

Performing Successful Airport Approach Surveys



Presented by:
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Performing Successful Airport Approach Surveys

- **AC 150/5300-16A – Geodetic Control**
 - Updated: September 15, 2007
- **AC 150/5300-17B – Aerial Imagery**
 - Updated: September 29, 2008
- **AC 150/5300-18B – Field Data & GIS Standards**
 - Updated: May 8, 2008

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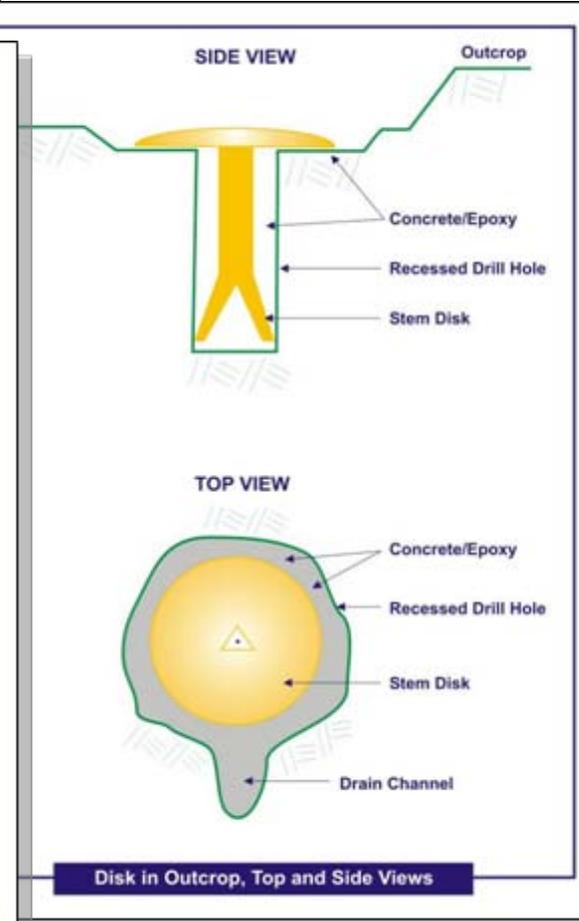
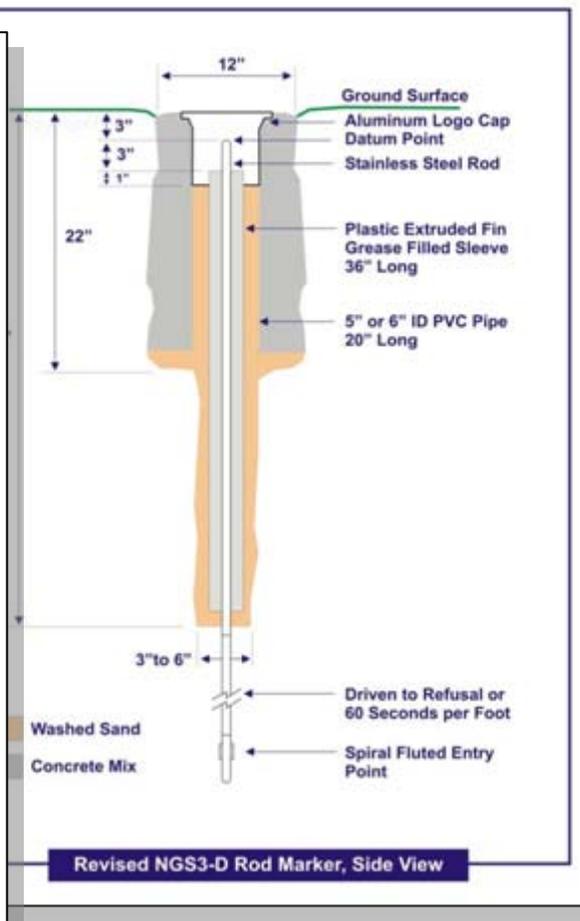
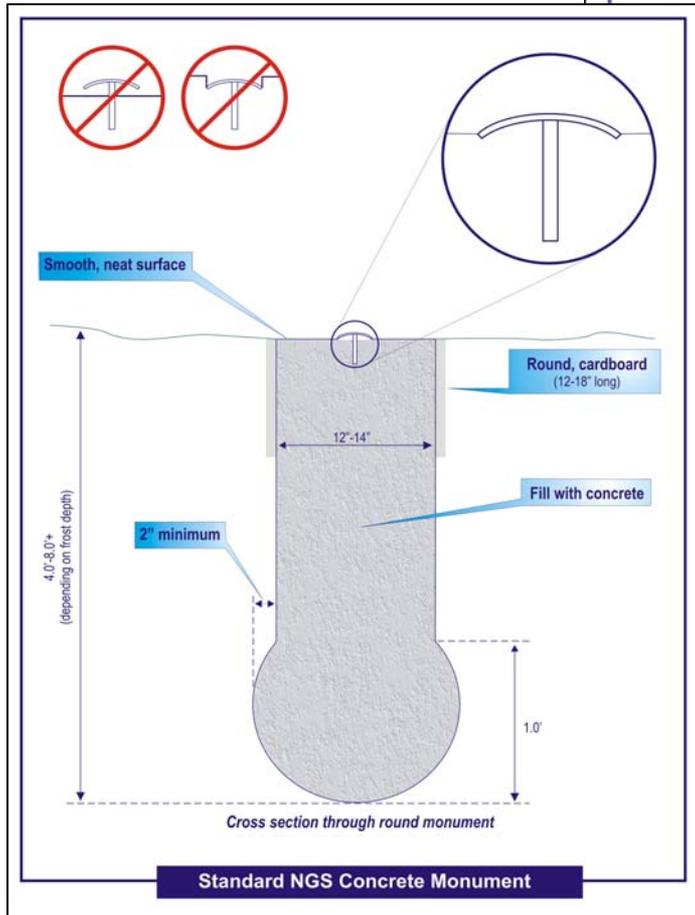
- **Defines the establishment process and requirements for geodetic control at airports**
 - Primary Airport Control Station (PACS)
 - Secondary Airport Control Stations (SACS)
- **Outlines planning, installation, processing and submission of data to the NGS for approval and inclusion to the NSRS**



