Magcam MiniCube3D three-axis magnetic field camera


MiniCube3D magnetic field camera

Magcam presents the three-axis ('3D') magnetic field camera 'MiniCube3D', providing quantitative 3D (Bx,By,Bz) magnetic field maps in a 12.7mm x 12.7mm 2D plane with 0.1mm spatial resolution, measured at highest speed. The camera is based on Magcam's unique integrated 2D Hall sensor array technology.

Features:
- Quantitative digital 3-axis magnetic field mapping (Bx, By, Bz)
- On-chip integrated 2D array of Hall sensors
- Number of measurement points: 128 x 128 = 16 384
- High spatial resolution: 0.1 x 0.1 mm²
- Field of view: 12.7 x 12.7 mm²
- Magnetic field range (Bx,By,Bz): +/- 1000 mTesla
- Magnetic field resolution (Bx,By,Bz): 0.1mT
- Magnetic field accuracy: (Bx,By,Bz)
    - 0.5mT in 0-100mT range
    - 0.5% in 100-500mT range
    - 1% in 500mT-1T range
- Single measurement for full magnet analysis
- High speed measurements: <1 second per image (=16384 pixels)
- No moving sensor parts
- Compact size: 24 x 24 x 24 mm³
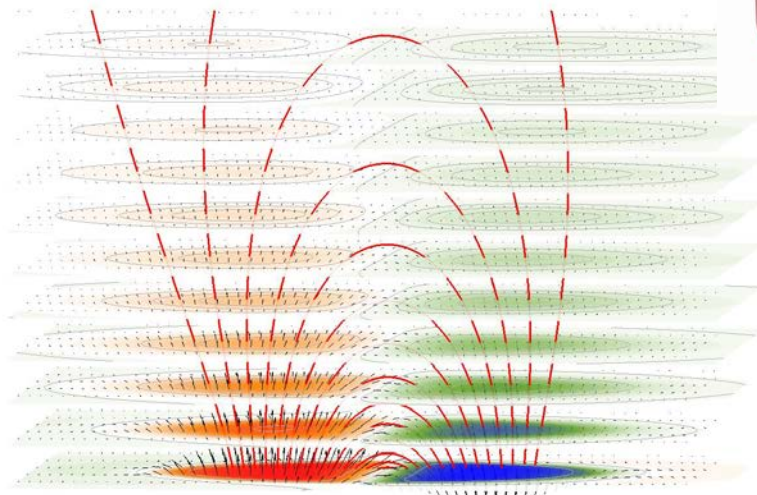
Combined vector / color / contour / fieldline plot of the measured full 3-component magnetic field distribution (measured at multiple distances from the magnet, requires Magcam 3-Axis Scanner)


Important note

In order to obtain correct measurement results with the MiniCube3D magnetic field camera, the following boundary conditions need to be fulfilled during the measurement: the recorded magnetic field distribution has to contain the full magnetic field of the measured magnet or magnet assembly. With 'full magnetic field' it is meant that at all edges of the measured magnetic field image the magnetic field should be monotonically decreasing towards zero when going outwards towards the image edges. In practice this means that a sufficiently large area should be measured, including extra space around the magnet. For measuring larger magnets or magnet assemblies for which the MiniCube3D's field of view (12.7mm x 12.7mm) is too small, it is advisable to use Magcam's XYZ scanner, which extends the measurement range to 300mm x 300mm.

For Rotor Inspector applications, the full rotor field should be within the measured area in a similar way as described above, i.e. sufficient space below and above the rotor should be measured in order to satisfy the boundary conditions.

