

AIR TRAFFIC CONTROL CASE STUDY

Station 2: Air Traffic Control Case Study

Name: _____

Group Members: _____

Background

Communication is not always about convenience. Sometimes it is about safety. An air traffic controller communicates with pilots using several different systems. These systems help guide airplanes safely during takeoff, flight, and landing.

Some of these systems use analog signals, while others use digital signals. At this station, you will analyze several aviation communication systems and determine why digital signals are often more reliable.

Part A: Identify the Signal Type

Examine the air traffic communication diagram at your station. For each labeled system, determine whether it uses analog signals, digital signals, or both.

Aviation System	Analog	Digital	Combination
Voice Radio	☐	☐	☐
Primary Radar	☐	☐	☐
Transponder	☐	☐	☐
Flight Data Storage	☐	☐	☐
Secondary Radar	☐	☐	☐
ADS-B	☐	☐	☐

Part B: Reliability Evaluation

Imagine a severe thunderstorm is causing interference and static in communication signals.

Based on what you learned, rank the systems from *most* reliable to *least* reliable during the storm.

1 (Most Reliable): _____

2: _____

3: _____

4: _____

5: _____

6 (Least Reliable): _____

Explain Your Reasoning

Write 2–3 sentences explaining why you ranked the systems this way.

Part C: Analyze System Failure

If one system stops working:

Which system fails first? Why?

What system or systems take over?

Can planes still land safely? Explain.

Part D: Reflection

Answer the following questions.

1. What is one advantage of digital transmission in aviation communication?

2. What is one disadvantage or risk of relying on digital systems?

3. Why would air traffic control not rely only on analog voice communication?
