A Global Solution for the Future ATC Communications System—What are the technology possibilities?

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A Global Solution for the Future ATC Communications System

- What characteristics are required for future ATC communications systems?

•Need to define Inter-operability (data and voice)

•Future – Looking at 2015-20 timeframe for implimentation

•Multi-mode radio solution (transition but not the end solution)

•Multi-media solution – (VHF or SATCom) (economic and geographic factors)

•If Multi-band/multi-radio solution – recognize cost factor/implementation difficulties

•ITU have a generic aviation allocation and aviation community determines the use/ time frame

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- What characteristics are required for future ATC communications systems?

•Make sure the consideration is network oriented (not just a point-to-point solution

•Determine what the community thinks it wants in the system (characteristics/ flexibility)

•Access the network globally (open interface)

•Need to balance with the different class of users

•Define the framework of the interface for the variety of users (need to set minimums for operability)

•Want to be open to IP protocol (but not locked in)

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- What characteristics are required for future ATC communications systems?

•To what extend do we involve the user community to buy into the process

•Define information flow for ‘’Free Flight’’ application

•Flexibility, scalability key to the solution

•Air-to-air needs to be considered in the future pipeline because of airframe / cost implications

•Is there operational considerations that need to be considered from the starting point

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- What characteristics are required for future ATC communications systems?

  - •Developments that come along with change the operational concepts and need to build in flexibility to change on the fly
  - •Almost positive the solution involves datalink
  - •Maybe want to consider a system of systems (Not a single pipe)
  - •Want to keep safety and security as factor in the decision process (voice and digital implementations)
  - •Advantageous to share information with European concept of operations

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- What characteristics are required for future ATC communications systems?

  •Is the FAA study a global solution (Oceanic and Domestic) is it open or closed in terms of system concerns (Defining the solution opens a variety of other issues)

  •Consideration for legacy systems and the interface during transition (both now and 2035 … at backend of 2015 solutions)

  •Consider operational requirements no matter how the technology develops – seamless to the user (ground and airborne)

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- What are possible technologies that could provide a solution?

  - •TCP/IP or other solutions (MLS band or new tech …4g cellular)
  - •Ad hoc networking
  - •Airborne Internet
  - •Interoperability via different interfaces
  - •Software-defined radios
  - •Define a better way to certify new technologies (such as software-defined radios)
  - •Quality of service support

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- What are possible technologies that could provide a solution?

  - Domain-dependant (terminal vs. oceanic) technology
  - Performance based rather than technology based
  - Testing and simulation systems adequate for the new technologies
  - Definition and application of required communication performance
  - Defining communication performance in terms of built in redundancy
  - Meld existing standards and guidelines into the development of new standards

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- What are possible technologies that could provide a solution?

  - Packet-ized voice concept
  - Need to add evaluations to the process
  - Encryption technologies
  - More efficient compression technologies
  - Narrow, wide and broadband technologies

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- What are possible technologies that could provide a solution?

  •Large scale data management systems

  •Intent of using satellite systems for solutions (Leo/Meo) to address latency issues and polar coverage

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- What problems, constraints, and pitfalls should be avoided?

  •Users need to buy in upfront

  •Maintain management support throughout the process

  •Equipage – Must include a strategy that looks at the potential of governmental mandates (and who pays)

  •Part of the user buy-in is an identification of the strategy that shares in the decision-making process for mandates

  •Need transitional strategy for minimal impact

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- What problems, constraints, and pitfalls should be avoided?

  - Improve the transitional strategy based on past experience
  - Users need to buy in without a major impact
  - Funding and certification are major factors in the process
  - Users need to have problems and associated decisions articulated in terms they understand
  - Users do not want to deal with multiple mandates regarding same issue
  - When a decision is made … stick with it

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- What problems, constraints, and pitfalls should be avoided?

  - Are timelines too long for implementation?
  - Have to have an R&D strategy and an implementation strategy that work
  - Combine civil and military buy in to ensure success of the process
  - More joint programs/research (which may require high-level pressure)
  - Include European (and other) nations in the decision-making process

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- What problems, constraints, and pitfalls should be avoided?

  - Will the airborne internet consortium sync up with existing and future strategies of all concerned?
  - Make sure roles and strategies are known
  - Is it feasible from an operational standpoint to meet safety and performance requirements?
  - Need to identify the spectrum that drives this future ATC system
  - Risks are associated with some technologies depending on available spectrum

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- What problems, constraints, and pitfalls should be avoided?

  •Not having a clear roadmap that includes with gates that allows for alternate pathways (could include external events that are outside control)

Summary

Characteristics

- Global interoperability
- Flexible, scaleable
- User community buy-in
- System of systems
- Technical solution fits in with operational concept
- Improve safety and security

Summary

Technologies

- Satellites are a component of the solution
- Datalink is a component of the solution
- Software-defined radios as solutions to equipage issues
- Required communication performance (performance based vs. technology based)
- Domain based selection of solutions (for all types of airspace)

Summary

Problems/Pitfalls to Avoid

- Shorten the cycle – implementation cycle is too long
- User and ATSP commitment
- Not having a clear roadmap that includes with gates that allows for alternate pathways (could include external events that are outside control)
- Spectrum needs and constraints addressed/recognized
- International and High-level commitment for the long haul

Summary

General Comments

•Adequate simulation and evaluation tools to make the case for a future global ATC communication solutions to get buy-in