Multilink Air-to-X Communication

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Case of Application

• “Always Best Connected”: Satellite, ground, other aircraft

• Important performance metrics:
  – Link reliability
  – Packet loss rate
  – Delay
  – Throughput

• Improved by:
  – Multilink transmission
  – Network Coding

ATM: Air Traffic Management
VHF: Very high frequency

ATM: ATM (VHF Data Link)
In-flight Gogo Internet
Internet, ATM (Iridium, Inmarsat, SatCom)
Cabin
Cockpit

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• **Uses various transmission systems at once**

• **Aims:**
  – Reliability through redundant data transmission
  – Enlarge throughput by using multiple transmission systems
  – Load balancing by equally using transmission systems

• **Challenges:**
  – Determination of scheduling algorithm
  – Decision of transmission link
  – Priority of data
Network Coding

• **Aim:** Improve transmission efficiency

• **Approach:** Encoding and reconstruction of packets using Random Linear Network Coding (RLNC) [1]

• **Challenges:**
  1. **Guarantee separation of packets at destination**
  2. **Mitigation of coding / decoding delay (waiting time)**
  3. **Tradeoff between throughput gain and network delay**

Thank you! Questions?

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