Factory Calibration Report

Trimble Harrier 68

Serial Number : H68_035

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Calibration Version: 003
Date: 2016-12-22

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2 Disclaimer

This document is supplied “as it is” without express, implied, or limited warranty of any kind by Trimble. In no event shall Trimble be liable for any loss or damage caused by information obtained from this report. The results present in this report are only applied for specific conditions. The reader must therefore be sure that the application at hand is exactly similar to the assumptions made herein to be able to use the results presented in this report. If the user's application(s) is different from those presented in this report, it is recommended to consult Trimble.

3 LiDAR System

Lever Arms from IMU to LIDAR:

```
X = -0.056 m
Y = -0.025 m
Z = +0.153 m
```

Boresight Calibration:

```
droll  = -0.01827 °
dpitch = +0.04846 °
dhead  = -0.02837 °
```

Based on the GPS reference data and the IMU the calibration strip adjustment result is:

```
0.0231 m (RMS)
```

4 Digital Camera (1) TAC AICpro P65

4.1 Camera SN 201209182

Camera (Sensor) Orientation = 0°

4.2 Lens SN 12087861 [CAMERA_1]

Type RGB

```
INC          = 0.0060 mm
XPIX         = 8984 pix
YPIX         = 6732 pix
```

Lever Arms from IMU to Camera:

```
XLEVER = +0.160 m
YLEVER = +0.000 m
ZLEVER = +0.243 m
```

Camera Calibration:

See Inpho Camera Calibration report

Boresight Calibration Camera:

```
ROLL  = +0.2941 °
PITCH = +0.0098 °
HEAD  = +0.2353 °
```

Radial Symmetric Lens Distortion:

See Inpho Camera Calibration report

According to ISPRS regulations:

$dR = A1 * R * (R^2-R0^2) + A2 * R * (R^4-R0^4)$

Radial Symmetric Distortion Table (1 page each)
Radial Symmetric Distortion Diagram (1 page each)

4.3 Lens SN 12103600 [CAMERA_2]

Type RGB

```
INC          = 0.0060 mm
XPIX         = 8984 pix
YPIX         = 6732 pix
```

Lever Arms from IMU to Camera:

```
XLEVER = +0.160 m
YLEVER = +0.000 m
ZLEVER = +0.243 m
```

Camera Calibration:

```
See Inpho Camera Calibration report
```

Boresight Calibration Camera:

```
ROLL  = +0.2406 °
PITCH = +0.2066 °
HEAD  = +0.1727 °
```

Radial Symmetric Lens Distortion:

```
See Inpho Camera Calibration report
```

According to ISPRS regulations:

$dR = A1 * R * (R^2-R0^2) + A2 * R * (R^4-R0^4)$

Radial Symmetric Distortion Table (1 page each)
Radial Symmetric Distortion Diagram (1 page each)

