

# DEUTSCHER KALIBRIERDIENST **DKD**

Kalibrierlaboratorium für geometrische Optik  
*Calibration laboratory for measured quantities geometric optics*

Akkreditiert durch die / *accredited by the*

Akkreditierungsstelle des DKD bei der

PHYSIKALISCH-TECHNISCHEN BUNDESANSTALT (PTB)



DKD-K-05201



Kalibrierschein  
*Calibration Certificate*

Kalibrierzeichen  
*Calibration label*

8419
DKD-K-05201
04-06

Gegenstand <i>Object</i>	Aerial Survey Camera
Hersteller <i>Manufacturer</i>	Carl Zeiss D-73446 Oberkochen
Typ <i>Type</i>	RMK TOP 30
Fabrikat/Serien-Nr. <i>Serial number</i>	143 093
Auftraggeber <i>Customer</i>	Terra Bildmessflug GmbH & Co. Schumannstr. 21 D - 71672 Marbach
Auftragsnummer <i>Order No.</i>	41 353
Anzahl der Seiten des Kalibrierscheines <i>Number of pages of the certificate</i>	4
Datum der Kalibrierung <i>Date of calibration</i>	15.06.04

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

Der DKD ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

*This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).*

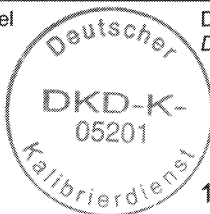
*The DKD is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.*

*The user is obliged to have the object recalibrated at appropriate intervals.*

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Akkreditierungsstelle des DKD als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.

*This calibration certificate may not be reproduced other than in full except with the permission of both the Accreditation Body of the DKD and the issuing laboratory. Calibration certificates without signature and seal are not valid.*

Stempel  
*Seal*



Datum  
*Date*

16.06.04

Leiter des Kalibrierlaboratoriums  
*Head of the calibration laboratory*

Dr. Wiedenmann

Bearbeiter  
*Person in charge*

Müller

Carl Zeiss  
Industrielle Messtechnik GmbH  
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CAMERA TYPE: RMK TOP 30 SERIAL NO. 143093  
 LENS TYPE: Topar A3 SERIAL NO. 143120  
 MAX. APERTURE: F/5.6 NOM. FOCAL LENGTH 305 MM

1) CALIBRATED FOCAL LENGTH = 305.083 MM

2) DISTORTION /0.001 MM, REFERRING TO P.P. OF SYMMETRY PPS

S/MM=	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
5	0	-1	-1	-1	0	0	2	2	2	1	0	-2	-4	-3	0	6
6	0	0	0	-1	0	0	1	1	1	1	0	0	-1	-3	-2	4
7	0	-1	-1	-1	0	0	2	2	2	2	1	-1	-3	-3	-1	2
8	0	-1	-1	-1	-1	0	1	1	1	1	0	-1	-2	-3	-2	3
AV.	0	-1	-1	-1	0	0	1	2	1	1	0	-1	-2	-3	-1	4

3) P.P. OF AUTOCOLLIMATION AND FIDUCIAL CENTRE, REFERRING TO PPS

P.P. OF AUTOCOLLIMATION PPA X= 0.039 Y= -0.008 MM  
 FIDUCIAL CENTRE FC X= 0.043 Y= -0.004 MM  
 CORNER FIDUCIAL CENTRE FCC X= 0.043 Y= -0.008 MM

4) FIDUCIAL MARKS, REFERRING TO PPS

X1= 113.034 X2=-112.963 X3= 0.043 X4= 0.042 MM  
 Y1= -0.004 Y2= -0.005 Y3= 112.988 Y4=-113.007 MM  
 DISTANCES 1-2= 225.997 3-4= 225.994 MM  
 X5= 113.042 X6=-112.961 X7=-112.956 X8= 113.035 MM  
 Y5= 112.983 Y6=-113.004 Y7= 112.994 Y8=-113.004 MM

5) PHOTOGRAPHIC RESOLVING POWER, IN CYCLES PER MM  
 (AS PER DEFINITION, R. P. IS NOT A CALIBRATED DATUM)  
 AREA WEIGHTED AVERAGE RESOLUTION 90