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- **PACS – PRIMARY AIRPORT CONTROL STATION**
 - STABILITY A or B
 - HORIZONTAL ACCURACY – 1:1,000,000
 - VERTICAL ACCURACY – GPS DERIVED (CM)
- **SACS – SECONDARY AIRPORT CONTROL STATION**
 - STABILITY C or BETTER
 - HORIZONTAL ACCURACY – 1:100,000
 - VERTICAL ACCURACY – GPS DERIVED (CM)

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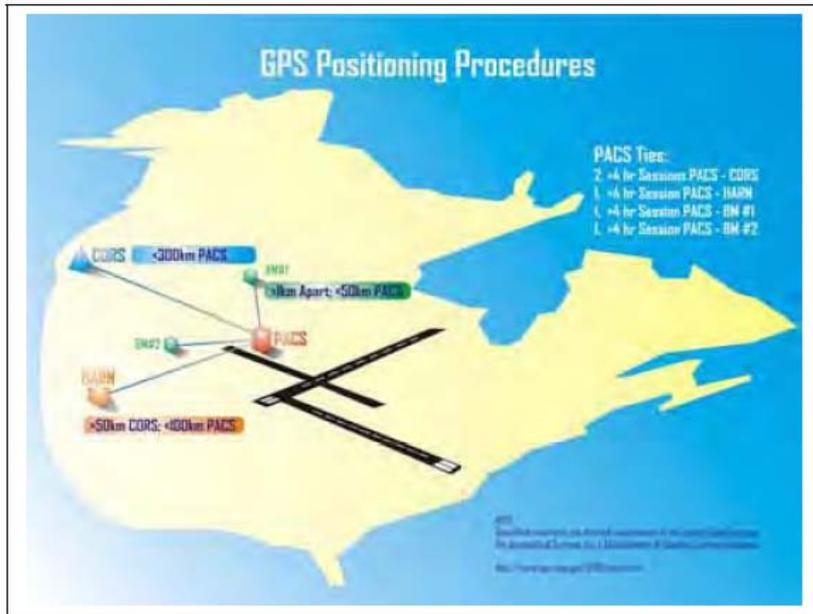


Figure 8.31a.
GPS Positioning of the PACS using CORS and HARN stations



Figure 8.32.
SACS are tied to a single PACS at the airport.

