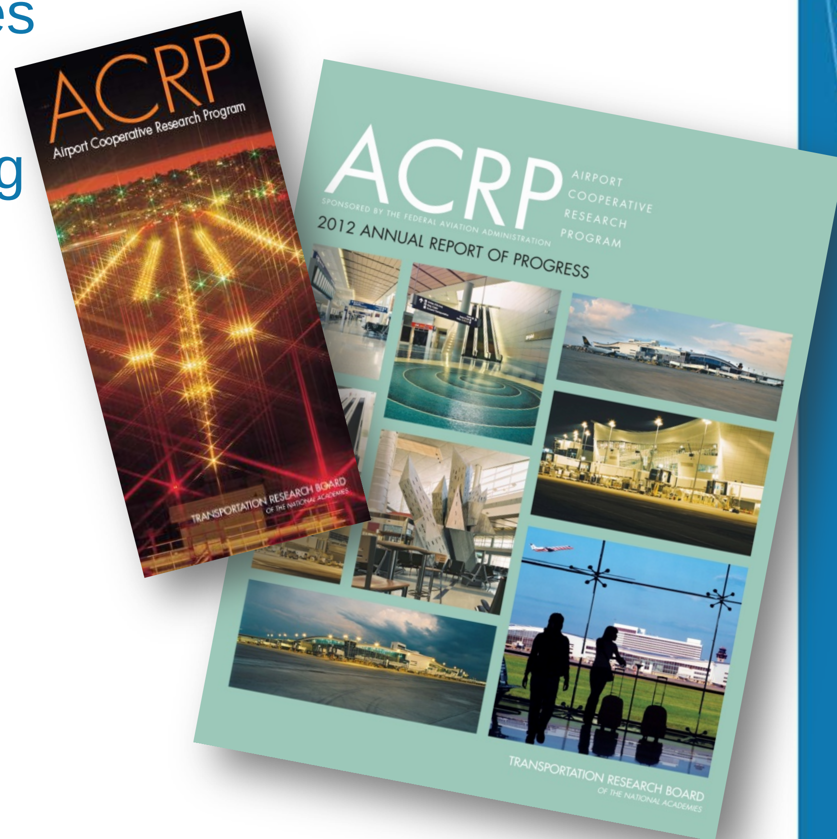
Information on ACRP

- www.TRB.org/ACRP
- Regular news and updates on:
  - o Upcoming and ongoing research projects
  - o New publications
  - o Success stories
  - o Announcements
  - o Webinars
- Find ACRP on Facebook and LinkedIn



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Upcoming ACRP Webinars

- ***October 21st – Legal Aspects of Airport Programs***
- ***November 5th – Guidance for Understanding WiFi Disruptions and Cyber Security at Airports***
- ***December 1st – Planning for Climate Change Adaptation at Airports***

You can register for and learn more about these webinars by visiting:

http://www.trb.org/ACRP/ACRPwebinars.aspx

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Additional ACRP Publications on this Topic

- **ACRP Report 43 –** A Guidebook for Improving Environmental Performance at Small Airports
- **ACRP Report 113 –** General Aviation Facility Planning
- **ACRP Report 128 –** Alternative IT Delivery Methods and Best Practices for Small Airports
- **ACRP Report 138 –** Guidebook on Preventative Maintenance at General Aviation Airports

You can learn more about these publications by visiting ***www.trb.org/publications***

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TRB Aviation Group Committee Overview

Aviation System Planning (AV020)

Seth Young, Committee Chair

What is TRB's Aviation Group?

- **The Aviation Group consists of nine committees that…**
  - o *propose research*
  - o *share research findings*
  - o *sponsor special activities, programs, and events*
  - o *provide a forum for transportation professionals to discuss today's and tomorrow's aviation-related issues.*

Aviation Group Committees

Intergovernmental Relations in Aviation
(AV010)
Pamela S. Keidel-Adams, Chair
pam.keidel-adams@kimley-horn.com

Aviation System Planning
(AV020)
Seth Young, Chair
Young.1460@osu.edu

Environmental Impacts of Aviation
(AV030)
Jennifer Salerno, Chair
salerno_jennifer@bah.com

Aviation Economics and Forecasting
(AV040)
David Ballard, Chair
bdballard@gra-inc.com

Airport Terminals and Ground Access
(AV050)
Andrew Kirchhoff, Chair
akirchhoff@landrum-brown.com

