

Name: __Homework #4 Solution____

Date: ____9/22/10_____

SYST 490

Fall 2010

Homework #4: Critical Reading

Describe each of the elements of a System Engineering Analysis (in the table below) for analysis described in the technical paper Air Pollution Accountability and Compliance Tracking System (*Andrew Keller-Goralczyk, Joshua Finks, Omar Mathir, David Helmly, Abdulrahman Althagafi* 2010).

Notes:

1. Read the paper first, then complete the table.
2. Keep in mind, the paper is not perfect and elements of an SEA may be incomplete or missing. If an element is missing, note that it is missing and describe what you think should have been done.
3. Keep descriptions short. Bullet points or short paragraphs
4. List the source of your description by page number and paragraph no. (e.g. page 1, para 1,2,3 and 4)

Elements of a System Engineering Analysis	Description	Page and para #
1. Context	<ul style="list-style-type: none"> • Demand for air travel forecast to grow 3-7%/year over next decade • Regulations to curtail static sources of emissions are in place. Regulations to curtail mobile sources of emissions are on their way. • Airports are responsible parties for airport operation emissions (and will have to pay non-compliance penalties), but do not purchase the aircraft or make an operational decisions (airlines purchase aircraft, airlines and air traffic control make operational decisions) • Monitoring sensors are cost prohibitive to acquire, install, monitor and maintain. • Monitoring sensors do not differentiate between different sources of emissions (due to dispersion) • <u>NEED</u>: A system to estimate aircraft emissions. Must be within cost budget, be in compliance with federal regulations, and must differentiate between airborne emissions and emissions from other sources. 	
2. Stakeholders of the Emissions Monitoring System	<p><u>Consumers (of Emissions Monitoring System)</u>: Airports air quality departments, Govt/State/County/Municipality Air Quality departments, Passengers (?)</p> <p><u>Service Provides (of Emissions Monitoring System)</u>: manufacturers of monitoring sensors, simulation manufacturers.</p> <p><u>Beneficiaries</u>: Passengers, Airlines, Homeowners near airports, airport employees, ...</p> <p><u>Victims</u>: Homeowners near airports, Passengers, Airlines, Airport employees, ...</p>	
3. Problem Statement	<p>A system to estimate aircraft emissions. Must be within cost budget, be in compliance with federal regulations, and must differentiate between airborne emissions and emissions from other sources.</p> <p>Note: This paper did not describe a trade-off analysis of alternate methods or technologies to estimate aircraft emissions.</p>	
4. Proposed Solutions	This paper only proposed one solution – a simulation using the ICAO emissions reference model.	
5. Method Analysis/Simulation	ICAO emissions reference model.	
6. Design of Experiment	No experiment was run to investigate alternate proposed solutions. An experiment was run to investigate impact of improved engine technology to reduce emissions (e.g. 10% for major carrier at Dulles airport), but this was not part of the system design decision.	
7. Results	Simulation results presented. Results not validated. Some sensitivity analysis for change in emissions (e.g. 10%) of major airline at IAD.	