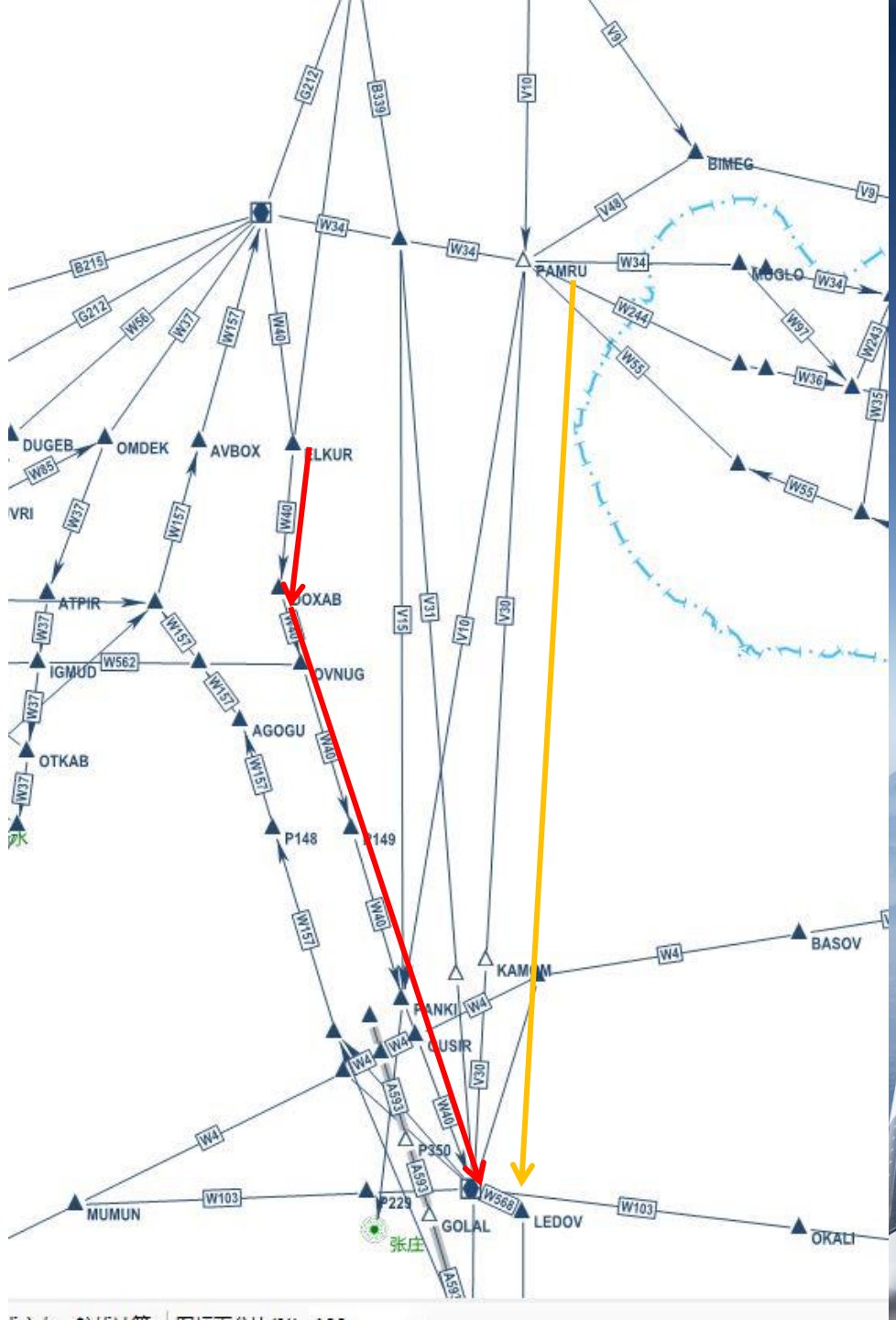
01 Save Distance

02 Reorganize Traffic Flow

03 Collaborate with TSA

01 Save Distance