Airfield and Airspace Capacity and Delay
(AV060)
Chris Oswald, Chair
coswald@aci-na.org

Aircraft/Airport Compatibility
(AV070)
Geoff Baskir, Chair
geoffbaskir@gmail.com

Light Commercial and General Aviation
(AV080)
Moira Harvey, Chair
Moira.harvey1@gmail.com

Aviation Security and Emergency Management
(AV090)
Richard Bloom, Chair
bloomr@erau.edu

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TRB's Aviation Group Committees

- Intergovernmental Relations in Aviation (AV010)
- Aviation System Planning (AV020)
- Environmental Impacts of Aviation (AV030)
- Aviation Economics and Forecasting (AV040)
- Airport Terminals and Ground Access (AV050)
- Airfield and Airspace Capacity and Delay (AV060)
- Aircraft/Airport Compatibility (AV070)
- Light Commercial and General Aviation (AV080)
- Aviation Security and Emergency Management (AV090)

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Aviation System Planning (AV020)

Mission: To address aviation planning issues:

From Airport Master Planning

to Regional & National Airport System Planning

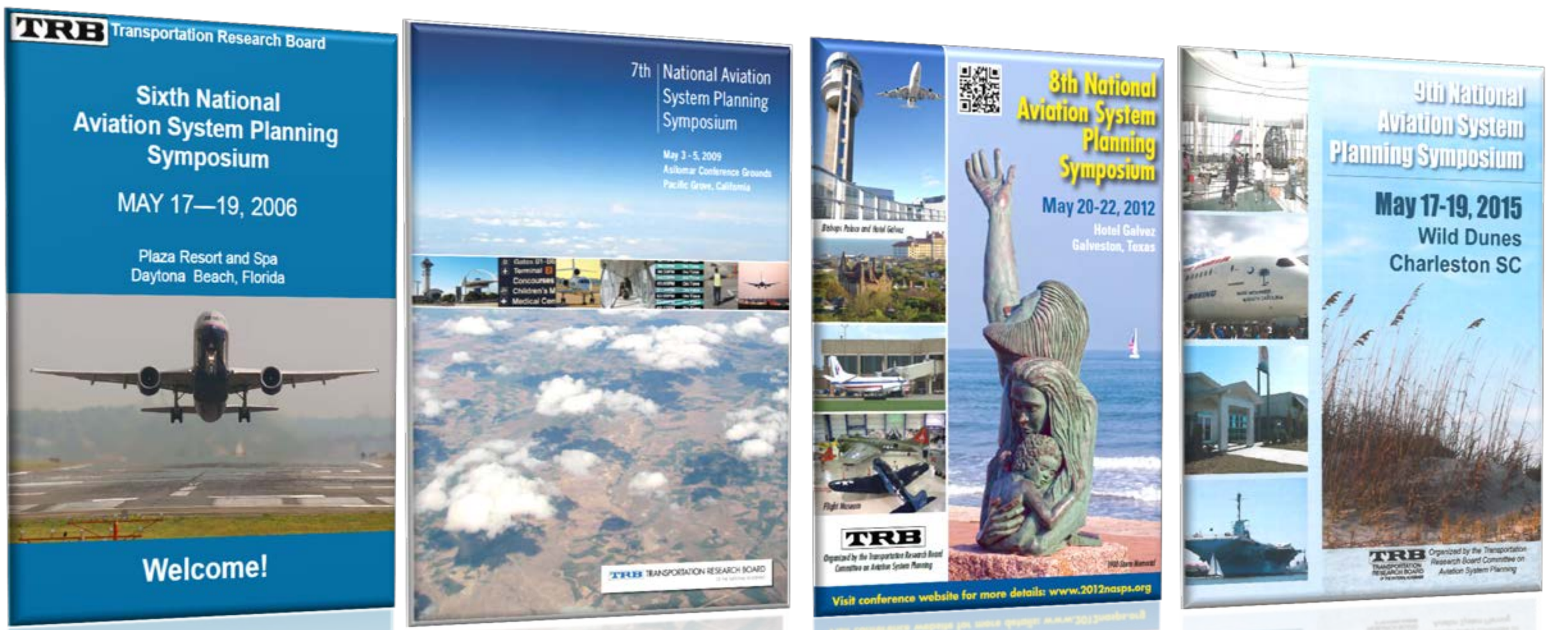
Key Activities:

Sessions and Workshops at Annual Meeting

Paper Solicitations and Reviews for TRR

Aviation System Planning (AV020)

