

Martin Schmitz, Gerhard Wübbena
*Geo++[®], Gesellschaft für satellitengestützte geodätische und
navigatorische Technologien mbH*
D–30827 Garbsen, Germany

April 2001

Remarks on Effects of the SCIS Radome on PCV

The phase center variation (PCV) of the Leica AT504 GPS antenna (LEIAT504) has been calibrated with the Automated Absolute Field Calibration of GPS Antennas in a Real-Time procedure at Geo++[®]. Please refer to the references for detailed information on the absolute field calibration approach.

The Automated Absolute Field Calibration characteristics are:

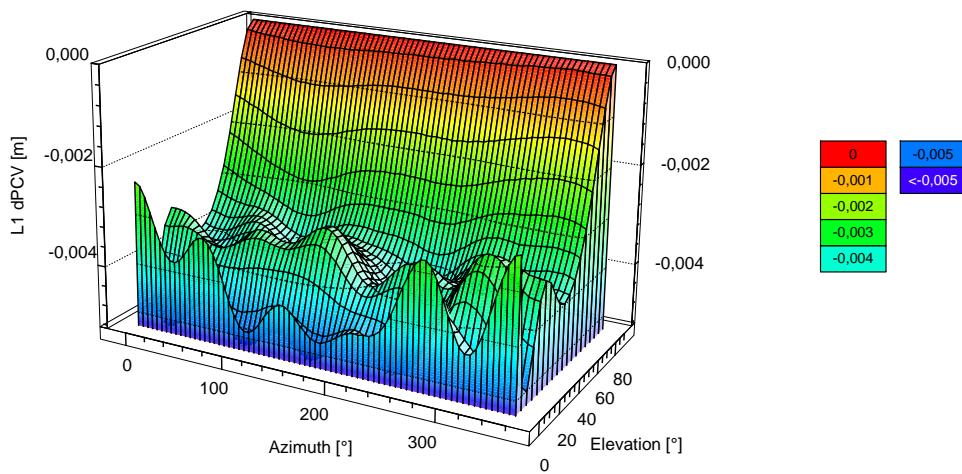
- absolute three-dimensional offsets
- absolute PCV
- PCV from 0° to 90° elevation and azimuth dependent PCV
- free of multipath effects

Several individual LEIAT504 (setup without radome) and the same antennas with the SCSI radome setup LEIAT504 SCIS have been calibrated. The PCV differences of the two antennas LEIAT504 and LEIAT504 SCIS are given in the following figures for the original L1, L2 observable and the ionospheric free linear combination L0. The differences are an example from one antenna with the different setup.

The PCV differences show a significant change in PCV, especially for the ionospheric free linear combination. Of major importance is the large change in elevation dependency at high elevations. Changes in the height components must be expected from adding a SCIS radome to any Dorne Margolin Type antenna. The effect on the coordinates can be additionally magnified by the location of the station and the so-called “Northern Hole”.