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Observation Day -			2		
# of Receivers used -			4		
CORS Tie -			PO32		
Observers -			DJK and DW		
PACS - FAA SAA A					
	Day 1	Session 1	1688	8:00-13:30	(5 .5 hr)
	Day 2	Session 2	1688	14:00-19:30	(5 .5 hr)
SACS #1 - FAA SAA B					
	Day 1	Session 1-a	2145	8:00 - 10:30	(2.5 hr)
	Day 2	Session 2-a	2145	14:00 - 16:30	(2.5 hr)
SACS #2 - SAA C					
	Day 1	Session 1-b	2145	11:00 - 13:30	(2.5 hr)
	Day 2	Session 2-b	2145	17:00 - 19:30	(2.5 hr)
BM #1 - X 75					
	Day 1	Session 1	2147	8:00 - 13:30	(5 .5 hr)
BM #2 - S 74					
	Day 2	Session 2	7751	8:00 - 13:30	(5 .5 hr)
HARN - DAYS					
	Day 1	Session 1	7751	14:00-19:30	(5 .5 hr)
<p>Remarks:</p> <p>Session duration is fixed, start and end times are approximate depending on travel times, date of survey, satellite status, weather conditions, airport logistics ect.</p> <p>Detail station information is listed in the Station Table.</p>					

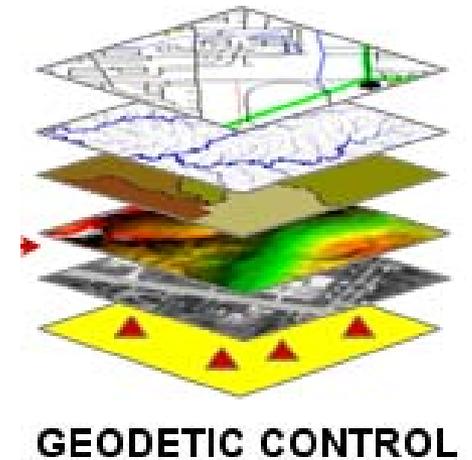
Performing Successful Airport Approach Surveys

- **Benefits of PACS and SACS**
 - Provide the Geodetic Framework
 - Monuments are stable
 - NGS review – Published in the NSRS
 - NGS will maintain the data
 - Included in any national re-adjustment



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- **Benefits of PACS and SACS**
 - Provide the Geodetic Framework



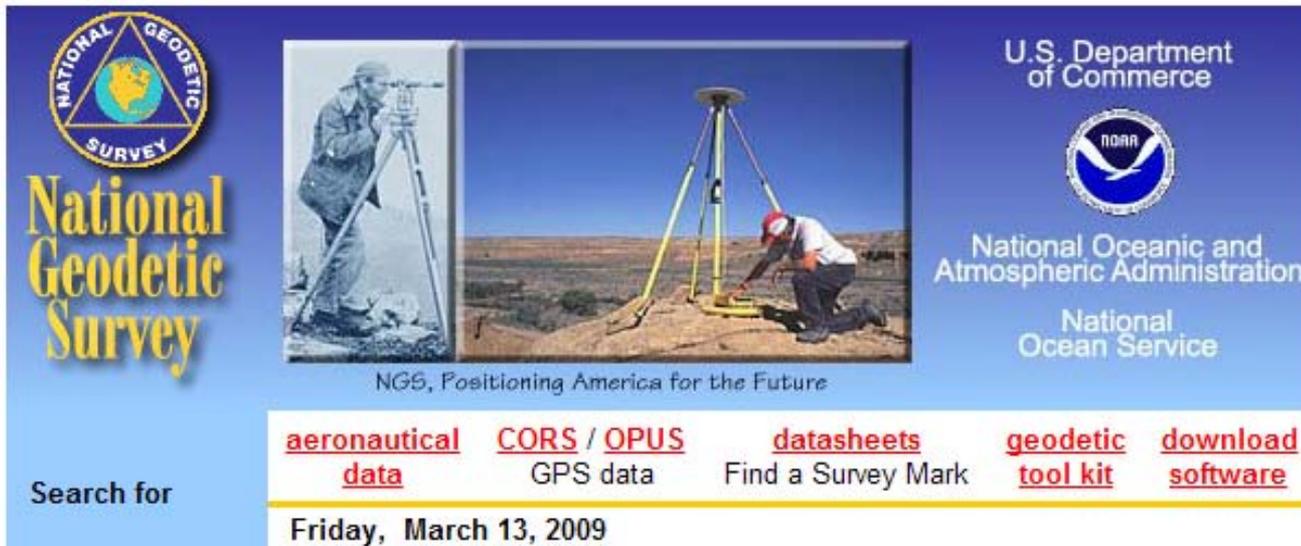
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- **Benefits of PACS and SACS**
 - Monuments are stable

