International Civil Aviation Organization

# Packaging Tomorrow's Aviation System
# 包装明日航空系统

Second Briefing on
ICAO's Aviation System Block Upgrades
国际民航组织航空系统组块升级
第二次讲评

Issued: July 2012

# The 30’000 Feet View 30000英尺的视角

- 航空交通量每15年增长扩大2倍
- 航空交通量的增长是一把双刃剑
- 挑战来自于怎样取得安全和运行效率水平的共同提高
  - 全球统一
  - 对环境负责
  - 经济高效

# 系统中的系统


标准
Standardization
政策
Policy (GASP)
TACTICAL WORK PROGRAMME ADJUSTMENTS
战术
工作项目调整
实施
Implementation
RASGs
地区航空安全
工作组
ANNUAL GLOBAL SAFETY REPORT
年度全球安全报告
The Global Aviati
Safety System
全球空中航行系统
分析
Analysis
REGIONAL REPORTING
地区报告
PARTNER INFORMATION SHARING & RISK ASSESSMENTS
合作伙伴信息共享及风险评估
ICAO AIR NAVIGATION COMMISSION
国际民航组织空中航行委员会
监控
Monitoring
标准
Standardization
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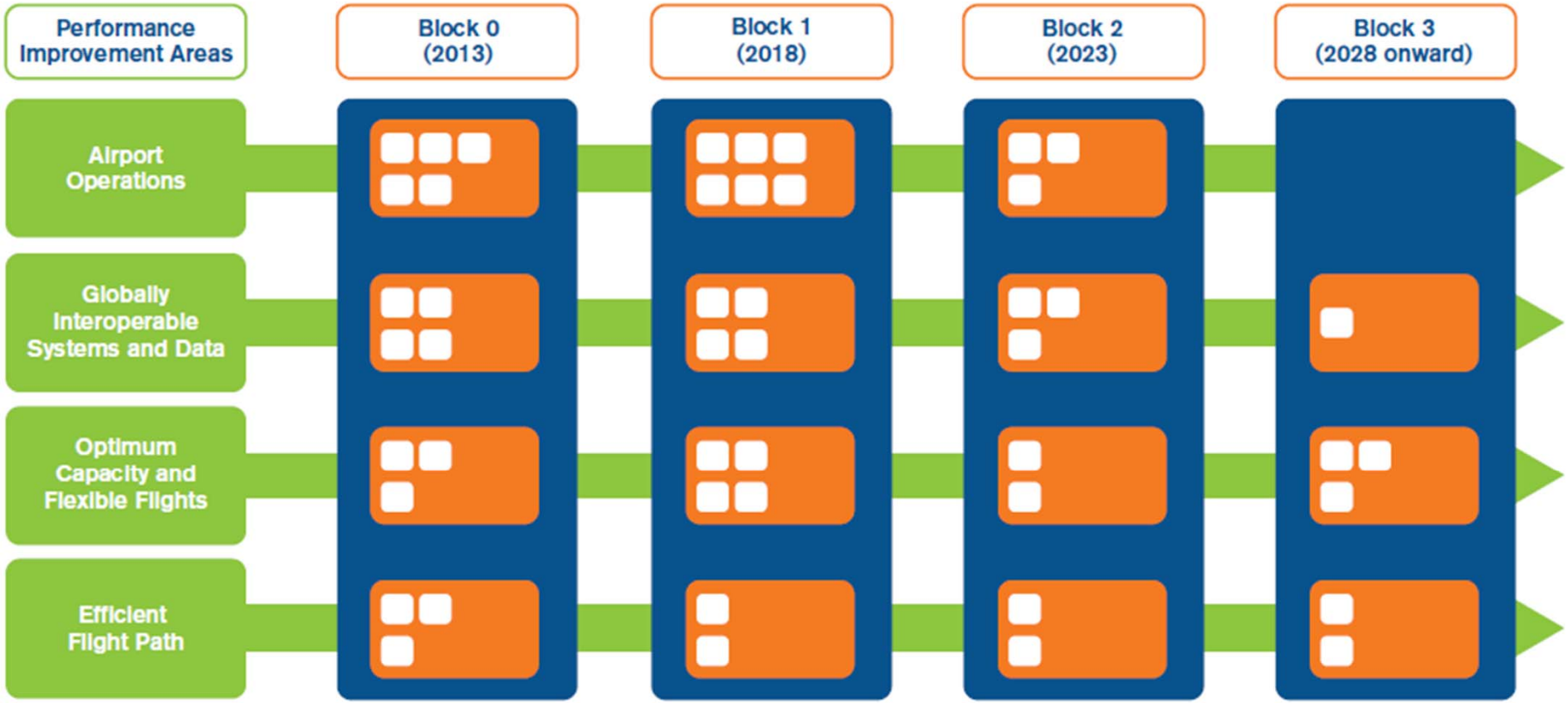
监控
Monitoring

