

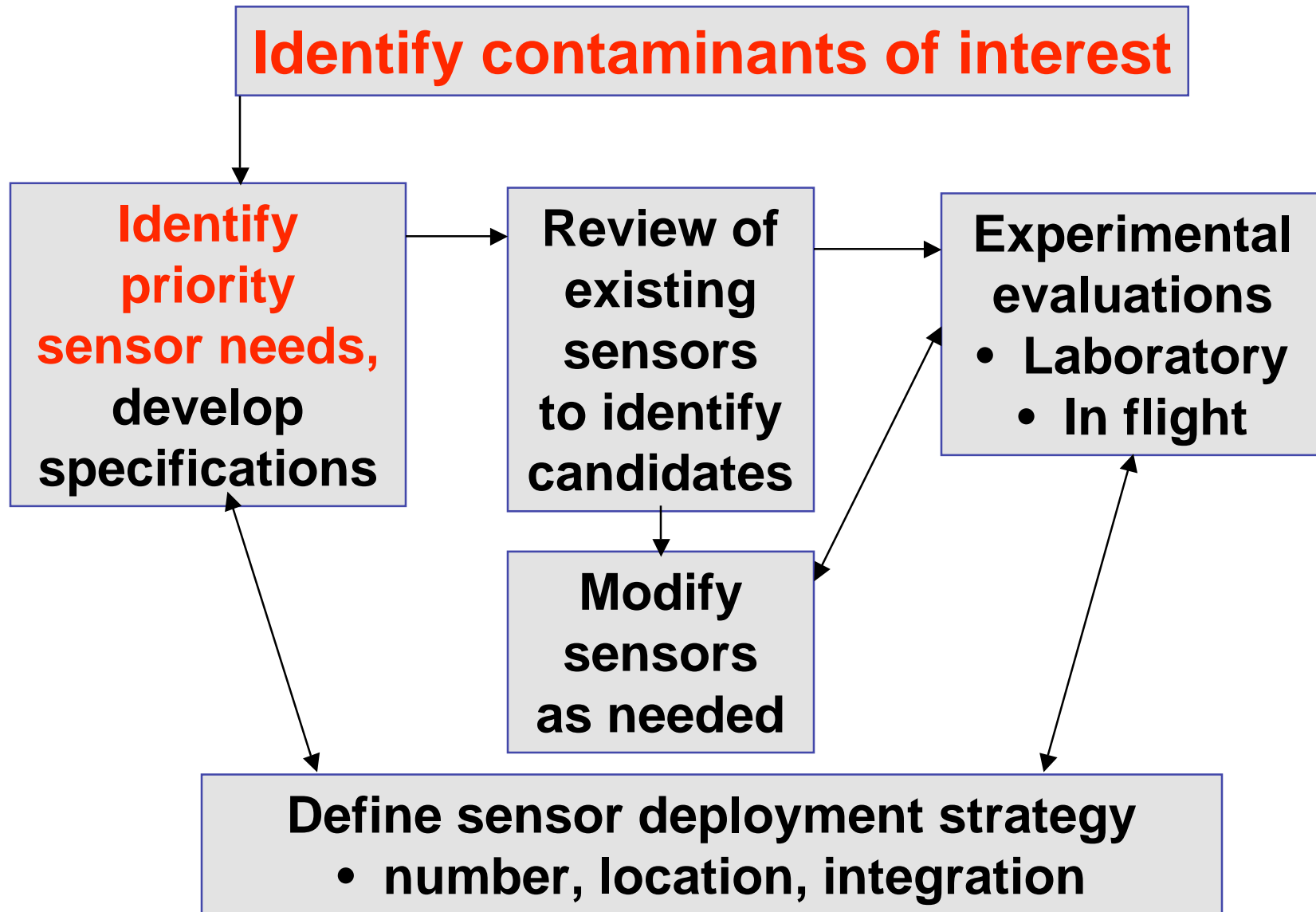


Contaminants of Interest and Associated Needs for Sensors

**Presentation at the Workshop on
Sensors for the Aircraft Cabin
Environment**

**January 19 & 20, 2005
Everett, WA**

Overview of the COE's Plans for Sensors



Sensor Applications: Research versus Routine Monitoring

Research

- Sensor* requirements driven by research objectives
- Reduced constraints on cost, weight,
- Not necessarily integrated with other aircraft systems

Routine

- Must be a practical use for routinely collected data
- Increased constraints on cost, weight, long term stability, etc.
- More likely integration with other aircraft systems

*shorthand for sensor or instrument



Contaminants of Potential Concern

Contaminant	Possible Source(s)	Potential Significance
Ozone	Outdoor air	Respiratory effects, chemical reactions
Airborne allergens	Pets, attached to clothes, outdoor air, microbial growth in aircraft	Allergic symptoms, asthma exacerbation
CO	Outdoor air, Incidents	Headache, lightheadedness, indicator of incidents?
Hydraulic fluids, oils, deicing, deg. products	Incidents	Possible toxic effects
Pesticides (and carriers)	Intentional application	Skin irritation, neurological effects, respiratory effects, etc.
CO₂ (outdoor air supply)	People, Outdoor air	Indicator of outdoor air supply per person