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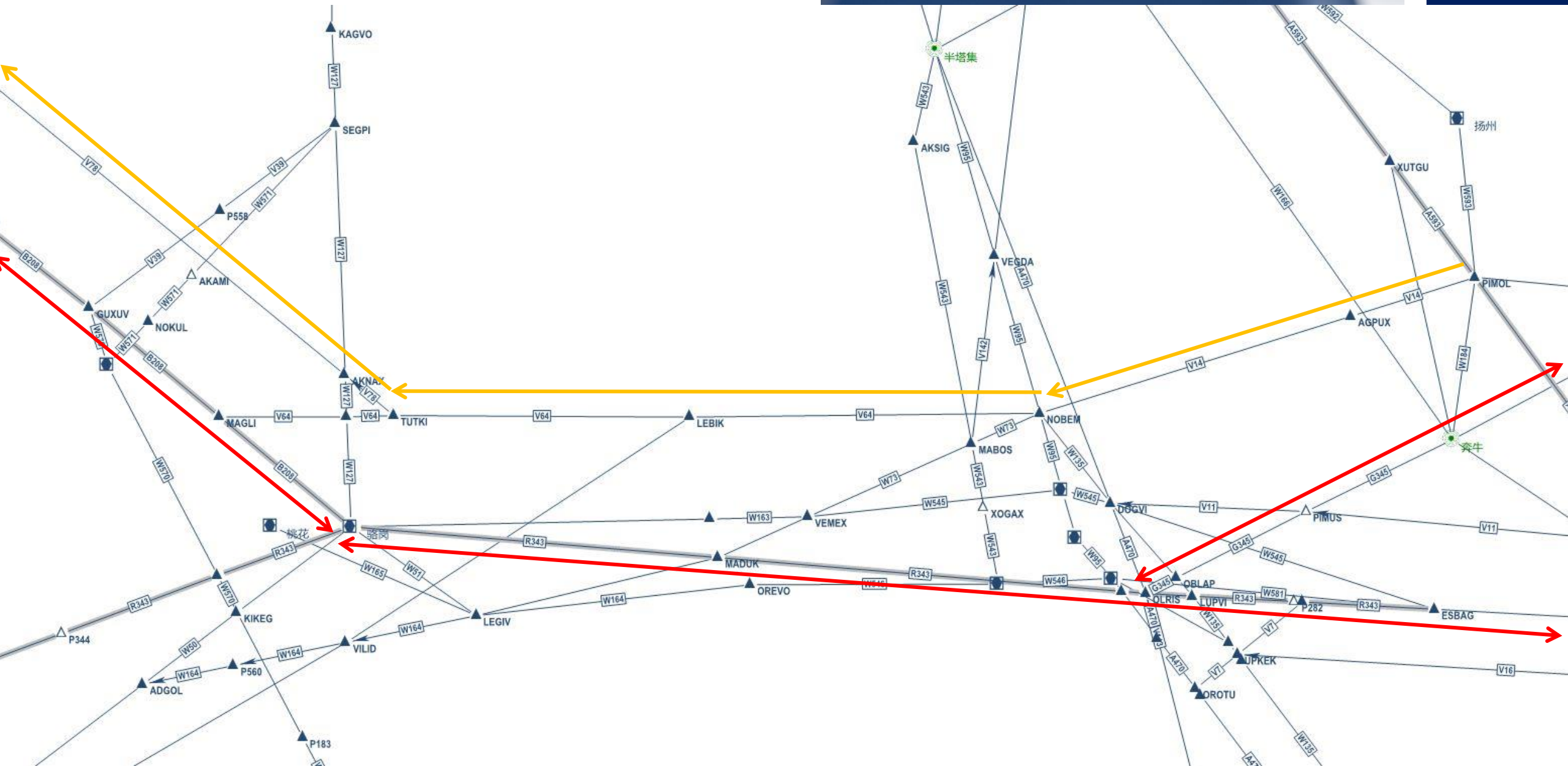
02 Reorganize Traffic Flow