# Synchronizing the System of Systems
# 同步系统中的系统


# ICAO's Strategic Approach
# 国际民航组织的方法策略


# ICAO's Strategic Approach
# 国际民航组织的方法策略

# Integrated Planning through Block Upgrades
# 通过组块升级的整合计划



# Near-Term Blocks & Modules
# 近期的组块和模块单元

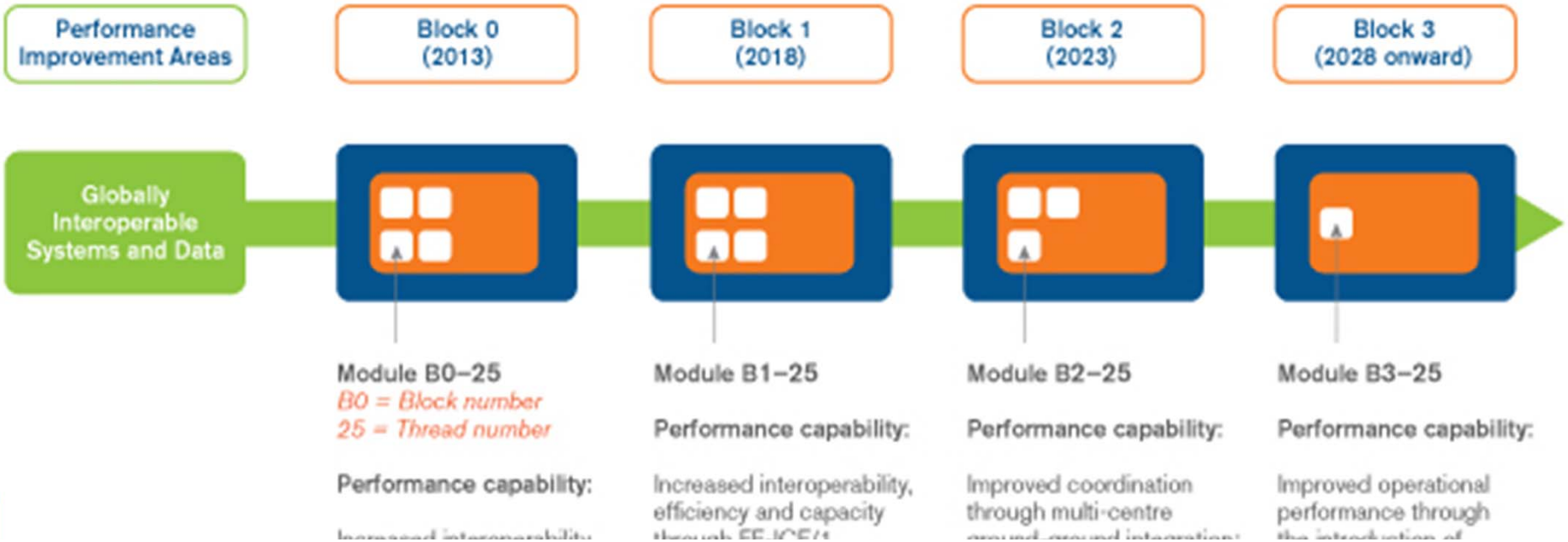
| 性能改进领域 | 组块 0 (2013) | 组块 1 (2018) |
|---|---|---|
| 机场运行 | 优化进近程序<br>通过优化尾流间隔提高跑道吞吐量<br>通过跑道排序提高交通流量<br>提高场面运行的安全和效率<br>通过机场协同决策机制优化机场运行 | 优化机场可用/准入能力<br>通过动态尾流间隔提高跑道吞吐量<br>通过离场、场面和进场管理改进机场运行<br>提高场面运行的安全和效率和增强目视系统<br>开发先进的机场协同决策系统<br>远控机场管制管理 |
| 全球互用的系统和数据 | 通过数字化航空情报管理改进服务<br>通过地对地集成，提高互用性、效率和容量<br>气象情报支持提高运行效率和安全 | 通过集成所有数字ATM信息改进服务<br>实施离场前的FF-ICE/1 应用程序<br>应用全系统信息管理（SWIM）<br>通过集成气象信息改进运行决策 |
| 最优容量和灵活飞行 | 通过基于全网络的规划提高流量性能<br>通过加强航路航迹改进运行<br>场面监视的初步能力<br>空中交通态势感知(ATSA)<br>提高最佳飞行高度层可用性<br>ACAS 改进<br>强化地面安全网的有效性 | 加强网络运行规划<br>通过自由选择航路提高运行<br>通过间隔管理提高容量和效率<br>应用进近的地面安全网 |
| 高效飞行航径 | 通过初步应用航路数据链改进安全和效率<br>提高下降剖面的灵活性和效率<br>提高离场剖面的灵活性和效率 | 增强交通信息同步化和初步基于航迹的运行<br>提高下降剖面的灵活性和效率<br>将遥控驾驶航空器系统初步纳入非隔离空域 |