■ **NAS highest priority**

■ **NAS medium priority**

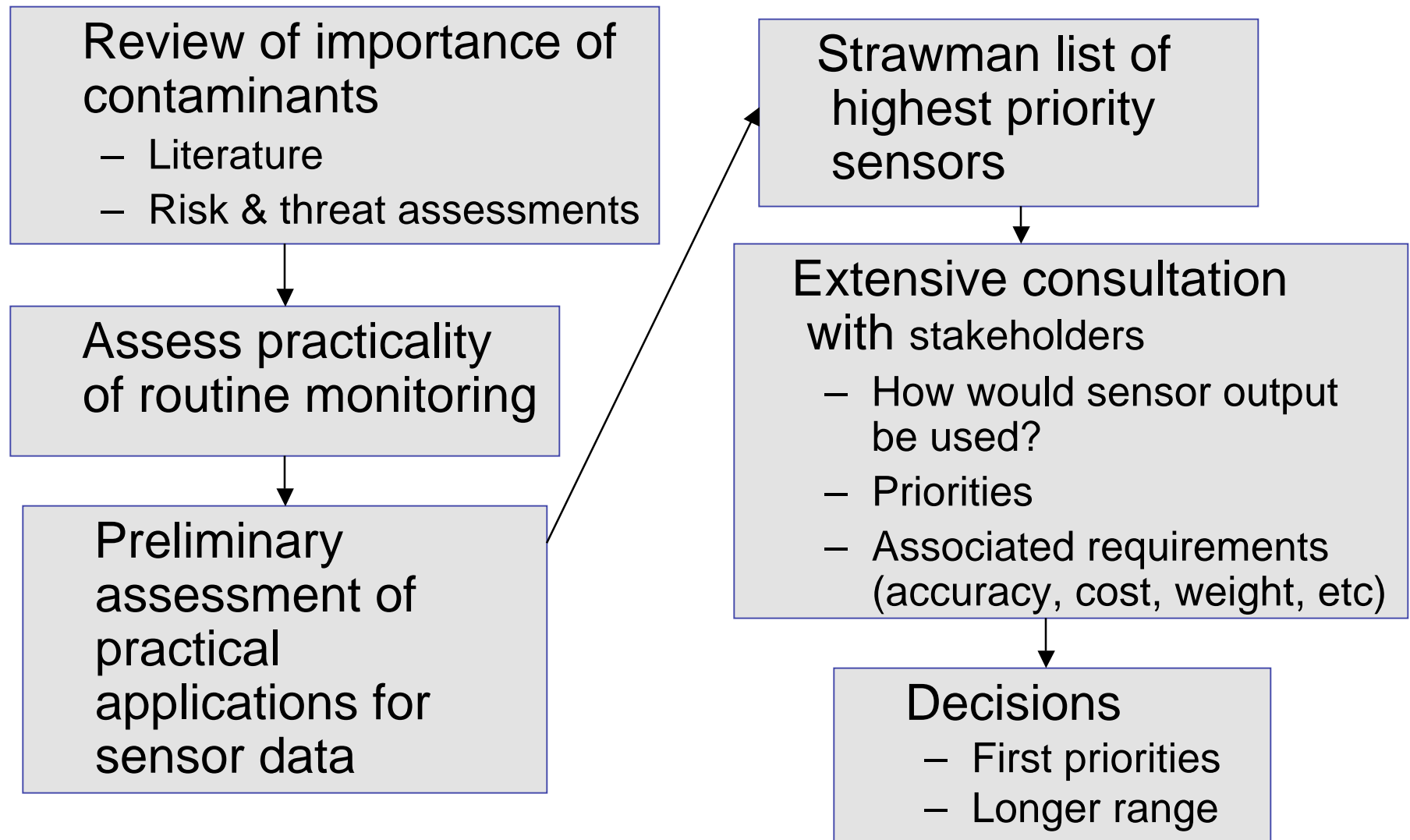
Contaminants of Potential Concern – Cont.

Contaminant	Possible Source(s)	Potential Significance
Infectious agents that cause communicable disease: bacteria, virus	Naturally infected people, intentional release	Infection and mild to severe illness, Subsequent infection outside of aircraft
Microbial agents that cause non-communicable illness; e.g., mold spores, anthrax	Clothes and items brought into aircraft, microbial growth in aircraft, Intentional release	Mild to severe illness
Organic chemicals including highly toxic chemicals	People, luggage, cleaning agents, intentional releases	Odor, Irritation, reaction with ozone, possible death from intentional release of highly toxic chemicals
Particles/dust	Surfaces, reactions, outside, people	Adverse affects on airways, skin, and eyes

■ **NAS highest priority**

■ **NAS medium priority**

Process for Identifying Highest Priority Sensors for Routine Monitoring





Hypothetical Example

Potential High and Low Priority Sensors for Routine Monitoring

High priority

Contaminant	Possible Practical Application for sensor data
Ozone	Trigger maintenance of ozone control system Evaluate compliance with standards
Carbon dioxide	Modify ECS operation, Trigger ECS maintenance Evaluate compliance with ventilation requirements
SARS virus	Enable rapid medical responses Isolate potentially infected individuals to prevent subsequent transmission in community settings

Low priority

Contaminant	Why low priority
Airborne allergens	No clear application for routine data Expensive measurements