03 Collaborate with TSA

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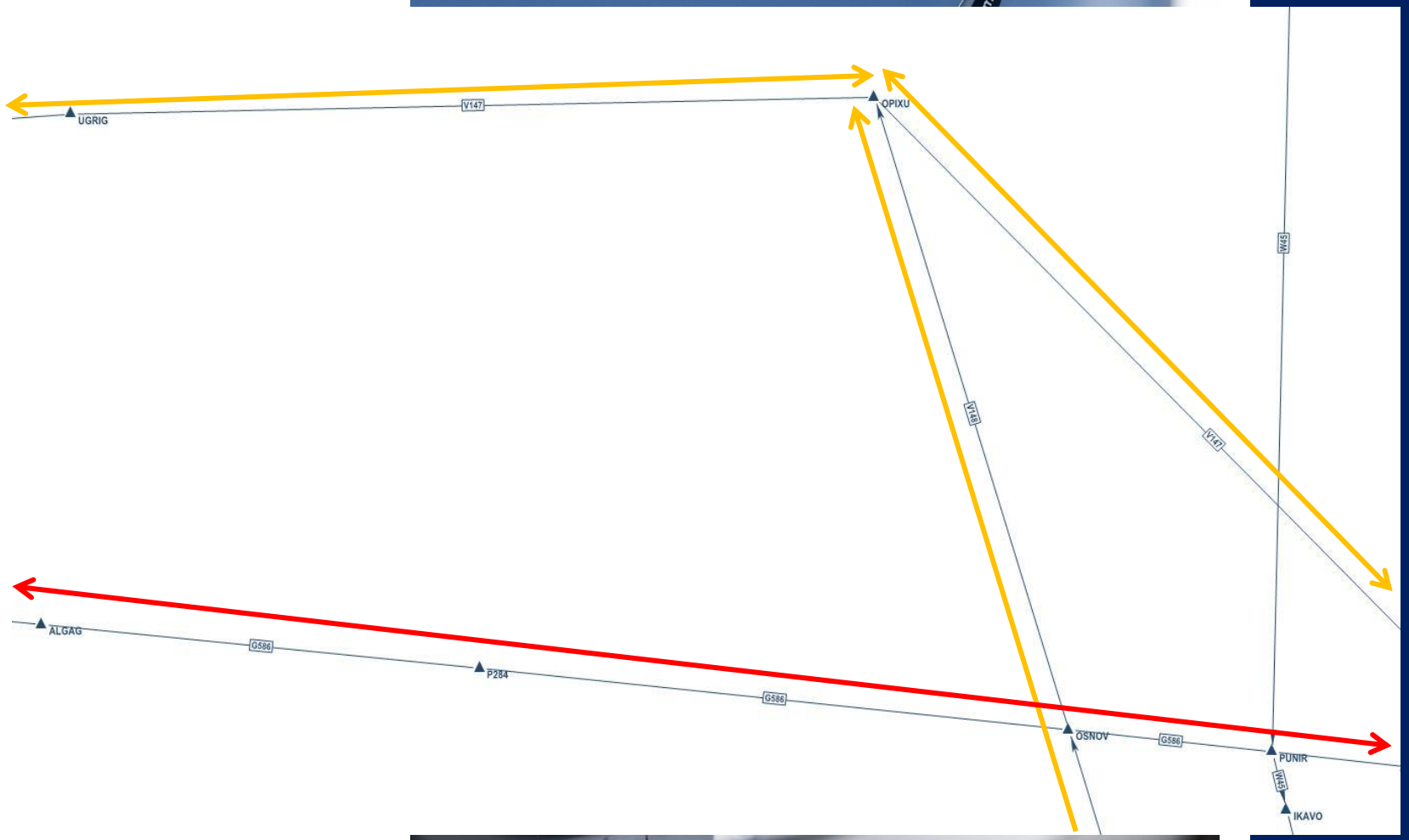
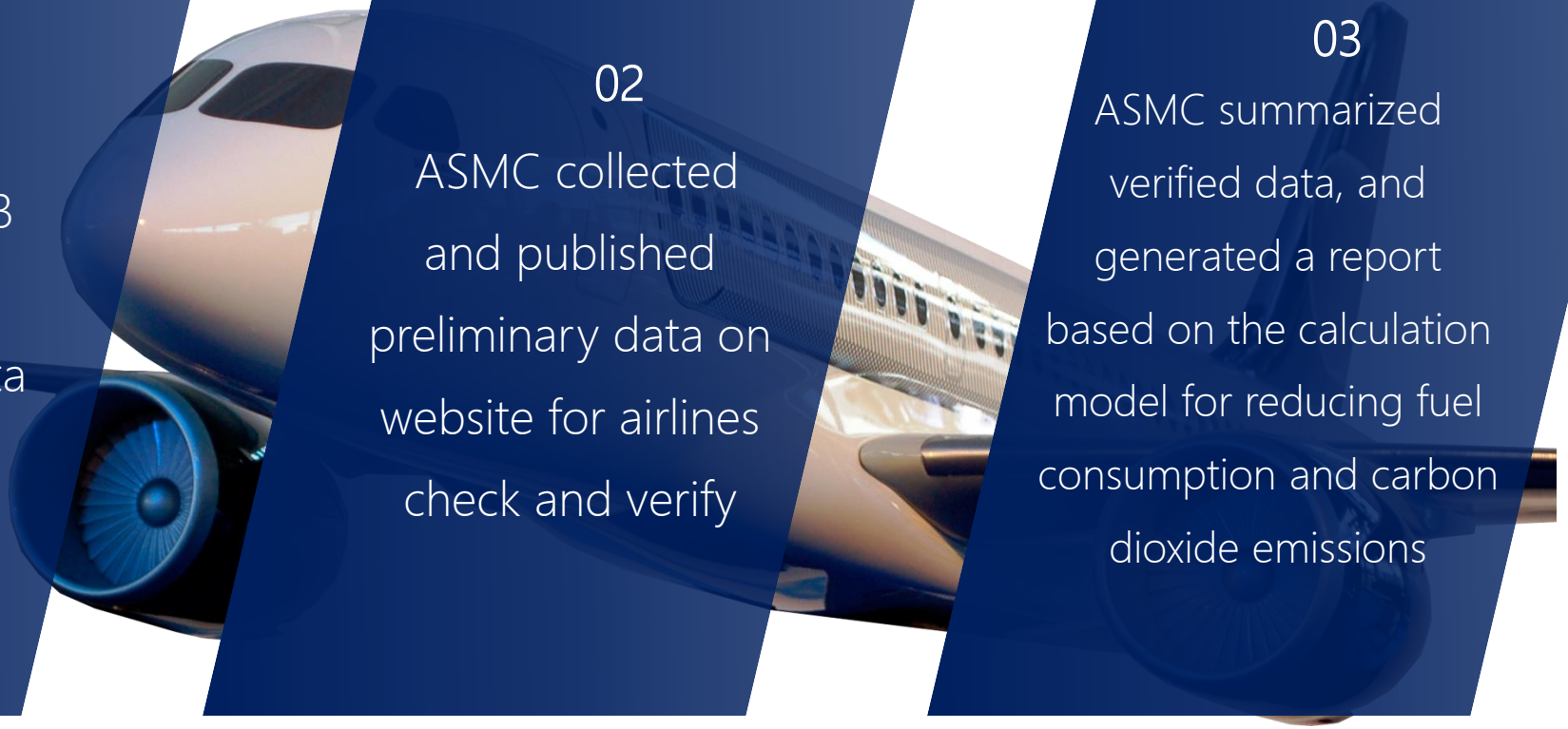
GG ZGGGOIXX
061428 ZBBBYNYX
(A3782/24 NOTAMN
Q) ZGZU/QARCH/IV/BO/E/000/999/
A) ZGZU B) 2411070000 C) 2411070730
E) SEGMENT OSNOV-ALGAG OF ATS RTE G586 NOT AVBL DUE TO TECHNICAL REASON, SCHEDULED FLIGHTS ALONG G586 OSNOV-ALGAG ADJUSTED TO ATS RTE V147, V148, ALL ACFT FLW ATC INSTRUCTION.
1. MOLSO AND BEYOND TO MAMSI AND BEYOND: MOLSO-OPIXU-UGRIG-MAMSI AND BEYOND.
2. MOLSO AND BEYOND TO ZGKL: MOLSO-OPIXU-UGRIG-MAMSI-ZGKL.
3. MAMSI AND BEYOND TO MOLSO AND BEYOND: MAMSI-UGRIG-OPIXU-MOLSO AND BEYOND.
4. ZGKL TO MOLSO AND BEYOND: MAMSI-UGRIG-OPIXU-MOLSO AND BEYOND.
5. AGVIL AND BEYOND TO MAMSI AND BEYOND:
AGVIL-OSNOV-OPIXU-UGRIG-MAMSI AND BEYOND.
6. AGVIL AND BEYOND TO ZGKL: AGVIL-OSNOV-OPIXU-UGRIG-MAMSI-ZGKL.
)