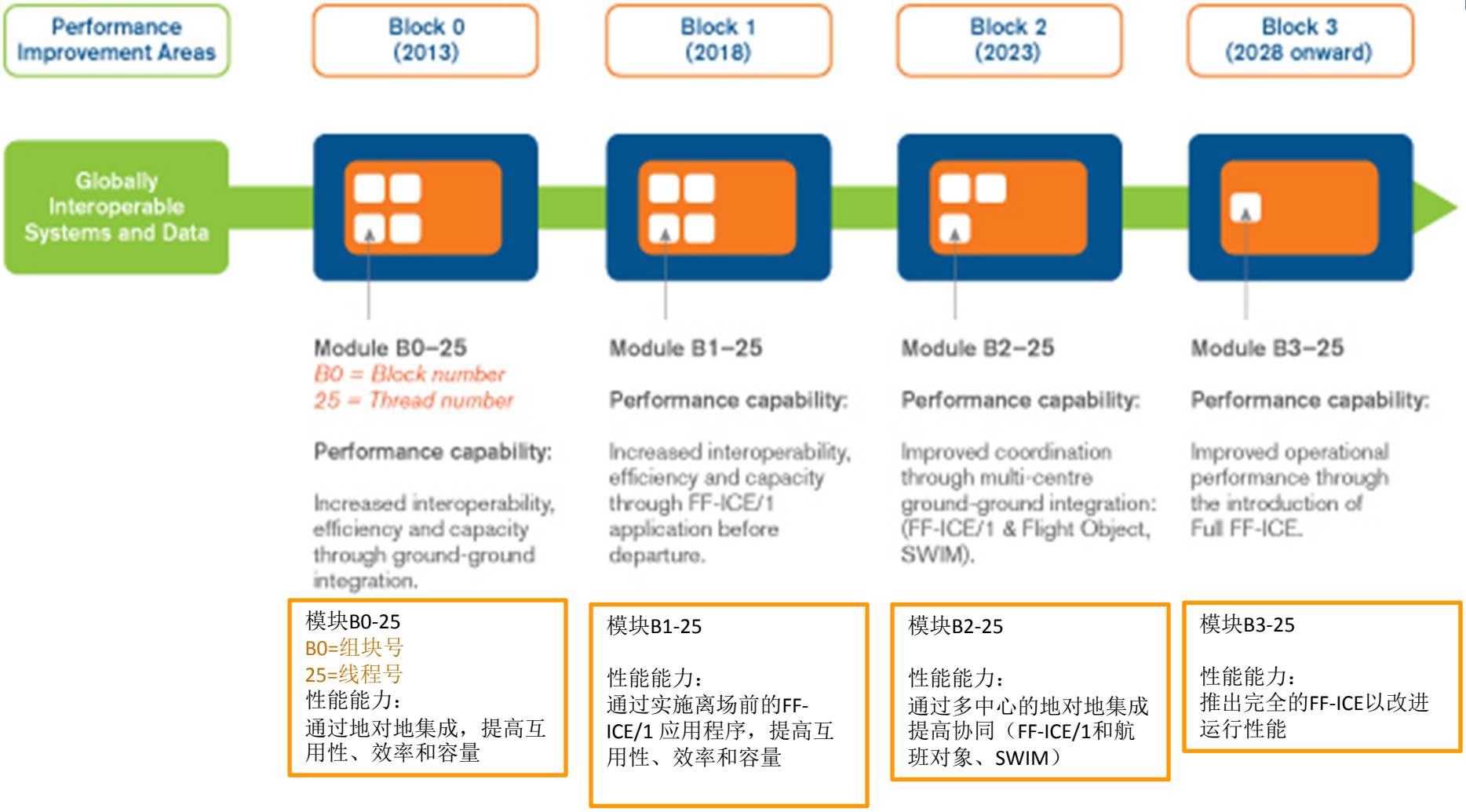
# Increased Runway Throughput Through Optimized Wake Turbulence Separation
# 优化尾流间隔提升跑道的起降航班的总量

| | | |
|---|---|---|
| **Summary**<br>概述 | Improved throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures.<br>通过优化最小尾流间隔标准和修改尾流分类及程序来改善跑道的起降航班量 | |
| **Main performance impact as per Doc 9854**<br>**9854号文件规定的主要性能影响** | KPA-02 – Capacity, KPA-06 – Flexibility.<br>KPA-02-容量；KPA-06-灵活性 | |
| **Operating environment/**<br>**Phases of flight**<br>运行环境/飞行阶段 | Arrival and departure<br>进离场 | |
| **Applicability considerations**<br>**适用性考虑** | Least complex – Implementation of revised wake turbulence categories is mainly procedural. No changes to automation systems are needed.<br>内容比较简单-修改尾流分类的实施工作主要是程序性操作。自动化系统也无需有任何变动。 | |
| **Global concept component(s) as per Doc 9854**<br>9854号文件规定的全球概念部分 | CM – conflict management<br>CM-冲突管理 | |
| **Global plan initiatives**<br>全球规划行动 | GPI-13: Aerodrome design 机场设计<br>GPI 14: Runway operations 跑道运行 | |
| **Main dependencies**<br>**主要依赖的因素** | Nil | |
| **Global readiness checklist**<br>各国准备状态检查单 | | Status (ready now or estimated date)<br>状态（目前一切就绪或是预计准备好的时间） |
| | Standards readiness 标准可读性 | 2013 |
| | Avionics availability 航空设备可用性 | N/A |
| | Ground systems availability 地面系统可用性 | N/A |
| | Procedures available 程序可用性 | 2013 |
| | Operations approvals 运行许可 | 2013 |

# Benefiting from All the Modules
# 使用全部模块单元将获益匪浅

- There is added value in using all modules
- 使用所有的模块单元能够产生附加价值
  - States should view modules in B0 & B1 as critical:
  - B0和B1组块中的模块应得到各个国家极大重视
    - Formalizing a minimum track
    - 正式确立了最低标准
  - They will allow for benefits down the road in B2 & B3
  - 在未来使用组块2和组块3的各模块单元时它们会产生的作用和益处