SOURCE	FROM	TO	(+/- 3CM) DIST	(+/- 4CM) ELLIP. DIFF.
NSRS	HUT A	HUT B	1215.681	0.910
WOOLPERT	HUT A	HUT B	1215.679	0.906
DIFFERENCE			0.002	0.004
NSRS	HUT A	HUT C	885.130	-1.759
WOOLPERT	HUT A	HUT C	885.126	-1.754
DIFFERENCE			0.005	-0.005
NSRS	HUT A	Y 295	2579.197	2.833
WOOLPERT	HUT A	Y 295	2579.202	2.841
DIFFERENCE			-0.005	-0.008
ORTHOMETRIC HEIGHT			(+/- 5CM)	
DESIGNATION	NSRS	WOOLPERT	DIFF	
HUT A	463.280	463.280	0.000	
HUT B	464.180	464.178	0.002	
HUT C	461.530	461.531	-0.001	
Y 295	466.092	466.095	-0.003	
B 367	484.143	484.200	-0.057	

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- **Benefits of PACS and SACS**
 - NGS review – Published in the NSRS
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The banner features the National Geodetic Survey logo on the left, which includes a globe and the text 'NATIONAL GEODETIC SURVEY' and 'National Geodetic Survey'. In the center, there are two photographs: one of a surveyor using a theodolite on a tripod, and another of a surveyor using a GPS receiver on a tripod. Below the photos is the text 'NGS, Positioning America for the Future'. On the right, it says 'U.S. Department of Commerce' and 'National Oceanic and Atmospheric Administration National Ocean Service'. At the bottom, there are several links: 'aeronautical data', 'CORS / OPUS GPS data', 'datasheets Find a Survey Mark', 'geodetic tool kit', and 'download software'. The text 'Search for' is on the left, and 'Friday, March 13, 2009' is at the bottom.

Search for

[aeronautical data](#) [CORS / OPUS](#) GPS data [datasheets](#) Find a Survey Mark [geodetic tool kit](#) [download software](#)

Friday, March 13, 2009

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- FINAL RESULTS**

Station List for Airport = SEA

SY2462	WA	033	EM 18 K CO 1972	...
SY2439	WA	033	EM 44 K CO 1973	...
SY2465	WA	033	EM 8 K CO 1972	...
SY2464	WA	033	EM 9 K CO 1972	...
SY0605	WA	033	J 408	...
SY0604	WA	033	K 408	...
SY2392	WA	033	RADAR	PAC
AA5124	WA	033	SEA E	SAC
AA5125	WA	033	SEA F	SAC

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```

DATABASE = ,PROGRAM = datasheet, VERSION = 7.65
1 National Geodetic Survey, Retrieval Date = MARCH 8, 2009
SY2392 *****
SY2392 PACS - This is a Primary Airport Control Station.
SY2392 DESIGNATION - RADAR
SY2392 PID - SY2392
SY2392 STATE/COUNTY- WA/KING
SY2392 USGS QUAD - DES MOINES (1995)
SY2392
SY2392 *CURRENT SURVEY CONTROL
SY2392
SY2392* NAD 83(2007)- 47 27 06.57110(N) 122 18 52.57267(W) ADJUSTED
SY2392* NAVD 88 - 124.98 (meters) 410.0 (feet) GPS OBS
SY2392
SY2392 EPOCH DATE - 2007.00
SY2392 X - -2,309,805.772 (meters) COMP
SY2392 Y - -3,651,690.421 (meters) COMP
SY2392 Z - 4,675,952.767 (meters) COMP
SY2392 LAPLACE CORR- -1.11 (seconds) DEFLEC99
SY2392 ELLIP HEIGHT- 102.060 (meters) (02/10/07) ADJUSTED
SY2392 GEOID HEIGHT- -22.93 (meters) GEOID03
SY2392
  
```

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Example of Survey tied to PACS and SACS