The National Aviation System Planning Symposium (NASPS)



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Aviation System Planning (AV020)

(Co)-Sponsored Sessions at 95th Annual TRB Meeting

January 10-14, 2016 Washington, DC

- Impact of Megatrends on Aviation System Planning
- Underlying Factors Affecting General Aviation
- Update on ACRP NextGen Projects
- Evolving Ground Transportation Services to Airports
- Multi-Modal considerations in aviation planning
- The future aviation workforce
- Workshop on Commercial Space Transport
- Workshop on Unmanned Aerial Systems

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Ways to Get Involved

- Contact the committee chair
  - Seth Young (young.1460@osu.edu)
- Become a "friend" of the committee
  - Join the committee email distribution list
  - Volunteer to review research papers, work on a committee project or give a presentation
  - Participate in committee meetings

More information is available at:
http://www.trb.org/aviation1/trbcommittees.aspx

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Today's Speakers

Moderated by Seth Young,
Aviation System Planning,
TRB Aviation Committee (AV020)

1) ACRP Synthesis 55: Backcountry Airstrip Preservation
   - John Anderson, T-O Engineers

2) ACRP Report 129: Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports
   - Maria Muia, Woolpert and Mary E. Johnson, Ph.D., Purdue University

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ACRP SYNTHESIS 55:
Backcountry Airstrip Preservation

John W. Anderson, A.A.E.
T-O Engineers, Inc.
Boise, Idaho

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TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

John W. Anderson, A.A.E.
Principal Investigator

- Airport Advisor, T-O Engineers, Inc.
- Retired Boise Airport Director
- McCall, ID Airport Manager
- Air Force Pilot
- Commercial Single & Multi-Engine, Instrument Rated Pilot

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ACRP Synthesis 55
Topic Panel

Steve Durtschi, Utah Backcountry Pilots Association

Kimberly Kenville, University of North Dakota

Michael Maynard, CDM Smith

Verne Skagerberg, Alaska DOT

Mark Spencer, Recreational Aviation Foundation, AZ

Larry Taylor, Idaho Aviation Foundation

Thomas Thatcher, Kimball & Associates

Scott Brownlee, FAA Liaison

Christine Gerencher, TRB Liaison

Gail Staba, ACRP Senior Program Officer

ACRP SYNTHESIS 55:
Backcountry Airstrip Preservation

Objective of the Synthesis

- **Inventory Uses, Benefits, and threats to Backcountry Airstrips**
- **Identify useful practices and strategies to manage these threats**
- **Be an informational piece for:**
  - Users
  - Policy bodies
  - Airstrip owners
  - Stakeholders

Dug Bar Hells Canyon National Recreation Area

Classified as "Wild" by the Idaho Aviation Network

7480 Process has not been conducted

Backcountry Airstrip Users

Government Agencies

- Access for researchers
- Access for trail and roadway maintenance
- Wildland fire fighting support

Commercial Operators/Air Taxi

- Passengers' for hiking, rafting, hunting, fishing
- Delivery of mail & supplies to remote homesteads
- Law Enforcement, Air ambulance & rescue

Recreational Portals

- Individual pilots
- Pilot associations

Mineral Canyon, UT BLM

A favorite river-bottom, fly-in camp spot; High Canyon Walls; Uranium mine; Tamarisk forest

ACRP SYNTHESIS 55:
Backcountry Airstrip Preservation

Why Backcountry Airstrips are Important

- Air Access to America's Backcountry
- Wildland fire fighting in difficult terrain
- Emergency Access where few roads exist
- Alternate (Emergency) landing fields
- Flight Training
- Access for land and resource management
- Access to remote infrastructure

On Final Negrito, New Mexico

Elevation 8,143 feet

Runways, 7,500’ x 60’ & 4,000’ x 60’

Turf/gravel

Backcountry Airstrip Maintenance Challenges

Lack of Budget

Remoteness

Difficulty transferring supplies and equipment

Environmental Documentation, especially in Wilderness Areas

Prioritization of owner/agency

Work Party @Thomas Creek, ID Aeronautics

Wilderness Airstrip on the Salmon River

Grandfathered Wilderness Airstrip Legislation

- Wilderness Act of 1964
  - Existing use may continue subject to being deemed desirable by the Secretary of Agriculture
- Central Idaho Wilderness Act of 1980
  - Airstrips in use could not be closed except for extreme danger
- 1976 FLPMA set standards for creating WSA's
  - Allow continued use of existing uses such as airstrips
  - Mexican Mouintain, UT
  - Missouri Breaks, MT
- In every case, pilots have had to defend airstrip usage

Mexican Mountain, UT Wilderness Study Area

Maintenance Plan approved April 2014; Hand tools only; Utah Backcountry Pilots Association.