模块B0-25
B0=组块号
25=线程号
性能能力：
通过地对地集成，提高互用性、效率和容量

模块B1-25

性能能力：
通过实施离场前的FF-ICE/1 应用程序，提高互用性、效率和容量

模块B2-25

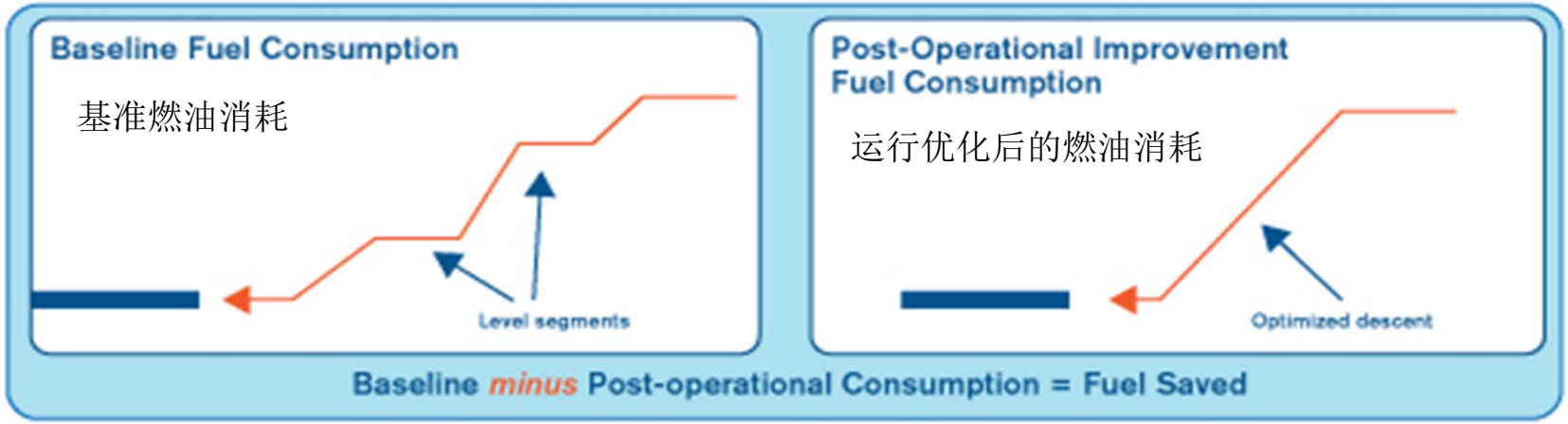
性能能力：
通过多中心的地对地集成提高协同（FF-ICE/1和航班对象、SWIM）

模块B3-25

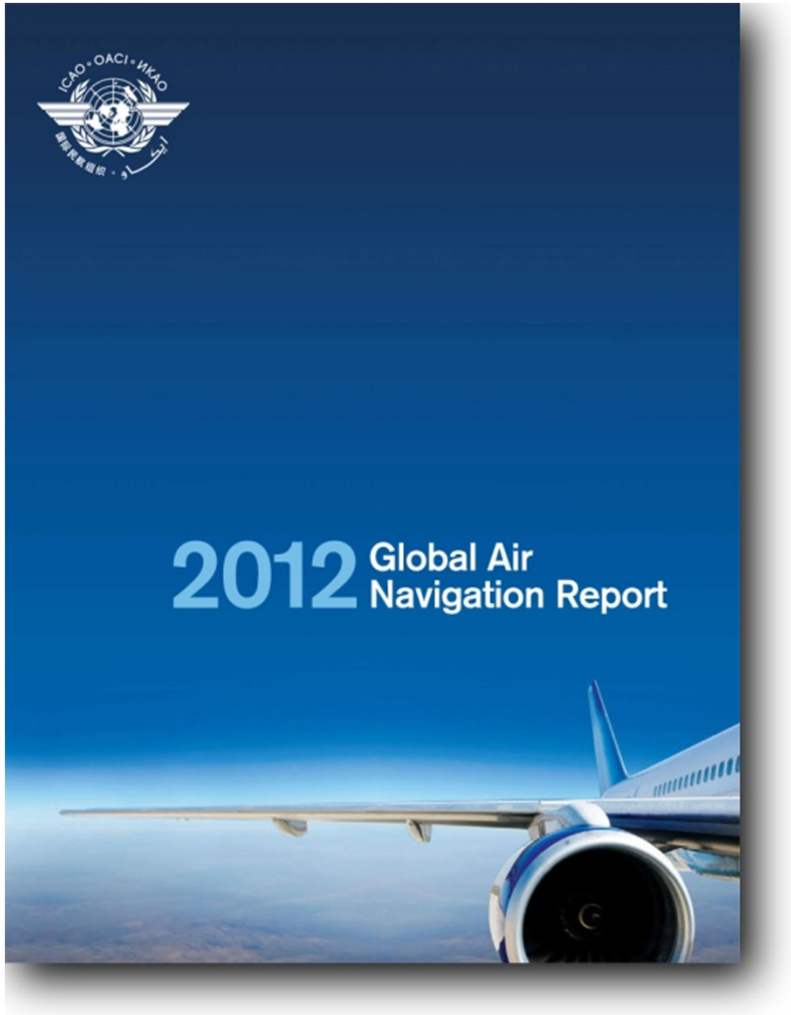
性能能力：
推出完全的FF-ICE以改进运行性能

# The Cost of Not Implementing
# 不实施组块升级将带来的损失

- Focusing on what it will cost if modules are not implemented:
- 关注不实施这些模块将会带来哪些损失
  - Increased risk of serious incidents and accidents
  - 增加严重事故和事件发生概率
  - Negative impact on operations
  - 给运行带来的不利影响
  - Environmental repercussions
  - 所产生的环境影响
  - etc.等等