```
|SEA |26395.A |ANM |1.07| |
|SEATTLE-TACOMA INTERNATIONAL AIRPORT |0712008|
|SEATTLE |WASHINGTON |
|NAD83 |5 CM |15 CM |NAVD88 |25 CM |
|-17.2|0712008|
| 432.5| |16L+59 |1472005|
| 665.0| |0712008|
| 472659.6|-1221842.4|
@
|16C |P|1472005| | | |
|N|1472005|
| 472749.7126|-1221839.5460|1802025| 9426|150|1472005|
| 429.6| |1472005|
|
| 0| 429.6| |1472005|
| 1552| 423.9| |1472005|
| 2604| 417.6| |1472005|
| 9426| 363.0| |1472005|
#
|34C |P|1472005| | | |
|N|1472005|
| 472616.6913|-1221840.3601| 2024| 9426|150|1472005|
| 387.1| |1472005|
|
| 0| 363.0| |1472005|
| 6822| 417.6| |1472005|
| 7873| 423.9| |1472005|
| 9426| 429.6| |1472005|
#
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@
| ASR      (SEA)                | 472704.7831|-1221921.8314| 291.9|      |      |      |0712008|
| DME      (16R_CJL/34L_BEJ) (UNC) | 472615.6196|-1221859.9395| 364.3|      |      |      |0712008|
| GS       (16R_CJL) (UNC)        | 472738.4643|-1221900.6009| 405.6|      |      |      |0712008|
| GS       (16R_CJL) (UNC) PP     | 472738.4794|-1221904.3835| 409.5|      | 260L| 1148|0712008|
| GS       (34L_BEJ) (UNC)        | 472634.9321|-1221859.9858| 358.7|      |      |      |0712008|
| GS       (34L_BEJ) (UNC) PP     | 472634.9518|-1221904.9335| 363.0|      | 340R| 915 |0712008|
| LOC      (16R_CJL) (UNC)        | 472615.9242|-1221905.0978| 343.8|      |      | 1013|0712008|
| LOC      (34L_BEJ) (UNC)        | 472759.7764|-1221904.1994| 370.9|      |      | 1010|0712008|
| TACAN    (SEA)                | 472608.5102|-1221835.9656| 353.6|      |      |      |0712008|
| VOR      (SEA)                | 472607.3443|-1221834.6226| 353.6|      |      |      |0712008|
#
| ALS      (16R)      (UNC)        |      |      |      |      |      |      |0712008|
| ALS      (34L)      (UNC)        |      |      |      |      |      |      |0712008|
| PAPI     (16R)      (UNC)        |      |      |      |      |      |      |0712008|
| PAPI     (34L)      (UNC)        |      |      |      |      |      |      |0712008|
..

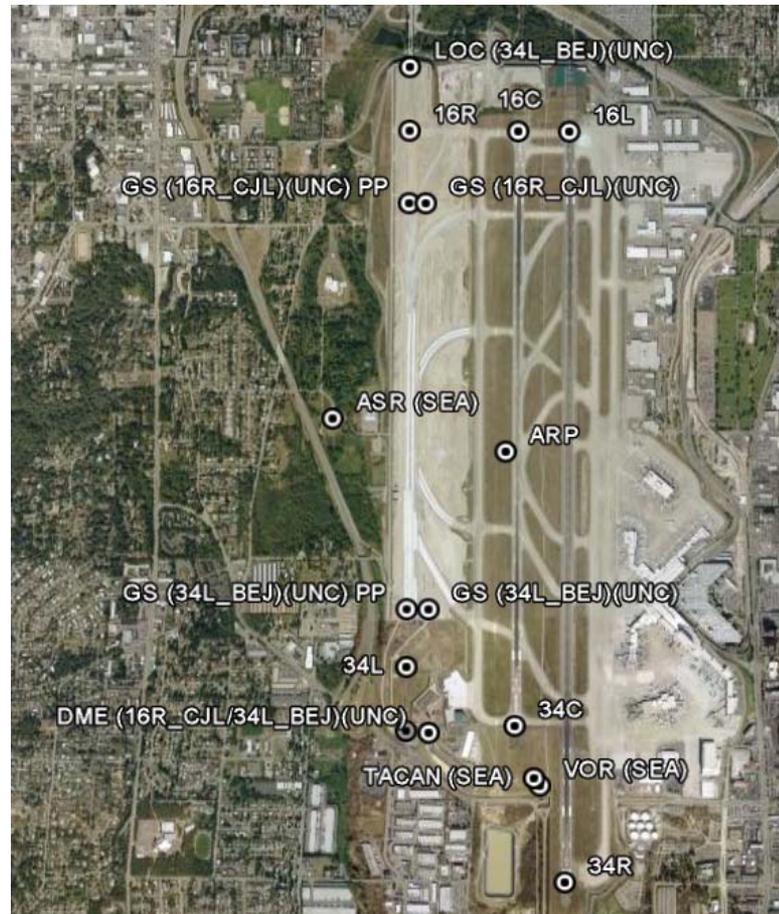
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@
|Additional Information:
|THIS DATA WAS COLLECTED IN ACCORDANCE WITH FAA NO. 405 AIRPORT OBSTRUCTION CHART SURVEY SPECIFICATIONS.
|
|THIS IS A SPECIAL SURVEY CONDUCTED AT THE REQUEST OF THE AERONAUTICAL INFORMATION SERVICES (ATO-R). SOME OF THIS DATA
|IS FROM A 2005 NGS SURVEY. SEVERAL NAVAID FACILITIES WERE UNDER CONSTRUCTION AT THE TIME OF SURVEY.
|
|NATIONAL GEODETIC SURVEY
EOF