Data Statistics Process



01

Regional ATMB office finished preliminary data collecting

02

ASMC collected and published preliminary data on website for airlines check and verify

03

ASMC summarized verified data, and generated a report based on the calculation model for reducing fuel consumption and carbon dioxide emissions

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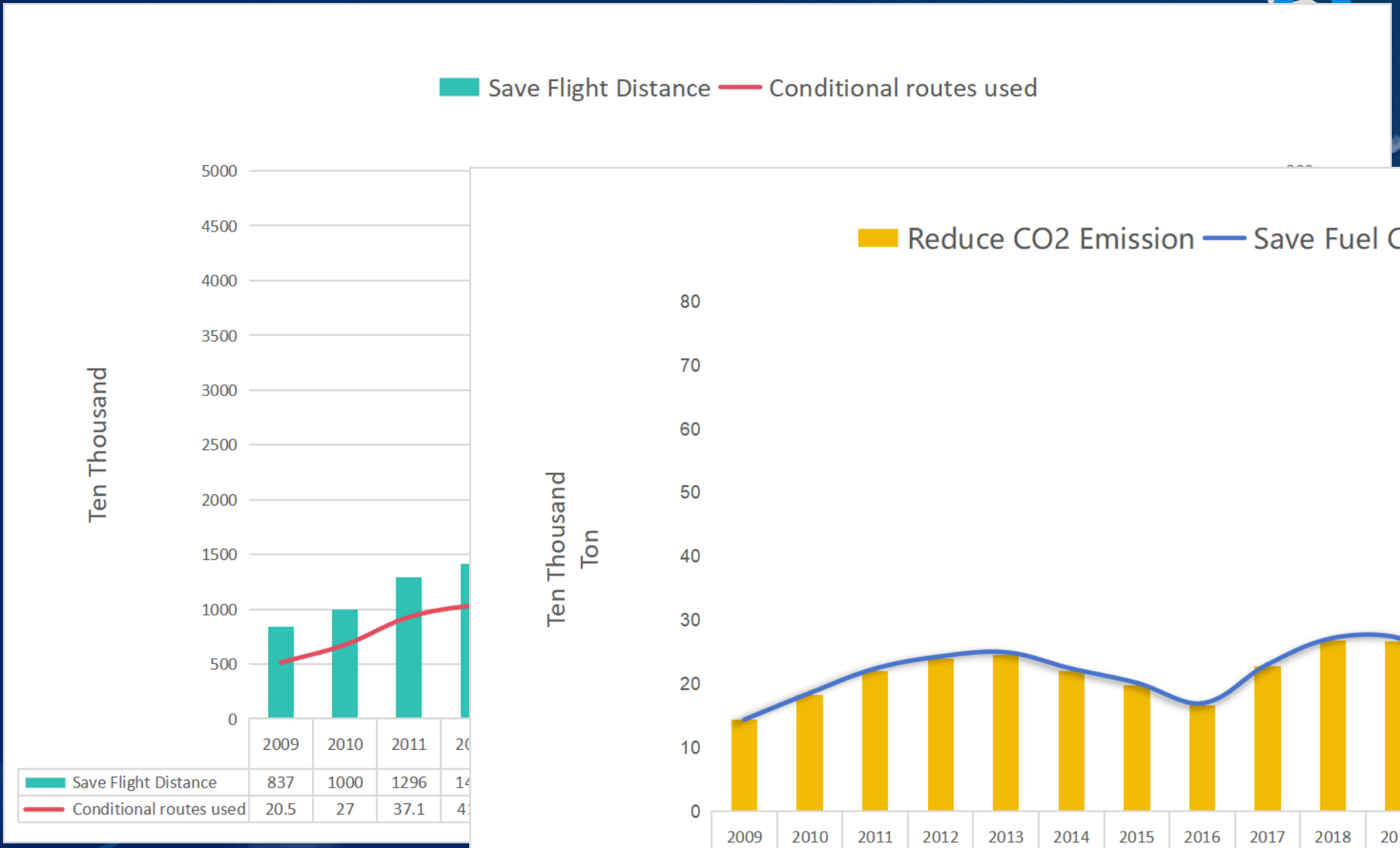
Statistics in the Past Decade