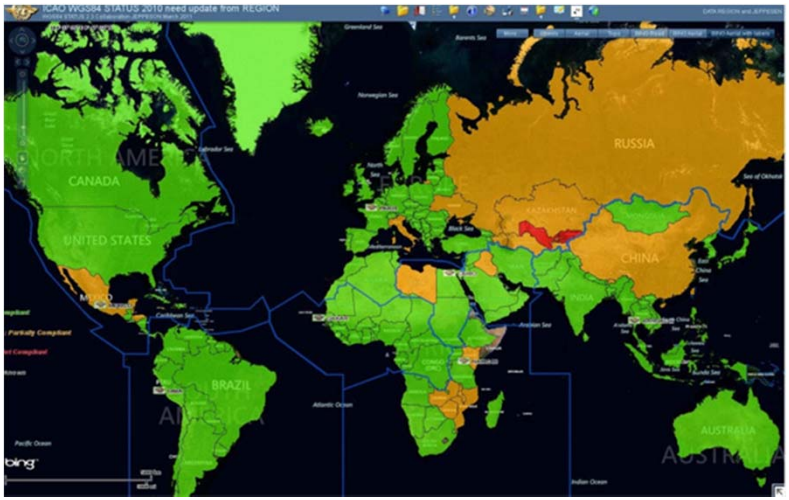


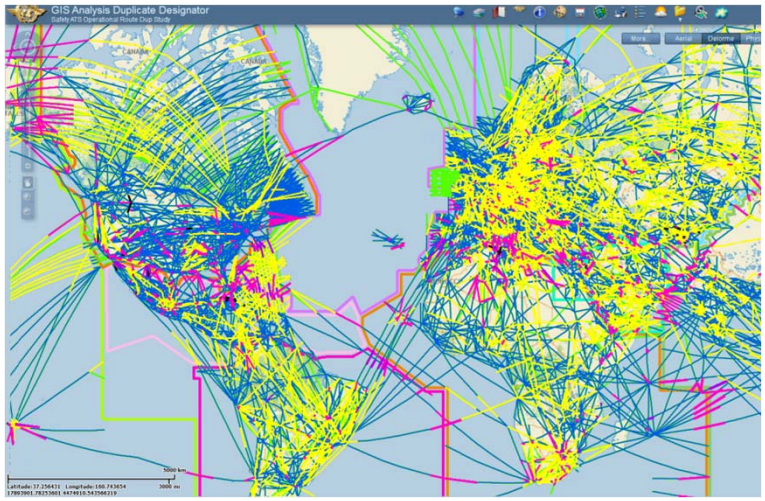
# Reporting Against the Global Plan…
# 在全球计划中做出针对性报告…

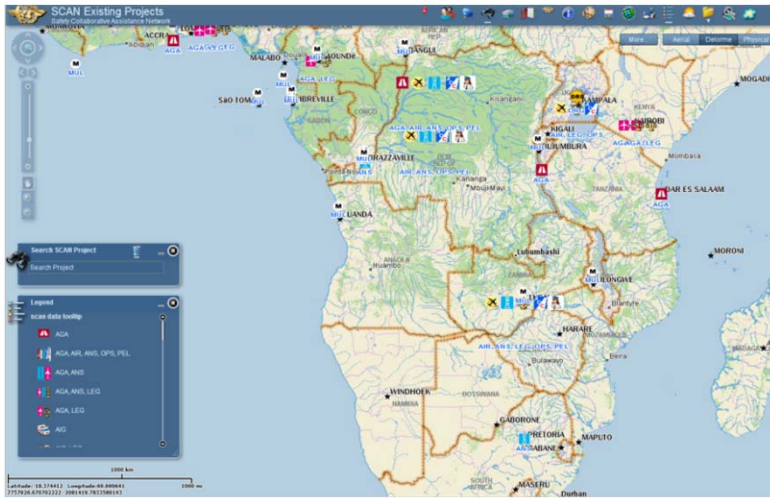



- Performance Monitoring
- 性能监控
  - of individual modules
  - 各个模块
  - Air Navigation Report Form
  - 空中航行报告表
- Annual Global Air Navigation Report
- 年度全球空中航行报告
- Compare progress across regions
- 对比各地区所取得的进展情况
- Adjust ICAO work programme
- 调整国际民航组织的工作计划