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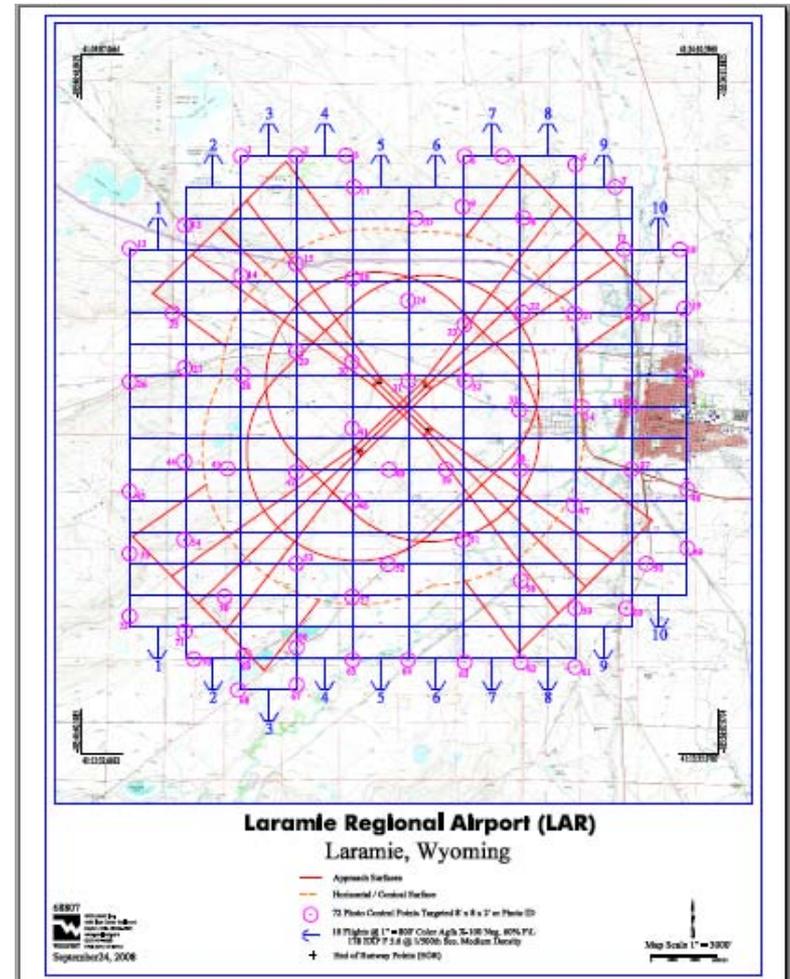
- **Conclusion**

- PACS & SACS are the key to highly accurate Airport Approach Surveys
- Compliance with AC-16A will be successful



Performing Successful Airport Approach Surveys

- **AC 150/5300-17B**
General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to NGS



Performing Successful Airport Approach Surveys

- **Standardizes the collection and delivery requirements of digital imagery to the NGS**
- **Purpose of imagery is to support the validation of airport survey and mapping projects**
 - CAT II/III Operations, Airport Charting and IAP
- **Digital imagery requirements and quality**
 - Ground Sample Distance
 - Clarity, color and brilliance
 - Sun angle and overlap



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- **Key Components of AC-17B**
 - Imagery Plan
 - Flight line Navigation and Guidance
 - Image Quality
 - Weather, Solar Angle, and Time of Year
 - Required Deliverables

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- **Principal Changes**

- Requires submission and approval of an Imagery Plan
- Requires Digital Orthoimagery
- Requires the use of the Airports GIS for submittal and project tracking

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Figure 3 provides an example directory structure.

Questions/Comments



- Kevin Hoffman,PLS
- Woolpert, Inc.
- Aeronautical Survey Project Manager