



# The National Aviation Operations Monitoring Service

**Survey Methodology-Part 2**

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# NAOMS Design Decisions

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- What events to address?
- What order of questions?
- How long of a recall period?
- What mode?

# Building Lists of Events



## Content Sources

- **Consultation with Industry/Gov't Safety Group, e.g.**
  - FAA
  - ASRS Analysts
  - Workshops
  
- **Review of Aviation Databases, e.g.**
  - ASRS
  - NTSB
  - NAIMS
  - BTS
  
- **Focus Groups with Active Professional Participants**

# Questionnaire Structure and Organization



- **Conducted ALPA-supported experimental research with active line pilots to determine**
  - How well pilots remember (period of recall)
  - How pilots organized memory of safety events (questionnaire organization)
  - Survey “talk-aloud” tests (individual pilots provide real time criticism of questionnaire content and structure)
  
- **Developed a draft questionnaire that was**
  - Extensively edited and corrected for non-technical wording by survey method experts
  - Edited and corrected for technical accuracy by aviation subject matter experts

**Extensive and detailed up-front effort was devoted to questionnaire development.**

# Question Ordering

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## Question Ordering Relates to Memory Organization:

- Records of experiences are organized systematically and thematically in memory
- Understanding respondent memory organization is crucial to optimizing accuracy
- Asking questions in clusters that match a person's memory organization improves measurement precision
- Various hypotheses about how pilots might organize their memories discussed, but no hard data.

# Memory Organizations

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- Severity
- Causes
- Phase of Flight

# Identifying Memory Organization



- Experiments
- Participants: Air carrier pilots
- Various tasks
  - Order of Recall
  - Labeling of Clusters
  - Sorting of Events into Categories
- Decision: A “hybrid” organization emerged: mostly causes with some phases

# Recall Period



## Recall Period - The optimal time between event occurrence and survey

- Respondent recall period is crucial to survey validity
- Needs to maximize recall and balance survey logistics
- Memories fade over time
- Participants should not be asked to recall things from too far in the past
- Literature Review: A literature review resulted in data that we felt to be insufficient for our purposes
- Our own study of pilots' recall of mundane flight events: 7 days maximum
- We needed to determine how long more serious events can be remembered

# Field Trial



- **Evaluate methods and survey questionnaire**
  - – Response rates
  - – Data quality and completeness
  - – Data reliability and validity
  - – Collection modes
  - – Question wording
  - – Respondent feedback on survey
  
- **Estimate scale of a fully operational system**
  - – Costs
  - – Required sample sizes

# Field Trial Approach



- **Assessment of the survey instrument and procedures**
  - – Limited to 630 air carrier pilots
  - – Various versions were tested
  - – Last section of survey asked participants for feedback on survey and process
  
- **Variations (72 variations were tested)**
  - – Mode (telephone, mail, face-to-face)
  - – Recall period
  - – Section order
  - – Topical foci

# Recall Period: Validity Analysis

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- Association of hours flown with number of events witnessed
- Association of days in the recall period with number of events witnessed
- Strongest relationships for one month and two months
- Decision: 60 days chosen as recall period

# Mode: Selection and Validation



## ■ Validation results:

- More hours flown should be associated with more events witnessed
- More days in the recall period should be associated with more events witnessed
- Stronger relationships indicate more accurate reporting

## ■ Mode selection:

- 30% stronger relationships for telephone than mail

## ■ Decision: Perform telephone interviewing (Computer Assisted Telephone Interview - CATI)

# Summary of Design Conclusions



- Address as many safety events identified during preliminary investigations as practical
- Order questions to match hybrid clustering
- Use 60-day recall period to maximize documentation of rare events
- Use telephone interviewing to maximize measurement accuracy
- Sample size of approximately 8,000 interviews per year will provide sufficient sensitivity.