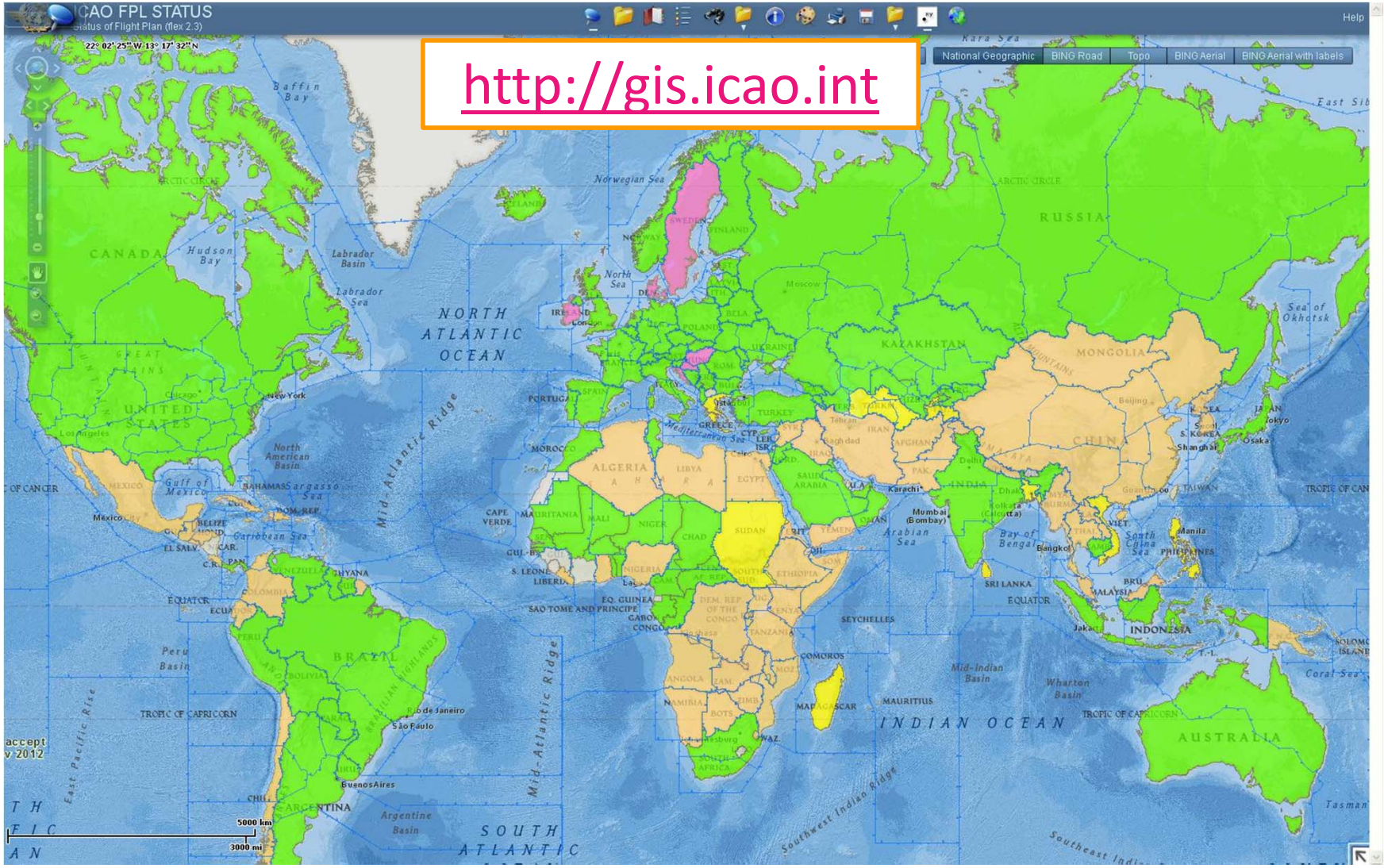
# …through the Use of GIS Tools
# …通过使用GIS工具