5 Center of Gravity and lever arms

Camera Orientation

Z	0 deg

IMU Orientation with Respect to Harrier Coordinate System

X	0 deg
Y	0 deg
Z	180 deg

Lever Arms from Origin to LiDAR Perspective Center

Lx	-0.056 m
Ly	-0.025 m
Lz	+0.153 m

Lever Arms from Origin to Camera Perspective Center

Cx	+0.160 m
Cy	+0.000 m
Cz	+0.243 m

Lever Arms from Origin to Housing Reference Corner

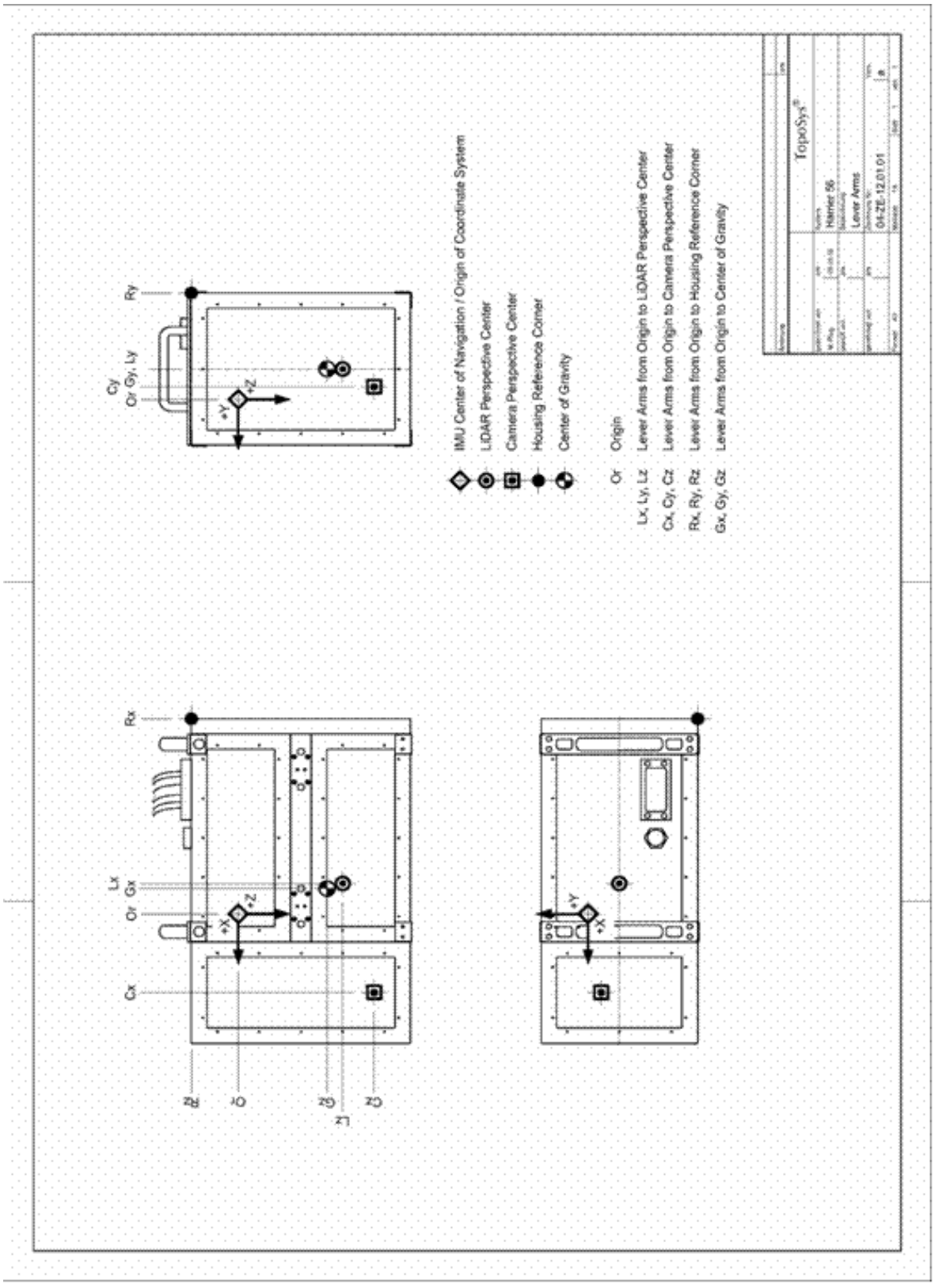
Rx	-0.380 m
Ry	-0.175 m
Rz	-0.128 m

Lever Arms from Origin to Center of Gravity

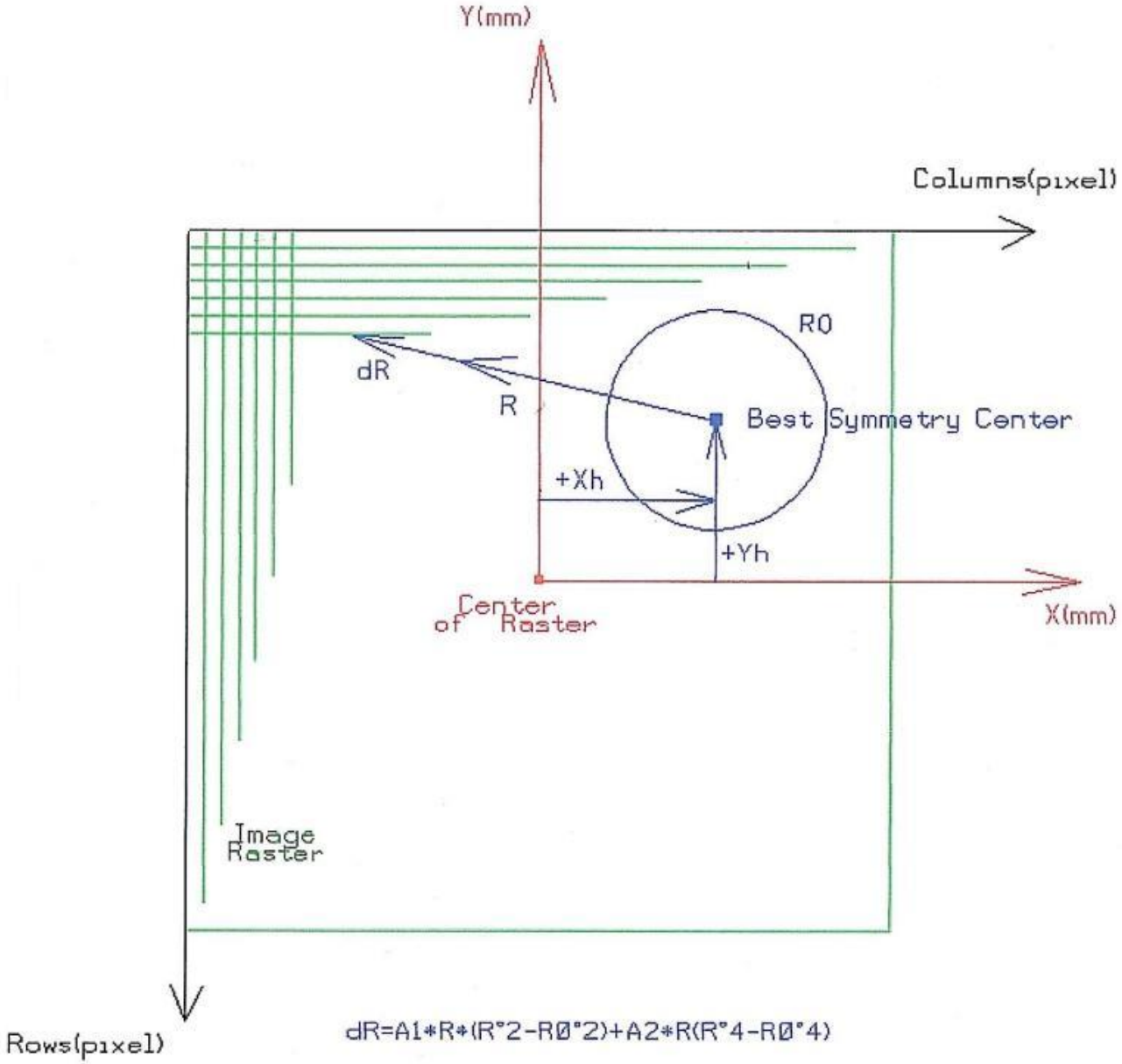
Gx	-0.050 m
Gy	-0.025 m
Gz	-0.160 m

Distance from Housing Reference Corner to Center of Gravity

X	+0.330 m
Y	+0.150 m
Z	+0.278 m


Ry
Cy
Or Gy, Ly
+Y
+Z
IMU Center of Navigation / Origin of Coordinate System
LiDAR Perspective Center
Camera Perspective Center
Housing Reference Corner
Center of Gravity
Or Origin
Lx, Ly, Lz Lever Arms from Origin to LiDAR Perspective Center
Cx, Cy, Cz Lever Arms from Origin to Camera Perspective Center
Rx, Ry, Rz Lever Arms from Origin to Housing Reference Corner
Gx, Gy, Gz Lever Arms from Origin to Center of Gravity
TopoSys®
Hämmer 56
Lever Arms
04-ZE-12.01.01
Rx
Lx
Gx
Or
Cx
+X
+Z
RZ
Or
GZ
LZ
CZ
+Y
+X

Definition Camera Coordinate System:



Calibration flight passed	☐	Customer
LIDAR-System calibrated	☐	Cheryl Buckley
RGB Camera + Lens calibrated	☐	Mark Abbott
Ini File checked	☐	Cheryl Buckley

Calibration finished:  Date: 22.12.2016

Calibration checked: Stilla Dunkel Date:22.12.2016