

# AirBorne RF measurements

## TYPES

## Services

Terrestrial broadcasting is growing platform worldwide, despite of alternative systems penetration. Frequency spectrum efficiency is becoming a focus of regulatory authorities and network operators. ELTI developed ultimate AirBorne RF measurement system with remotely piloted aircrafts (RPA) and equipped with dedicated equipment for performing RF measurements and HD video/picture inspections.

Unlike to conventional approaches ELTI AirBorne remotely piloted system, delivers several advantages in its scope and makes RF or any other inspections easy and comfortable. Audit and regular tower inventory inspections, especially where network operators rent spaces on towers are with this service fast and easy.



## The Elti AirBorne applications:

- Site surveys before installation
- Network coverage analyses
- Site surveys with radio spectrum analyses
- Radio frequency monitoring
- Mast inventory and regulatory compliance audits (HD video/picture)
- Antenna system installation inspections
- Antenna system radiation pattern measurements (horizontal and vertical)

## To AirBorne adopted equipment

With years of practical experiences ELTI assembled solution using RPA and specially adopted components:

- Dedicated light weight and high accurate measuring equipment
- High resolution of orientation and piloting facilities
- Autopilot flight on predefined path
- Calibrated receiving antennas
- Specific software for data analyses

## Site surveys before installation

In many cases prior new antenna or any other equipment installation site survey can contribute to better, faster and safer works. On traditional way tower inspection shall be performed by trained and highly skilled climbers/riggers.

## Network coverage analyses

Traditional ground measurements of “off-air” signal in a practical way do have some serious limitations:

- Impact of ground reflections
- Iterations are required as measurements can be done on selected points only
- Measuring results can be hardly used in determination of antenna pattern and corresponding coverage

With ELTI AirBorne RPA corrected measuring trajectory can be set and measuring results can be easily correlated to theoretical coverage simulation and antenna patterns.

## Antenna systems radiation pattern inspection

Wrong antenna system design and especially unprofessional installation of equipment can lead to serious distortions in network coverage and services. Even if visual inspection and electrical measurements of antenna give good impression, actual services in the coverage area might not be in accordance to predictions.

ELTI AirBorne measurements can very effectively prove the real performance of broadcasting system. Most commonly inspected characteristics are horizontal (HRP) and vertical radiation pattern (VRP).

Distortions in HRP and VRP can appear due several reasons and have major impact on coverage area. Most common reasons are improper jumper cable installations, improper feeder phasing however during the years of operation also environmental conditions could results in malfunction of individual components of antenna system.

As minimum we do recommend to perform measurements:

- After initial installation of transmission system
- After any major modification or maintenance works are done
- After extreme weather conditions which could cause mechanical damage on installed equipment
- Regular on five years inspections for sites covering dense populated areas

Some network operators are performing “off-Air” measurements using conventional helicopter, which are far more expensive and far less accurate in comparison to using RPA aircraft.

## Mast and equipment inspection

Equipment installed on towers is exposed to different environmental conditions. Materials used in those systems may in several years of operation degrade in its mechanical characteristics.

ELTI AirBorne RPA can be equipped with HD video and picture facility in order to inspect:

- Mechanical construction of mast and corrosion impact
- Radome protection of single antenna panels
- Radome protection of whole antenna systems, ie. fiber glass cylinder
- Aviation lights
- Lightning rods
- Other on tower installed equipment
- Verifying consistency of installed equipment on the tower with designed solution on the paper