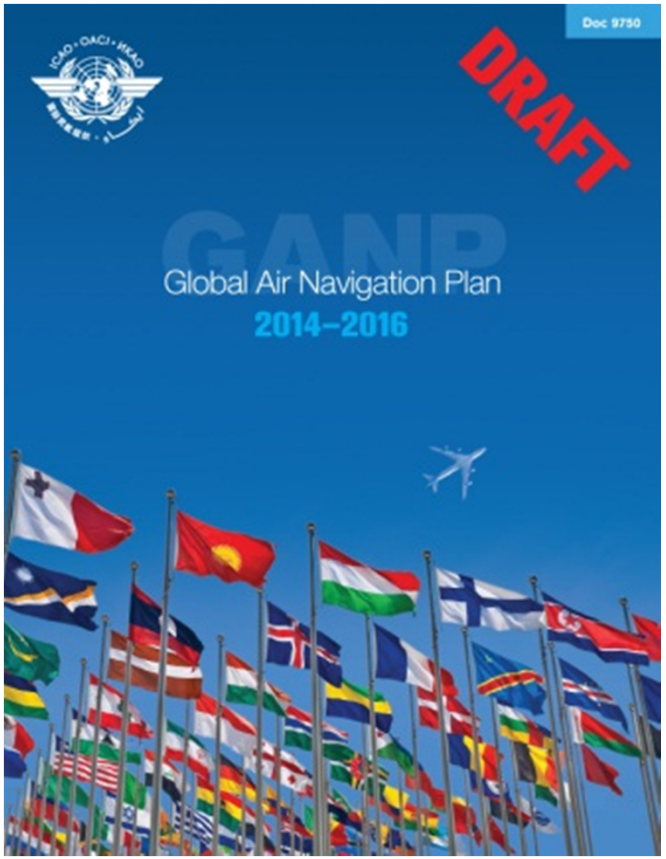



# in States & Regions
# 跟踪监控各国各地区的执行情况

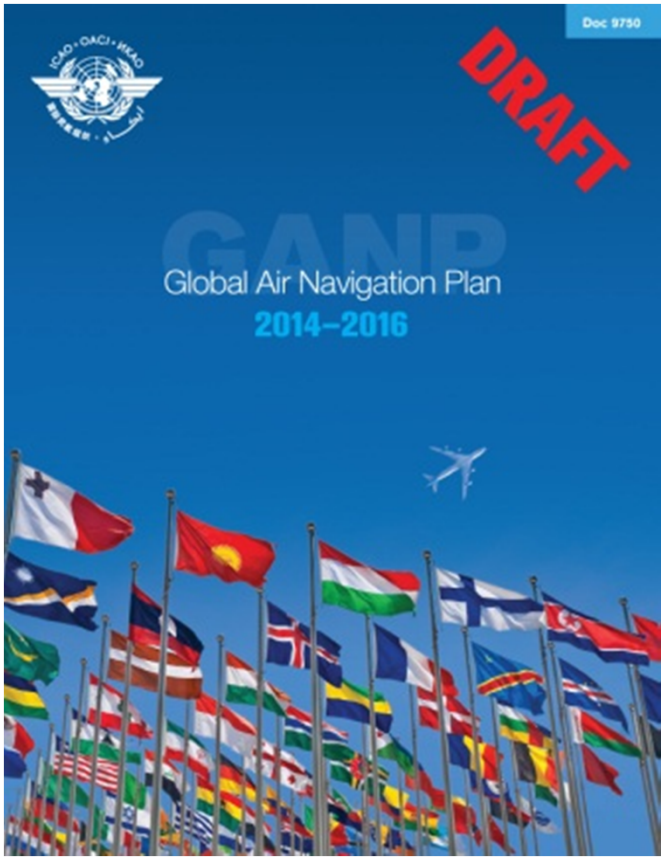


# Aligning the Conference & the Global Air Navigation Plan
# 使大会和全球空中航行计划相一致




| CHAPTERS | | AN-CONF/12 WORKING PAPERS |
|---|---|---|
| 1 | **Global Air Navigation Policy**<br>全球空中航行政策 | • **WP3** – Revised Global Air Navigation Plan (GANP) – framework for global planning<br>• 关于全球空中航行计划修定版—全球计划的总体框架<br>• **WP5** – High-level Conference on Aviation Security (HLCAS)<br>• 航空保安高级别会议<br>• **WP13** – Civil/military coordination/cooperation and flexible use of airspace<br>• 军/民航协调合作以及灵活使用空域<br>• **WP25** – Minimum Path<br>• 最短路径 |
| 2 | **Standardization: Aviation System Block Upgrades**<br>标准化方案：航空系统组块升级 | |
| 3 | **Continuing Strategic Planning**<br>后续战略规划 | |
| 4 | **Implementing Globally Interoperable ATM**<br>实施全球互用的空中交通管理 | |
| 5 | **Aviation System Reporting & Performance Adjustments**<br>航空系统报告和性能调整 | |

# Aligning the Conference & the Global Air Navigation Plan




| CHAPTERS | | AN-CONF/12 WORKING PAPERS |
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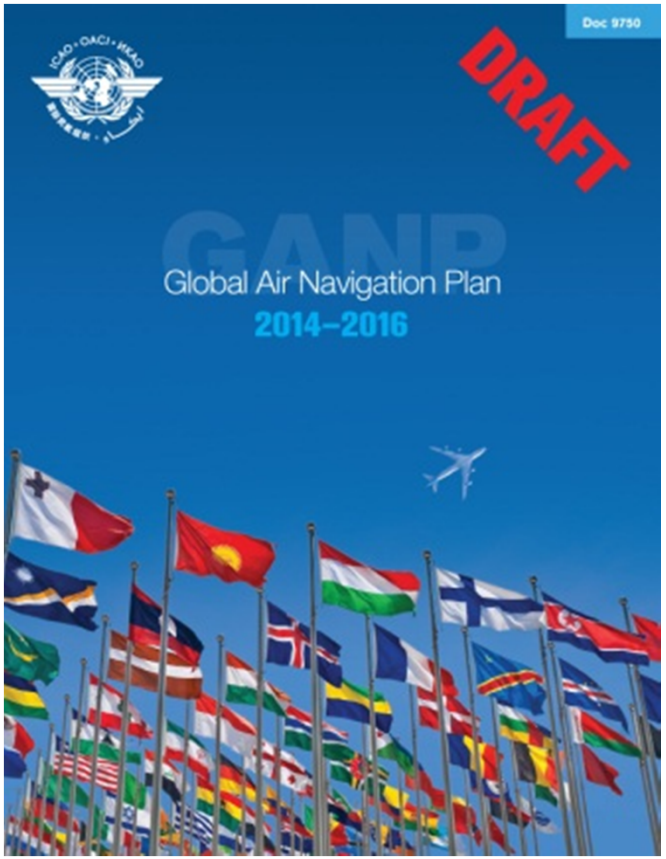
| 1 | Global Air Navigation Policy | |
| 2 | **Standardization: Aviation System Block Upgrades**<br>**标准化方案：航空系统组块升级** | |
| 3 | **Continuing Strategic Planning**<br>**后续战略规划** | |
| 4 | **Implementing Globally Interoperable ATM** | |
| 5 | **Aviation System Reporting & Performance Adjustments** | |

**Aviation System Block Upgrade Modules on:**

- **WP4** – Airport Capacity
- **WP7** – SWIM
- **WP8** – FF-ICE
- **WP9** – Service improvement through digital AIM and ATM information
- **WP10** – Network Operations
- **WP11** – Airborne Separation
- **WP12** – Airborne collision avoidance systems and ground-based safety nets
- **WP14** – Integration of RPA into non-segregated airspace
- **WP15** – Meteorological Information
- **WP17** – TBO
- **WP23** – Standardization – in support of One Sky

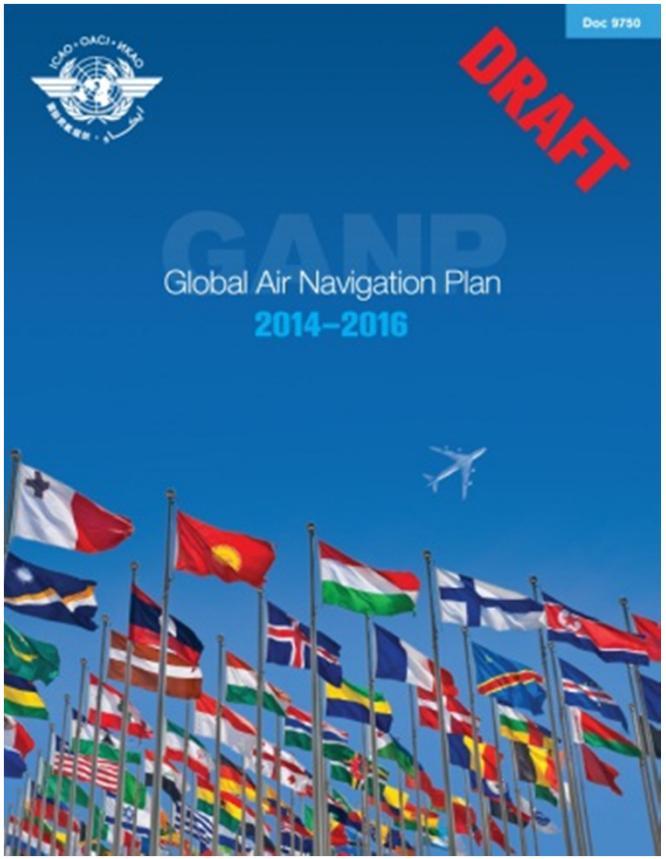
- **Pls refer to the memo below for the translations**