FIELD ANGLE /DEG = 0 7 14 24

RADIAL LINES 116 103 89 75  
 TANGENTIAL LINES 116 114 97 77

FILM: KODAK PANATOMIC X 3412 SPEED 40 AFS  
 DEVELOPED IN AGFA G 74 C AVIPHOT

6) Filter

7) Magazines

8) Measuring uncertainty

Distortion: U = 3 µm ; Point of symmetrie and collimation: U = 3 µm ; Image center: U = 5 µm ; Camera constant: U = 5 µm

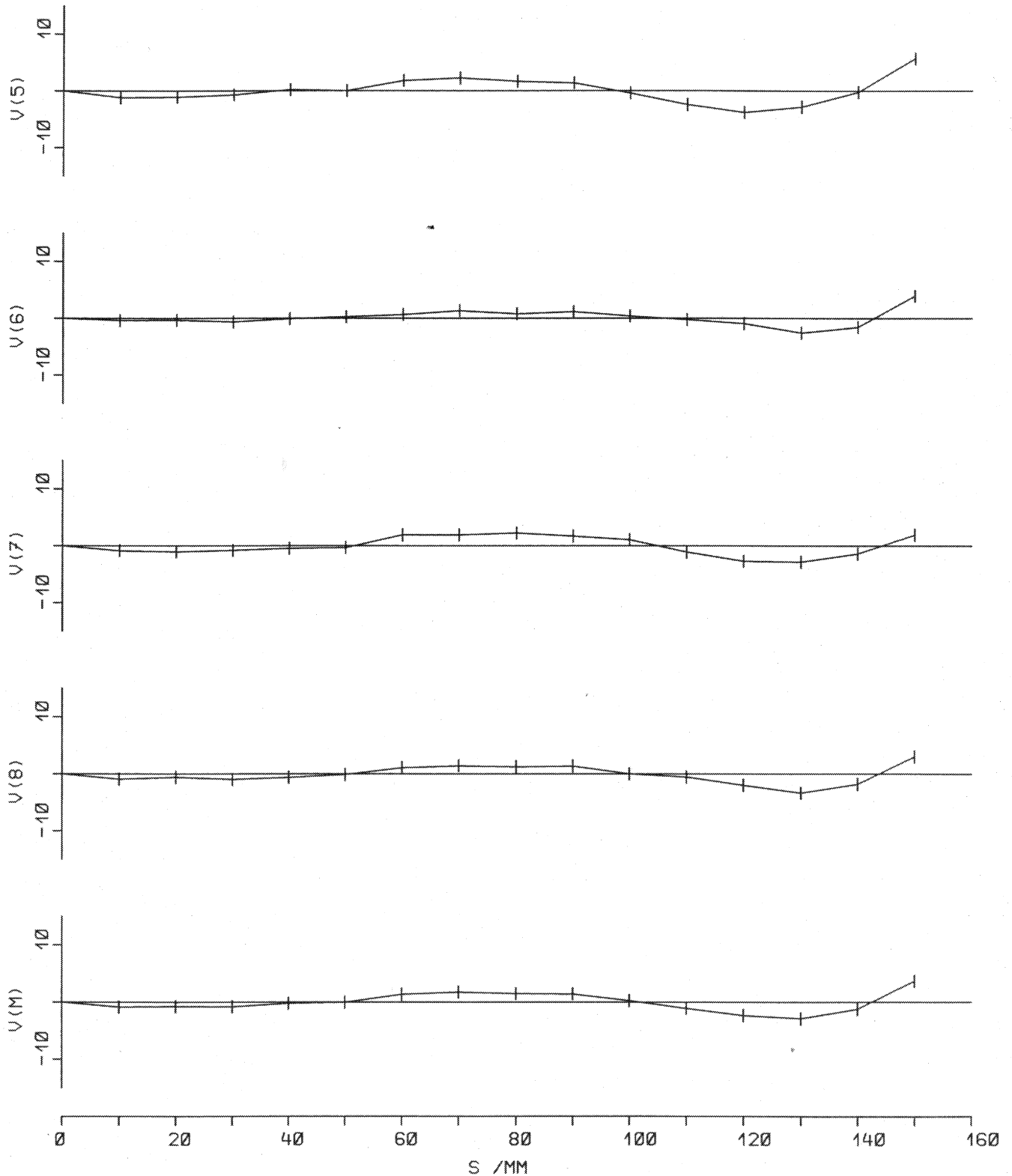
The specification indicates the upgraded measuring uncertainty resulting from the multiplication of the standard measuring uncertainty by the factor k = 2. It was determined in conformity with DKD-3. The values of the measurement parameter lie within the specified range with a probability of 95%.