Cabin Creek, ID Wilderness Airstrip

USFS Created wilderness airstrip management plan.

Educating Pilots

- **AZ Pilots Association**
- **Pilot Workshops**
  - RAF
  - IAF
  - NM Pilots Association
  - Utah Backcountry Pilots Association
- **Pilot Safety**

North Fox Island, MI Opens with RAF Effort

The Work Continues. Summer 2015 Michigan Department of Lands

Big Creek, ID Aviation Foundation rebuilding lodge

IAF & USFS Break Ground on new Big Creek Lodge. Successful partnership

Russian Flat Airstrip, MT

Partnership between the RAF, Montana Pilots Association, USFS & Contractor Donations

Aviation Associations

Some of the more active associations

Recreational Aviation Foundation
Idaho Aviation Foundation
Utah Backcountry Pilots Association
Arizona Pilots Association
New Mexico Pilots Association
AOPA
EAA

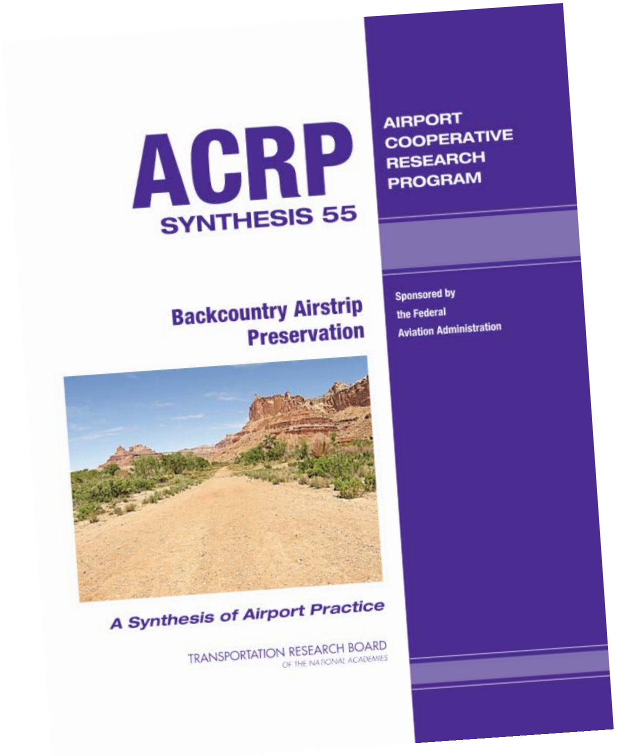
Grapevine, AZ Pilots Association Work Party

AZ Pilots Association works with USFS to re-open Grapevine on a limited basis.

Major Backcountry Airstrip Preservation Issues

- **Pilots Code of Conducts**
  - Located in Sensitive Areas
  - No “Bagging Airstrips”
  - No trace, tread lightly
- **Cooperative Efforts**
  - Pilots organizations
  - USFS, BLM, State Agencies
  - Recreation organizations
- **Enthusiasm and Advocacy by Pilots Organizations**
  - One of the growing segments of single engine GA
  - Aviation Foundations
  - State Pilots groups
  - AOPA, EAA joining in

For additional information:



ACRP Synthesis 55*:*
Backcountry Airstrip Preservation

http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_055.pdf

- John Anderson, A.A.E.
  - janderson@to-engineers.com

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ACRP Report 129: Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports

Maria J. Muia, Ph.D.
Mary E. Johnson, Ph.D.