3D software plugin for MagScope Measurement and Analysis Software

The 3D plugin for MagScope adds the functionality for analyzing the full three-component magnetic field distribution recorded with the MiniCube3D magnetic field camera. This includes:

- Plotting color graphs and cross-sections of following magnetic field components:
  B_x, B_y, B_z, B (full field), B_{xy}, B_{yz}, B_{xz}, azimuth angle (in-plane field direction), polar angle (out-of-plane field direction)
- Converting the magnetic field vector to spherical coordinates (azimuth and polar angles, field strength)
- Converting the measured data to cylindrical coordinates, resulting in following magnetic field components:
  Bradial, Btangential, Bz, B (full field) and any combination of 2 components.
- Generating vector plots of the field distribution
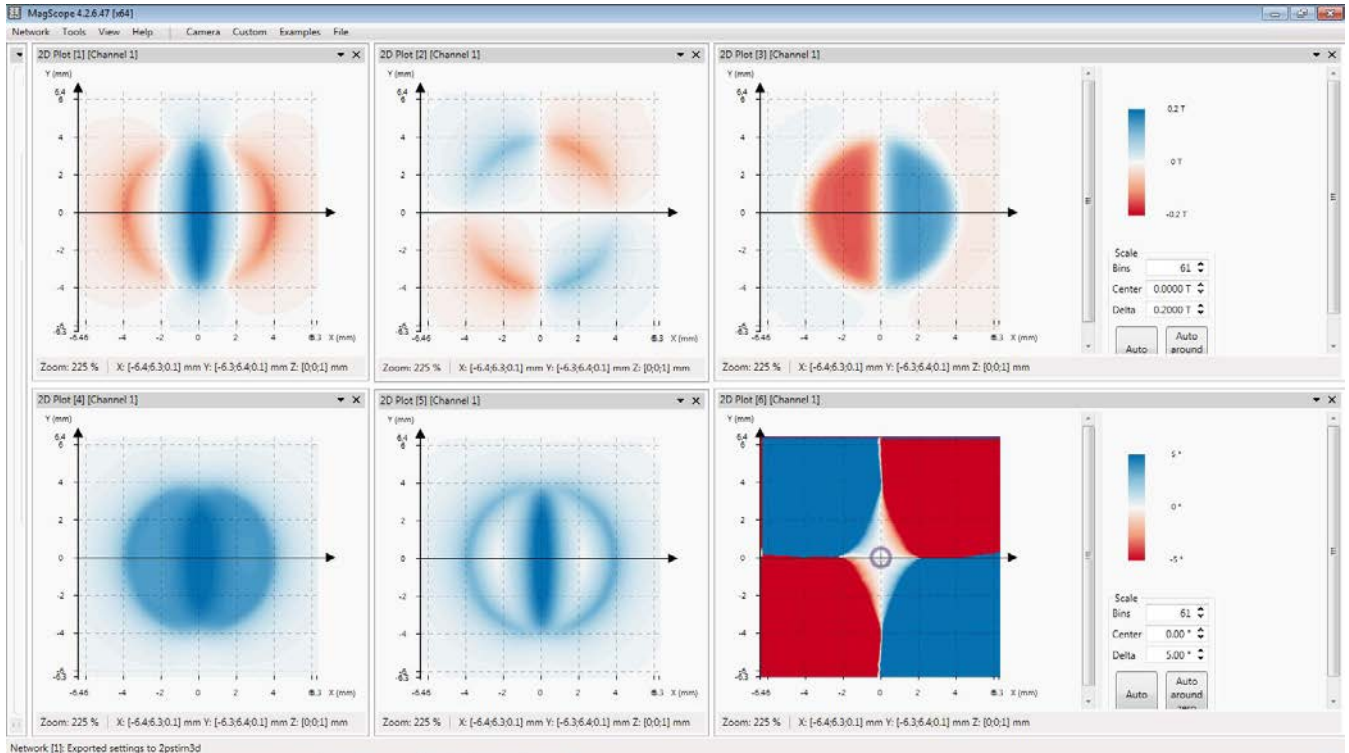
Measured distributions of various components of the magnetic field: Top: Bx, By, Bz;
Bottom: B, in-plane field angle, out-of-plane field angle

Typical applications:

- Rotary encoder magnetic field distribution and angle deviation analysis
- Sensor magnet quality inspection