Future Communications Study Overview

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Future Communications Study Briefing Overview

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FCS Background

- Aeronautical air-to-ground voice and data communications capacity for Air Traffic Management (ATM) is reaching saturation
  - Most severe in Europe and parts of the United States
- Various proposals to address this problem have been offered and approved independently; none has achieved global endorsement
- ICAO is seeking a common, global solution through the Aeronautical Communications Panel (ACP)
  - ANC/11 (Oct 2003) Recommendations

FCS Background – Concluded

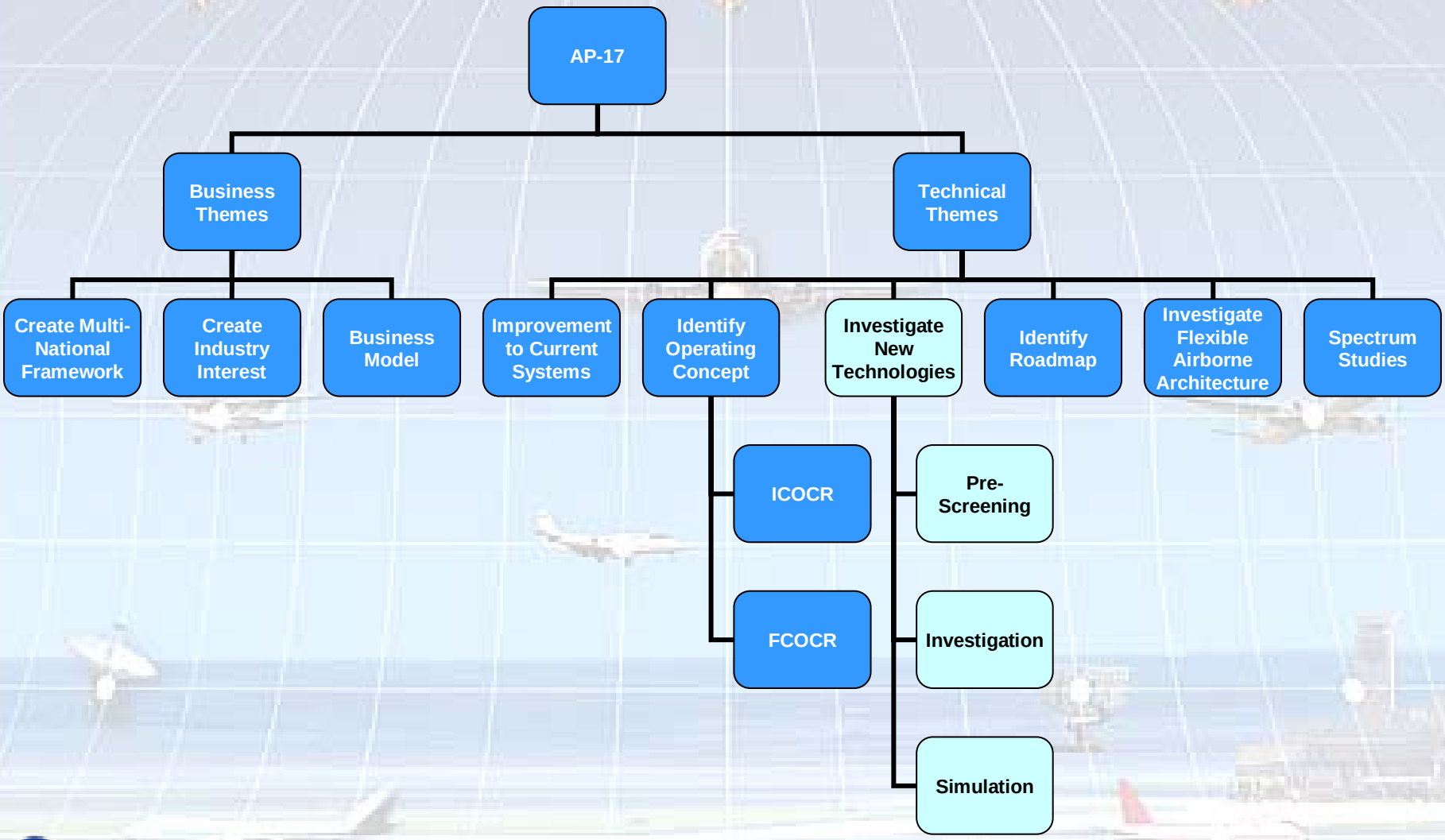
- The intent of the ICAO ANC-11 recommendations was to provide a path towards global interoperability of air-ground communications while investigating technology alternatives:
  - Evolutionary approach for global interoperability of air-ground communications [Recommendation 7/3]
  - Investigation of future technology alternatives for air-ground communications [Recommendation 7/4]
  - Standardization of aeronautical communication systems [Recommendation 7/5]
- The Future Communications Study emerged from Eurocontrol and FAA discussions as a way to progress the recommendations of ANC-11