# Aligning the Conference & the Global Air Navigation Plan




| CHAPTERS | | AN-CONF/12 WORKING PAPERS |
|---|---|---|
| 1 | Global Air Navigation Policy | • **WP6** – PBN for terminal and approach operations<br>• **WP16** – PBN for en-route operations<br>• **WP18** – CCO & CDO<br>• **WP19** – Regional Performance Framework – planning methodologies and tools<br>• **WP20** – Human Performance<br>• **WP21** – GNSS implementation issues<br>• **WP22** – Rationalization of terrestrial navigation aids |
| 2 | Standardization: Aviation System Block Upgrades | |
| 3 | Continuing Strategic Planning | |
| 4 | **Implementing Globally Interoperable ATM**<br>**实施全球互用的空中交通管理** | |
| 5 | Aviation System Reporting & Performance Adjustments | |

# Aligning the Conference & the Global Air Navigation Plan




| CHAPTERS | | AN-CONF/12 WORKING PAPERS |
|---|---|---|
| 1 | Global Air Navigation Policy | • **WP24** – Regional Performance Framework – alignment of areas of applicability of ANPs and regional SUPPs<br>• 地区性能架构—空中航行计划与地区补充程序适用范围相一致 |
| 2 | Standardization: Aviation System Block Upgrades | |
| 3 | Continuing Strategic Planning | |
| 4 | Implementing Globally Interoperable ATM | |
| 5 | Aviation System Reporting & Performance Adjustments<br>航空系统报告和性能调整 | |

# Desired Outcomes of AN-Conf/12
# 12次空中航行大会预期结果

- Endorsement of:
- 认可：
  - Global Air Navigation Plan, as unified planning mechanism
  - 全球空中航行计划作为统一的规划机制
- Agreement on:
- 达成一致：
  - Integrated work programme
  - 综合工作方案
  - Structure and management of “Expert Groups”
  - “专家组”的构成和管理
- Recommendations on ICAO technical work programme:
- 对国际民航组织技术工作提出的建议:
  - Endorsement for short term Block Upgrades
  - 认可近期的组块升级计划
  - Agreement on Block 1
  - 对于组块1达成一致意见
- Clear strategic direction for future infrastructure:
- 明确未来基础设施方面的战略方向：
  - Endorsement for medium and long  term Block Upgrades
  - 同意中长期组块升级
  - Agreement on Blocks 2 & 3
  - 对于组块2&3达成一致

# Today's Priorities
# 今天的首要任务

- Performance-based Navigation
- 基于性能导航
- Continuous Descent Operations
- 持续下降运行
- Continuous Climb Operations
- 持续爬升运行

# Further Addressing Technical Issues
# 需要进一步解决的技术问题

- Aviation Data Link: Now and Tomorrow (2014)
- 航空数据链：现在与未来（2014）
  - Next steps for Data Link
  - 数据链连接未来的运行步骤
- End-to-end System Demonstration of New ATM Concepts (2014)
- 闭环系统演示空中交通管理的新概念
  - Flight & Flow Information for a Collaborative Environment (FF-ICE)
  - 航班和流量信息协作
  - Trajectory-based Operations
  - 基于轨迹运行
  - Human performance aspects
  - 人为因素
- Air Navigation Information Management Divisional Meeting (2015)
- 空中航行信息管理分会（2015）
  - System Wide Information Management (SWIM)
  - 全系统信息管理

# Further Addressing Policies
# 进一步强调的政策

- Synergy between 12th Air Navigation Conference & 6th Air Transport Conference:
- 在第12届空中航行大会和第6届空中运输大会取得协同一致
- Policy on access and equity 准入与公正性政策
  - Consideration of possible global mandates
  - 考虑可能的全球强制实施
  - for key infrastructure needs such as datalink & SWIM
    - 以应对一些重要的基础设施需求，如数据链和全系统信息管理
  - Funding/financing of ground equipment & avionics for Block Upgrades
  - 为组块升级中的地面设备和航空电子设备升级提供资金支持

# Summary
# 总结

- Follow-up to previous briefing:
  - 对前面讲评的补充
  - Aviation System Block Upgrades
  - 航空系统组块升级
- Next steps in packaging tomorrow's aviation system
- 关于开发未来航空系统的工作步骤
- ICAO's strategic approach
- 国际民航组织的战略方法
- Steps leading to 12th Air Navigation Conference
- 第12届空中导航大会的会前工作步骤
- ICAO Working Papers available as of 30 June 2012
- 2012年6月30日完成国际民航组织工作报告
- For more information: www.icao.int/anconf12
- 更多信息请浏览网站: www.icao.int/anconf12

# ICAO

## Uniting Aviation on

## Safety | Security | Environment