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Maria J. Muia, Ph.D., Principal Investigator

- Senior Aviation Planner, Woolpert Inc.
- Former IN State Aviation Director
- Private Pilot, Instrument Rating
- SME, Green Specialist Certificate
- Ph.D., M.S. in Management
- B.S. in Aviation Administration

Mary E. Johnson, Ph.D., Statistical Analysis

- Associate Professor, Purdue University Aviation Technology Department
- Ph.D., M.S., B.S., Industrial Engineering
- Editor, Collegiate Aviation Review
- Co-Principal Investigator, FAA Center of Excellence for General Aviation Research – PEGASAS

  (Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability)

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CRP/ACRP Report 129 Oversight Panel

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CRP STAFF FOR ACRP REPORT 129

- Christopher W. Jenks, *Director, Cooperative Research Programs*
- Michael R. Salamone, *ACRP Manager*
- Joseph D. Navarrete, *Senior Program Officer*
- Terri Baker, *Senior Program Assistant*
- Eileen P. Delaney, *Director of Publications*
- Margaret B. Hagood, *Editor*

ACRP PROJECT 03-27 PANEL

- Field of Policy and Planning
- Jack E. Thompson, Jr., *C&S Companies, Orlando, FL* (Chair)
- Kerry L. Ahearn, *Boulder City Airport, Boulder City, NV*
- John J. Barker, *City of Lee's Summit Missouri, Lee's Summit, MO*
- Peter D. Buchen, *Minnesota DOT, Roseville, MN*
- Richard Lanman, *Auburn-Lewiston Airport, Auburn, ME*
- Kay A. Thede, *Clapsaddle-Garber Associates, Inc., Ames, IA*
- Tommy Dupree, *FAA Liaison*
- Richard A. Cunard, *TRB Liaison*

ACRP Report 129: Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports

- Provides a thorough review of techniques and technologies for estimating aircraft operations at airports without air traffic control towers.
- Evaluates the accuracy of three estimating methods and four counting technologies.
- Documents the industry's first comprehensive evaluation of the most common traffic estimation methods
- Valuable to practitioners seeking to develop a statistically defensible estimate of aircraft activity for their non-towered airport.

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Research Problem

- Annual aircraft operations estimates are used in
  - aviation system planning,
  - airport master planning,
  - environmental studies,
  - aviation forecasts, etc.
- At airports with air traffic control towers (ATCT), aircraft operations are tracked and recorded.
- Most airports in the U.S. do not have ATCT.
- The objective of this research was to identify, test, and evaluate methods for obtaining aircraft operations counts at non-towered airports.

Research Approach

1. Multiplying the number of based aircraft by an estimated number of operations per based aircraft (OPBA)
2. Applying a ratio of FAA instrument flight plans to total operations (IFPTO)
3. Expanding a sample count into an annual estimate through statistical extrapolation.
    - Automated acoustical counter,
    - Sound-level meter,
    - Security/trail cameras, and
    - Video image detection with a transponder receiver.

Research Approach

The estimating methods were tested using a small, towered airport dataset

- non-hub, non-primary public-use airports
- FAA visual flight rules (VFR) towers (inc. contract)
- less than approximately 730 air carrier operations per year

Since valid operations data does not exist for non-towered airports, these small, towered airports were used as a proxy for the comparison.

Note: OPSNET was used for historic operations; TAF for historic based aircraft

OPBA

Is there a consistent OPBA that occurs at small, towered airports that can then be applied to non-towered airports?

What about climate, population, and flight schools?

NOAA Climate region	OPBA range Low	OPBA range High	OPBA mean
Alaska	NA	NA	157.40
Central	201.75	1,015.54	429.54
E. N. Central	177.42	798.85	473.92
Hawaii	NA	NA	4,771.68
Northeast	225.91	828.52	432.95
Northwest	219.87	779.38	382.95
South	132.17	2,481.89	597.89
Southeast	190.89	2,491.54	561.74
Southwest	192.52	819.86	487.23
West	139.69	875.89	370.13
W.N. Central	NA	NA	NA
Overall	132.17	4,471.68	501.68

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IFPTO

Are there consistent IFPTO ratios that occur at small, towered airports, and do they vary by climate?

Region	IFR/Total GA OPS Mean	IFPTO Range (Low)	IFPTO Range (High)
Central	0.1842	0.0134	0.4442
East North Central	0.1232	0.0572	0.3469
Northeast	0.1195	0.0400	0.3234
Northwest	0.0735	0.0174	0.1524
South	0.1306	0.0057	0.5495
Southeast	0.1656	0.0034	0.3759
Southwest	0.0818	0.0102	0.2007
West	0.0498	0.0057	0.1785
Overall	0.1298	0.0034	0.5495

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Extrapolation from Sample Counts