Influence_SCIS_Radome

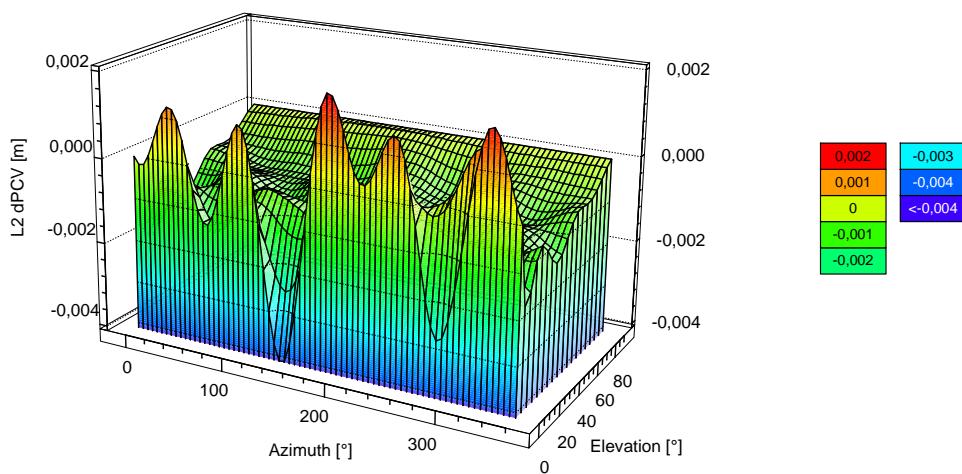
DIFF ABS PCV: LEIAT504 / LEIAT504 SCIS



(C) GeoService, 27.04.2001

Influence_SCIS_Radome

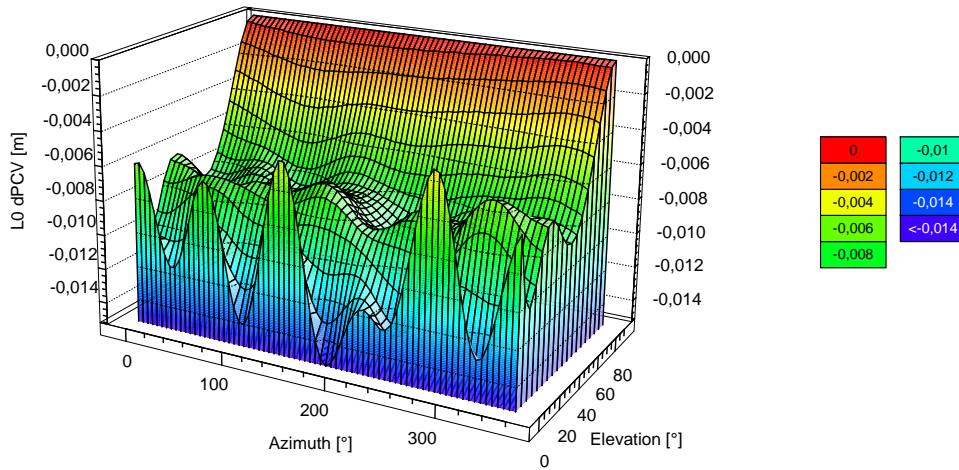
DIFF ABS PCV: LEIAT504 / LEIAT504 SCIS



(C) GeoService, 27.04.2001

Influence_SCIS_Radome

DIFF ABS PCV: LEIAT504 / LEIAT504 SCIS



(C) GeoService, 27.04.2001

References

Most of the references are available for download at <http://www.geopp.de>.

- IfE, Geo++® (2000): *AOAD/M_T Choke Ring Antenna Absolute Phase Center Variations, Results of Absolute PCV Field Calibrations at IfE and Geo++®*. Internet Publication compiled by F. Menge and M. Schmitz, world wide web (WWW): http://www.ife.uni-hannover.de/~web/AOA_DM_T.
- Menge, F., G. Seeber, C. Völksen, G. Wübbena, M. Schmitz (1998): *Results of Absolute Field Calibration of GPS Antenna PCV*. Proceedings of the 11th International Technical Meeting of the Satellite Division of the Institute of Navigation, ION GPS-98, Nashville, Tennessee, USA, September 15–18, 1998.
- Seeber, G., F. Menge, C. Völksen, G. Wübbena, M. Schmitz (1998). *Precise GPS Positioning Improvements by Reducing Antenna and Site Dependent Effects*. In: Brunner (Ed.). *Advances in Positioning and Reference Frames, IAG Symposia*, Vol. 118, Rio de Janeiro, Brasil, September 3–9, 1997, Springer Verlag.
- Wübbena, G., F. Menge, M. Schmitz, G. Seeber, C. Völksen (1996). A New Approach for Field Calibration of Absolute Antenna Phase Center Variations. Proceedings *International Technical Meeting, ION GPS-96*, Kansas City, Missouri, 1205–1214.
- Wübbena, G., M. Schmitz, F. Menge, G. Seeber, C. Völksen (1997). *A New Approach for Field Calibration of Absolute GPS Antenna Phase Center Variations*. NAVIGATION: Journal of The Institut of Navigation, Vol. 44, No. 2, Summer 1997, USA.
- Wübbena, G., M. Schmitz, F. Menge, V. Böder, G. Seeber (2000). Automated Absolute Field Calibration of GPS Antennas in Real-Time. Proceedings *International Technical Meeting, ION GPS-00*, Salt Lake City, Utah.

Acknowledgments

The actual project is funded by the German Ministry of Education, Science, Research and Technology (Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, BMBF) and Germany's National Aerospace Research Center/National Space Agency (Deutsches Zentrum für Luft- und Raumfahrt, DLR) under the grant 50NA9809.