In 2014, there were only 36 V-routes in China, with 285,000 conditional routes had been used nationwide.

Cut-off September 2024, there are 113 V-routes in China, with 1.8 million conditional routes had been used nationwide, resulting in a significant improvement in usage efficiency.

Save 233,000 tons of aviation fuel and reduce 734,000 tons of carbon dioxide emissions, contributing to the green development of civil aviation and carbon peak and carbon neutrality goals.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Number	36	43	46	60	64	95	99	104	108	111	113
Distance	6	7.5	8.1	10.6	11.3	15.9	16.3	17.5	18.9	19.3	19.7


Save Flight Distance
Conditional routes used
Ten Thousand
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2009
2010
2011
Save Flight Distance 837 1000 1296
Conditional routes used 20.5 27 37.1

Reduce CO2 Emission
Save Fuel Consumption
Ten Thousand Ton
Ten Thousand Ton
80
70
60
50
40
30
20
10
0
25
20
15
10
5
0
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024（Until SEP）
Reduce CO2 Emission 14.4 18.2 22 24 24.5 22 19.7 16.6 22.8 26.8 26.7 21 36.8 27.5 68.9 73.4
Save Fuel Consumption 4.5 5.8 7 7.6 7.8 7 6.3 5.3 7.2 8.5 8.5 6.7 11.7 8.7 21.9 23.3