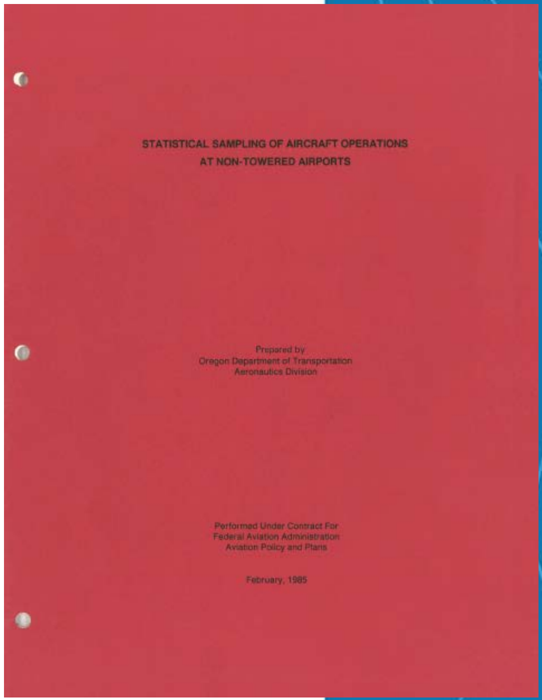
Sample can be extrapolated by

- statistical extrapolation process of your own airport, or
- by use of seasonal/monthly adjustment factors developed from small, towered airports.

  assumes variations in traffic at small, towered airports are representative of non-towered airports.

Therefore research team recommends using the statistical extrapolation process and performing sample counts for two weeks each season.

This removes the need for additional data and the influences of outside forces on the extrapolation process.


STATISTICAL SAMPLING OF AIRCRAFT OPERATIONS
AT NON-TOWERED AIRPORTS

Prepared by
Oregon Department of Transportation
Aeronautics Division

Performed Under Contract For
Federal Aviation Administration
Aviation Policy and Plans

February, 1985

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How to take samples?

Aircraft Traffic Counters

Different aircraft counting technologies included

1 - automated acoustical counter (AAC).

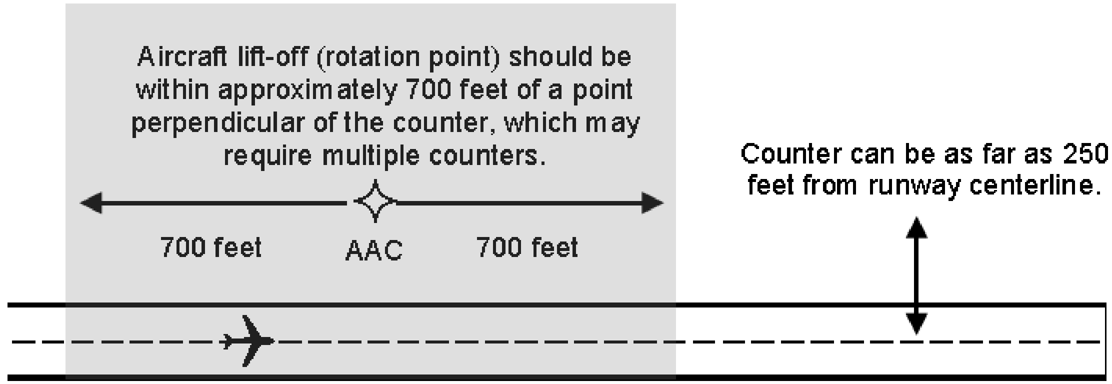
2 - sound-level meter acoustical counter (SMAC);

3 - security/trail cameras (S/TC), and

4 - video image detection with a transponder receiver (VID).

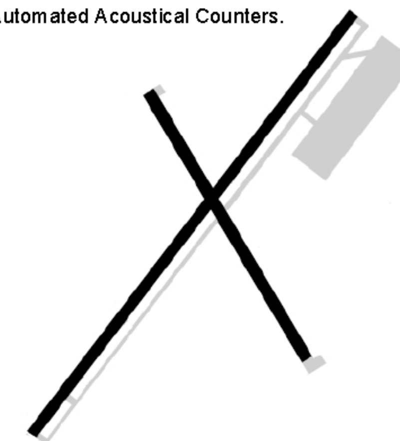
Tested at TYQ, I42, EYE, and LAF

AAC



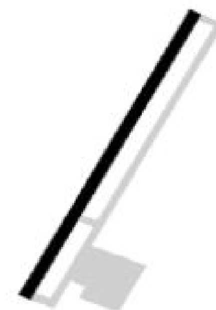
Example of configuration conducive for Automated Acoustical Counters.

Example of difficult configuration for Automated Acoustical Counters.