FCS Overview – Objectives

- The FCS, a cooperative R&D effort between Eurocontrol, FAA and NASA as outlined in AP17, is a comprehensive study, comprised of both Technical and Business themes

- FCS objectives include:
  - Provide communications capacity to support Air Traffic Management through 2030
  - Provide for a realistic transition to global solution for service providers and airspace users
  - Support Air Traffic Services (ATS) and Airline Operational Control Communications (AOC) for safety and regularity of flight
  - Address spectrum depletion in both regions
  - Investigate multi-mode avionics for implementation

FCS Overview – Themes



Indicates Current NASA Responsibilities

FCS Interim Results – COCR

- The objectives of the Communications Operating Concept and Requirements (COCR) effort are:
  - to identify and document consensus future operational requirements
  - to derive the communications requirements of a future communications system that would enable those concepts
- Two versions of the COCR have been published for review from the aviation community through ICAO.
  - The latest version of the COCR is available for review

    http://www.icao.int/anb/panels/acp/WG/W/WGW01/ACP-WGW01-WP05-APP-FCOCR_01_acp_wgw.doc

FCS Interim Results – COCR ATC Operational Concepts

- Operational Concepts described as two phases
  - Phase 1 begins in ~2015
    - > Evolution of communications services from voice to data.
    - > Operations begin the paradigm shift from “management by intervention” to “management by planning and intervention by exception.”
  - Phase 2 takes over through ~2030
    - > Evolution of communications services to support 4-D trajectory-based ATM with autonomous operations in designated airspace.
    - > ATC is a monitoring function as opposed to active control.
    - > Network Centric Operations allow air-ground flow of system wide information.

FCS Interim Results – Need for a New System

- The identified consensus operations requirements documented in the COCR call for an increasing reliance on data communications

- Both the amount of data and the types of services that are being specified indicate that a new data link will be required – the Future Radio System (FRS)

FCS Interim Results – Technology Assessment

- The primary goal is to assess suitability of candidate communications technologies for the next generation of air-ground and air-air safety critical data communications services

- Interim results called for more study of both terrestrial and satellite systems
  - Terrestrial systems that could more efficiently use the VHF band were identified, but no consensus recommendations were made
  - L-Band systems that can co-exist with equipment in the DME band, provide more capacity and functions are recommended, with some consensus candidates identified
  - C-Band systems for airport surface networks are recommended, but no consensus candidates as of yet
  - Further investigation of INMARSAT IV services was a consensus recommendation

FCS Interim Results – Technology Assessment Concluded

- The interim results of the technology assessment conducted for NASA Glenn Research Center by ITT Industries are:
  - Published as a NASA Contractor Report (May 2005)

    http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20050180618_2005179929.pdf
  - Summarized in a presentation to an ICAO Aeronautical Communications Panel (June 2005)

    http://www.icao.int/anb/panels/acp/WG/W/WGW01/ACP-WGW01-WP04-Rev1-Technology Prescreening Process.doc
  - Summarized by Glen Dyer in the next presentation in this ACAST Workshop

FCS Planned Activities

- Release final version of the COCR for comments in October 2005, and publishing in December 2005
- Commence technology investigation
  - Develop traceable evaluation criteria to requirements derived from COCR and revisit pre-screening results
  - Explore issues for L-Band recommendations
  - Explore issues for SatCom recommendations
  - Explore issues for C-Band recommendations