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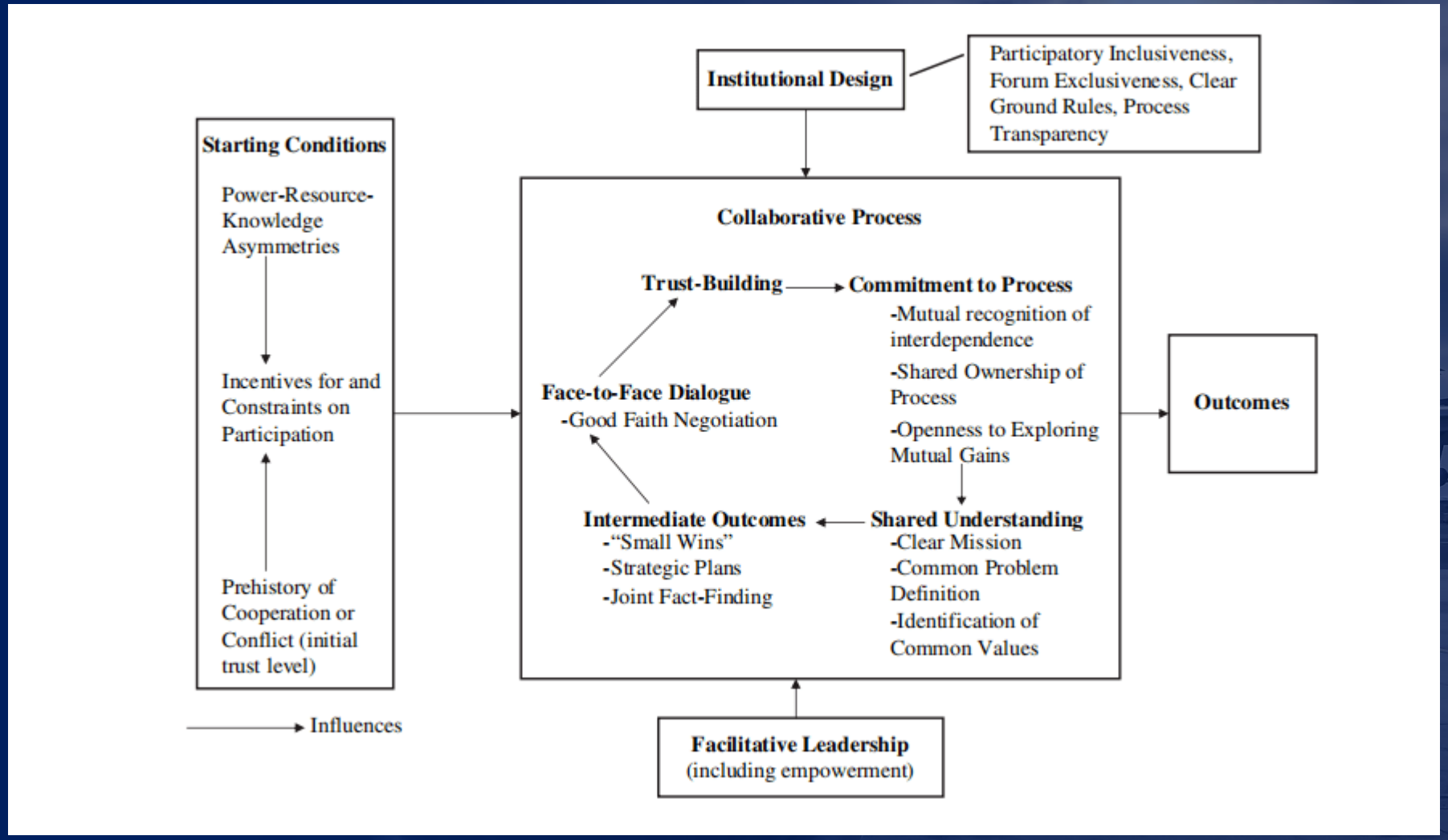
PART 02
Highlights



Source:Chris Ansell,Alison Gash. Collaborative Governance in Theory and Practice.

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1.(Starting Condition) Consensus reached among Civil- Military aviation users on efficient utilization of airspace resources.

2.(Facilitive Leadership)Policy guidance from Civil- Military Airspace management units on refined management of airspace.

3. (Institutional Design) Conditional routes are classified into four management methods.

4. (Collaborative Process) Strengthen collaboration and cooperation between Civil- Military ATC units at the operational level.