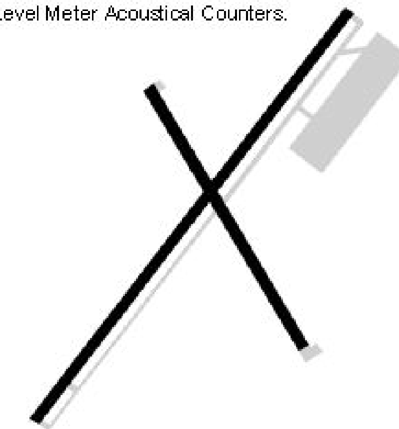


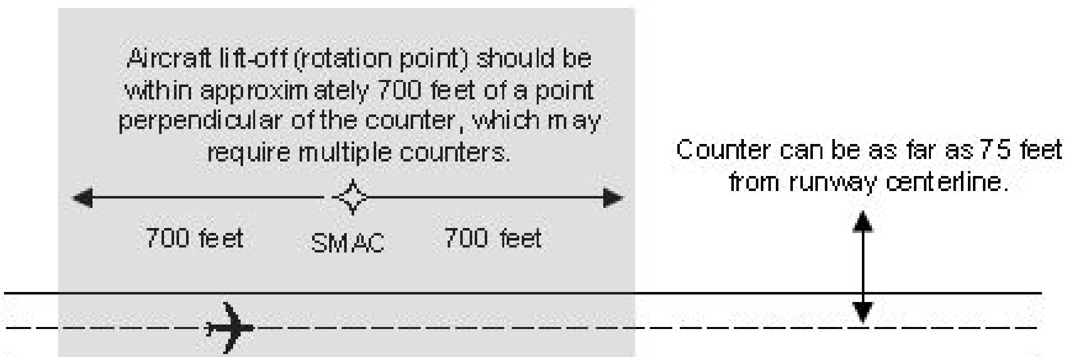
SMAC

Example of configuration conducive for Sound-Level Meter Acoustical Counters.



Example of difficult configuration for Sound-Level Meter Acoustical Counters.





VID (w/ ADS-B)

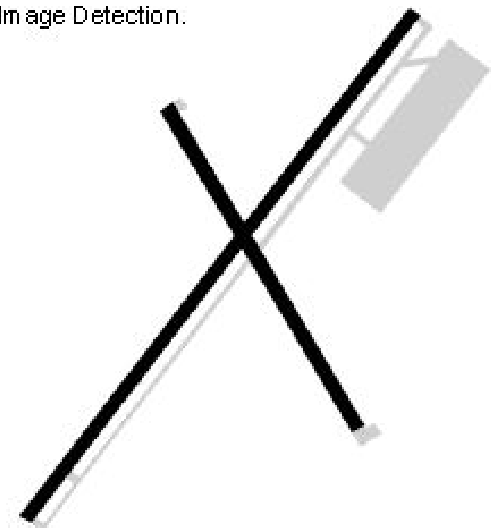



Video Image Detection and ADS-B Transponder Receiver Highlights

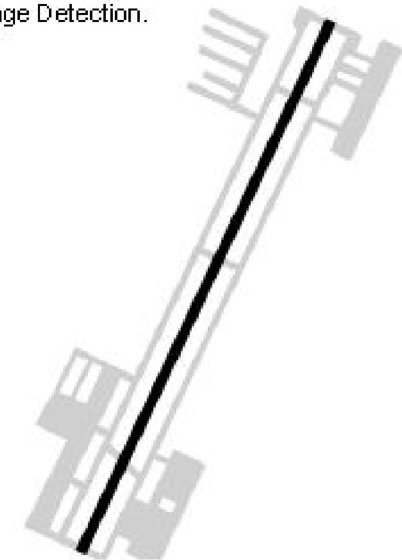
Best used at airports with centralized terminal and hangar area with limited access points and little touch-and-go activity.

- Accuracy levels as high as 90% were achieved for recording aircraft entering or exiting the runway environment.
- Unable to count touch-and-goes.
- ADS-B transponder receiver option adds little to no value considering the low equipage rate of the U.S. general aviation fleet with ADS-B out.
- Most expensive option.
- Least labor intensive option.
- Requires service contract.
- Can also be used for automated billing of landing fees.

Example of configuration conducive for Video Image Detection.



Example of difficult configuration for Video Image Detection.