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RMK TOP 30 NO. 143093  
Topar A3 5.6/305 NO. 143120  
CFL=305.083 MM

DISTORTION /0.001 MM, REFERRING TO PPS



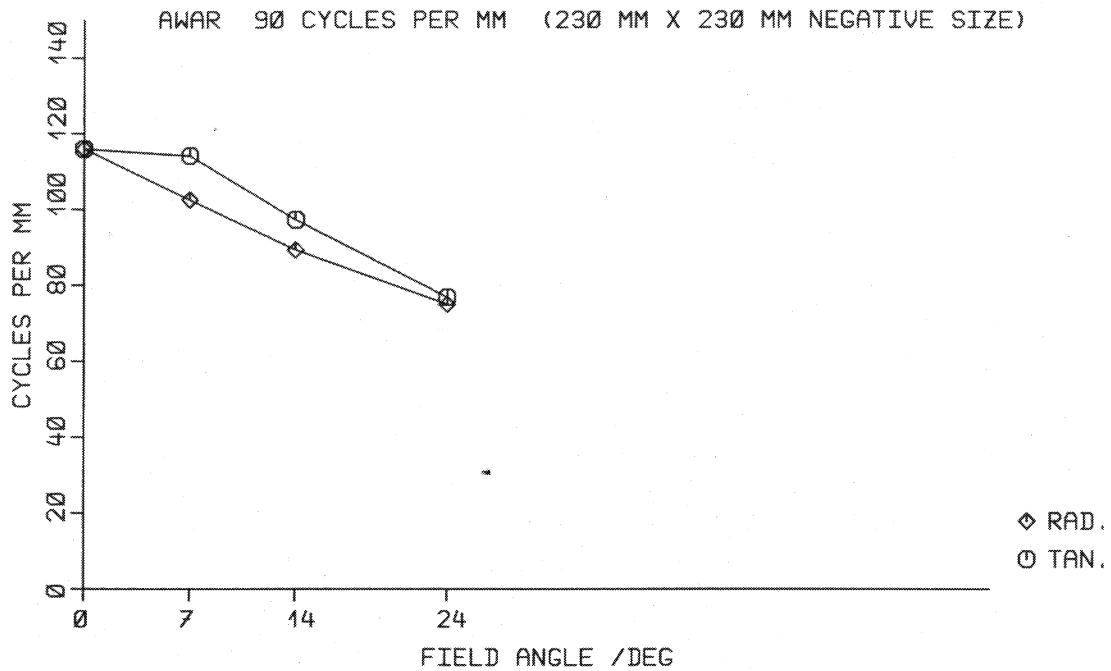


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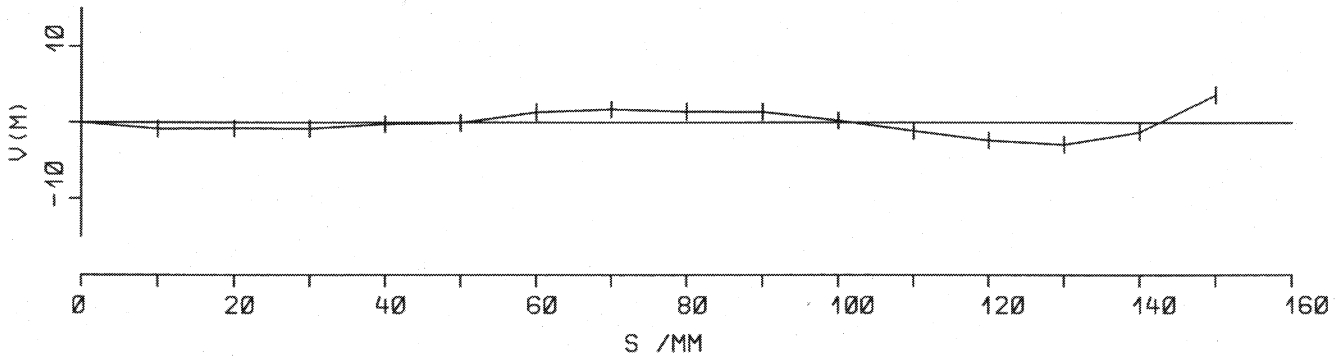
RMK TOP 30