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PART 03
Digital Tool

Manual statistics

01 Manual statistics waste valuable human resources of controllers

02 The efficiency of manual statistical work is not high

03 The accuracy of manual statistics is greatly affected by human factors

V S

Digital statistics

01 Scientific algorithms and statistical standards make data more persuasive.

02 Release the controller from repetitive statistical work

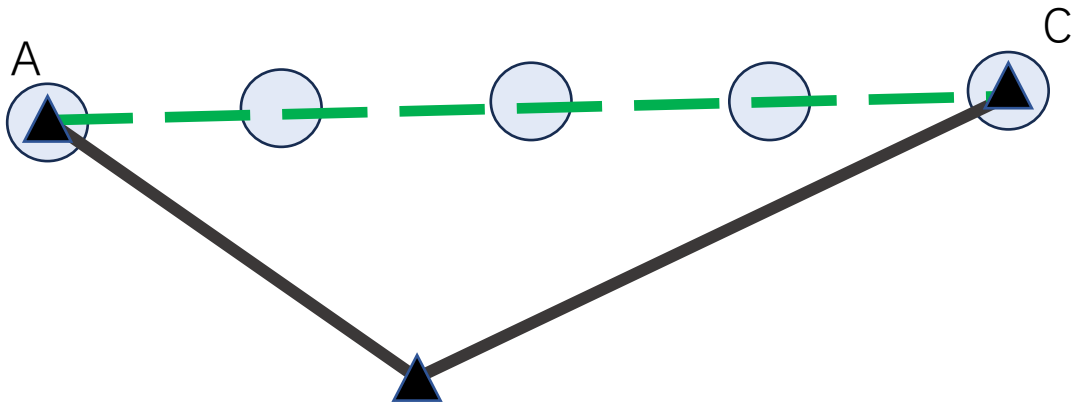
03 The time manner of statistical data can be further enhanced.

Selected from FPL

Divide the starting point and ending point of the conditional route equally, and take five points to form circles with a radius of 10 kilometers. If the aircraft passes through three or more circles, it is considered that the flight has used the temporary route.

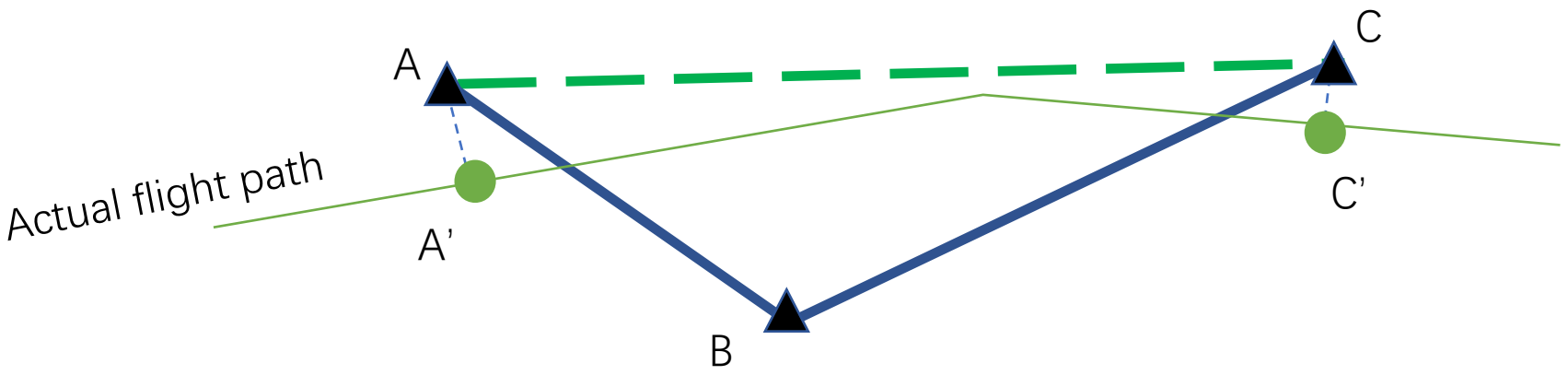
Selected from FPL

Geometric method



Divide the starting point and ending point of the conditional route equally, and take five points to form circles with a radius of 10 kilometers. If the aircraft passes through three or more circles, it is considered that the flight has used the temporary route.

Save distance method



Actual save distance is d_{ABC}-$d_{A'C'}$

Algorithms

50% theoretical saving distance ≤ actual saving distance ≤ 120% theoretical saving distance, At the same time, 50% of the trajectory points should be distributed within a 20 kilometer range on both sides of the conditional route.

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PART 04
Open Discussion

01

Establish an evaluation mechanism for conditional routes.

02

Establish conditional route dynamic allocation based on air traffic flow management.

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Q&A


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Thanks
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