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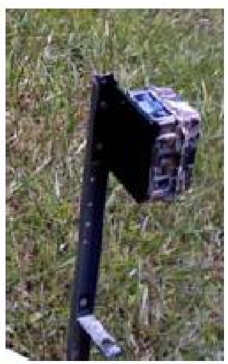
S/TC



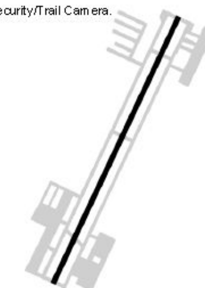
Security/Trail Camera Highlights

Best used at airports with centralized terminal and hangar area with limited access points and little touch-and-go activity.

- Accuracy levels approaching 100% can be achieved for recording aircraft entering or exiting the runway environment.
- Unable to count touch-and-goes.
- Exceptionally slow moving aircraft may be missed.
- As ambient temperature approaches temperature of target aircraft, target may be missed.
- Labor intensive because manual tally of images is required.
- Information on aircraft type, make, and model can be obtained from aircraft registration number.
- Low cost for airports with simple airfield configurations.
- Can also be used for detecting wildlife.

Example of configuration conducive for Security/Trail Camera.

Example of difficult configuration for Security/Trail Camera.



Prepared by: Woolpert, Inc.

Not all images are planes

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Wildlife and planes don't mix

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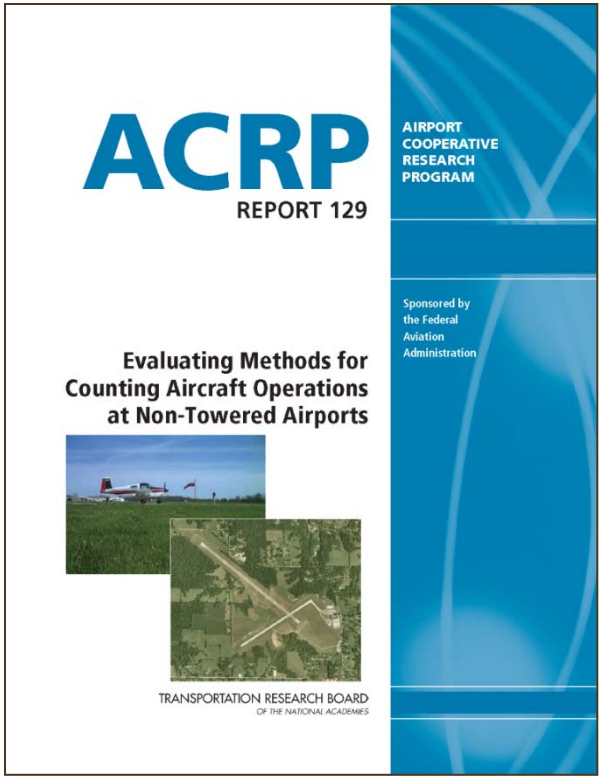
Table 3-9 Counting Equipment Evaluation Matrix

COUNTER	Automated Acoustical	Sound-Level Meter Acoustical	Security/Trail Camera	Video Image Detection (VID) Service Provider	VID Supplemental ADS-B Transponder Receiver Service Provider
Cost	Approximately $4,800 each at time of test.	Approximately $4,800 each at time of test.	Approximately $1,000 each at time of test.	Approximately $31,000 for lease of two cameras and data analysis service for 7 months at time of test.	Approximately $5,000 for lease and data analysis for 7 months at time of test.
Best Accuracy Obtained During Case Studies	Multiple counters needed for longer runways; 92% using 3 counters on single 5,500 ft. runway.	Multiple counters needed for longer runways; 94% using 1 counter on single 2,800 ft. runway.	100% for taxis to and from runway at airport with simple configuration and centralized terminal area. All touch-and-goes missed. Error rate dependent on number of touch-and-goes at airport.	90% for taxis to and from the runway. All touch-and-goes missed. Error rate dependent on number of touch-and-goes at airport.	0% during testing. Unit failed during study. When working, it only identified 5 aircraft that were not already identified by the VID.

Summary

- Research team recommends taking sample counts
- Two weeks per season
- Extrapolating via FAA-APO-85-7 (Appendix C of Report 129)
- Sampling technology is dependent on airport configuration, accuracy desired, and your budget.

For additional information:



ACRP Report 129: Evaluating Methods for Counting Aircraft Operations at Non-Towered Airports

http://www.trb.org/Main/Blurbs/172335.aspx

Maria Muia

- maria.muia@woolpert.com