NO. 143093

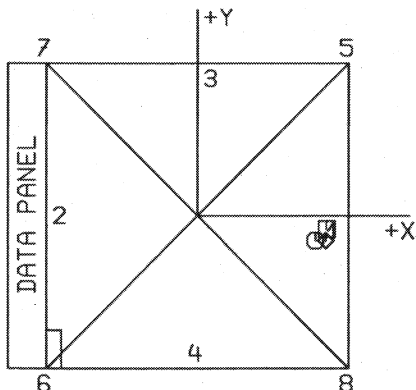
PHOTOGRAPHIC RESOLVING POWER



DEPARTURE OF AVERAGE DISTORTION FROM ZERO REFERENCE



PRINCIPAL POINT (PPA, PPS) AND FIDUCIAL CENTRE (FC)



COORDINATES, REFERRING TO PPS

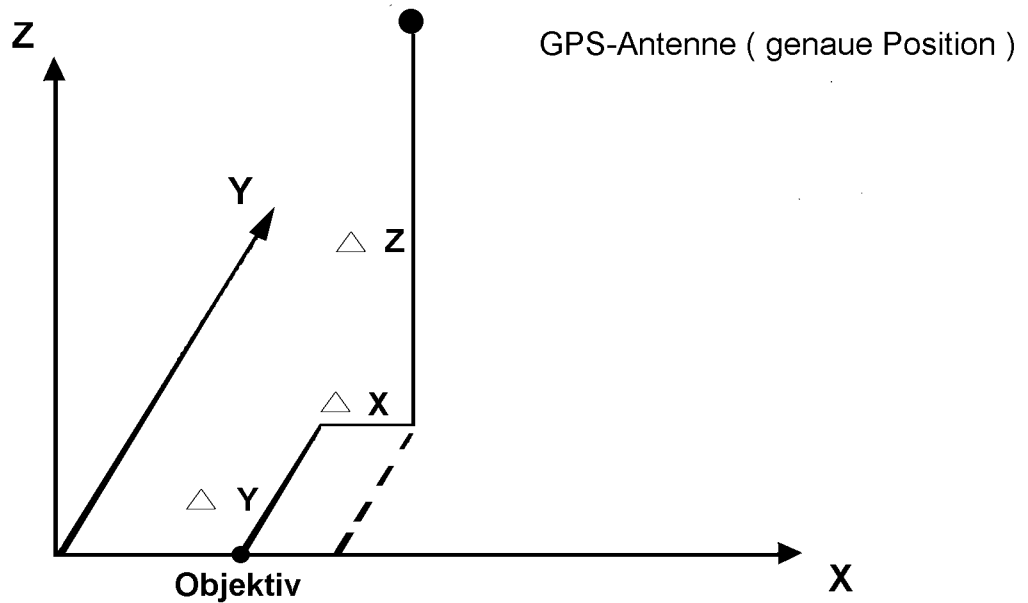
	X / MM	Y / MM
⊙ PPA	0.039	-0.008
□ FC	0.043	-0.004
◇ FCC	0.043	-0.008
(CORNER FIDUCIAL CENTRE)		

┆ 0.01 MM, X-AXIS AS DEFINED BY FIDUCIAL MARK COORDINATES

$\alpha(6) = 0.0^0$        $\alpha(8) = \alpha(6) + 90^0$

# TOP 30

Flugzeug D-IGPS  
Cessna 303



## Koodinatendifferenzen:

- $\triangle X = X \text{ GPS} - X \text{ Objektiv} = +0.186 \text{ m}$
- $\triangle Y = Y \text{ GPS} - Y \text{ Objektiv} = +0.397 \text{ m}$
- $\triangle Z = Z \text{ GPS} - Z \text{ Objektiv} = +1.283 \text{ m}$