Airborne Laser Scanning Software

RiMTA

for Automated Resolution of Range Ambiguities

- *automatic resolution of range ambiguity in time-of-flight ranging*
- *unlimited number of MTA zones*
- *processes data acquired with RIEGL VQ-580 and RIEGL LMS-Q680 laser scanners*
- *smoothly integrated in the RIEGL data processing workflow*

Acquiring data in airborne laser scanning with high measurement rates from high altitudes frequently results in range ambiguities. Instruments with multiple-time-around capability (MTA) like the LMS-Q680i provide data that can be utilized to resolve these ambiguities in post-processing. Instead of manually specifying the correct MTA zone for range calculation, RiMTA will detect the correct MTA zone for each measurement automatically.

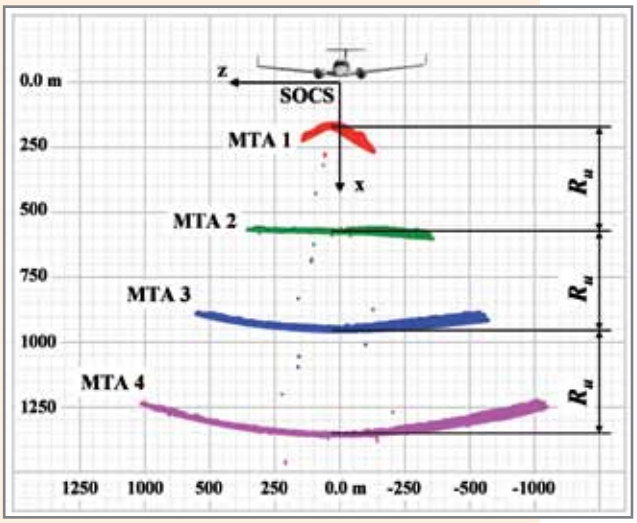
Correctly determining a measurement range in LIDAR instruments, based on time-of-flight measurements with short laser pulses, requires the allocation of each received echo pulse to its causative emitted laser pulse. However, at high pulse repetition rates (PRR) and large measurement ranges this definite allocation becomes ambiguous due to a limiting factor which may not be tweaked by engineers' skills: the speed of light. At a PRR of 400 kHz the range of unambiguity is already left at ranges above only approximately 375 meters, a measurement distance which is easily exceeded in airborne laser scanning (ALS).

The loss of unambiguity in ranging is known as "multiple-time-around" or "multiple-pulses-in-the-air". Up to now it was necessary to carefully avoid the appearance of range ambiguities during flight planning by choosing a height above ground for data acquisition so that all measurements stay within a single MTA zone, a task which becomes exceedingly difficult especially in complex terrain like, e.g., mountainous areas.

visit our website www.riegl.com

RIEGL®
LASER MEASUREMENT SYSTEMS

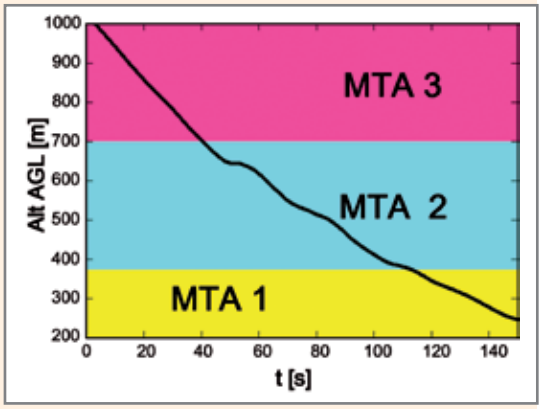
RiMTA - For Automated Range Ambiguity Resolution



Profile of scan data processed in MTA zones 1 to 4

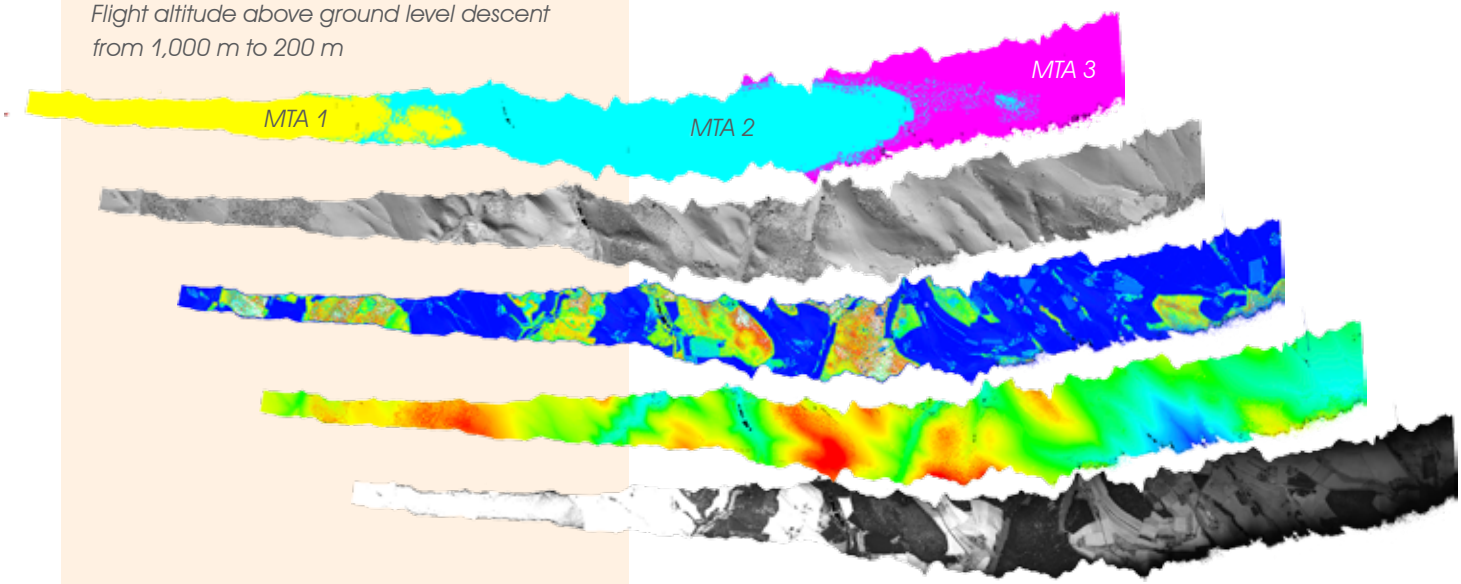
A novel approach based on the application of a sophisticated modulation scheme to the train of emitted laser pulses and on a dedicated data processing algorithm, allows the correct resolution of range ambiguities without any information about the expected measurement ranges and does not require any user-interaction.

With *RIEGL*'s airborne laser scanners VQ-580 and LMS-Q680i, which are easily capable to measure up to MTA zone 4, i.e., having up to 4 consecutive laser shots and the corresponding multiple echo signals in the air at the same time, this technique is a vast improvement when conducting airborne scanning surveys. It especially relaxes the requirements in flight planning for mountainous regions, thus increasing flight safety. The subsequent data processing with RiMTA is smoothly integrated in *RIEGL*'s workflow for scan data processing using RiPROCESS.



Flight altitude above ground level descent from 1,000 m to 200 m

One scan stripe transitting three MTA zones:
yellow MTA 1
blue MTA 2
purple MTA 3



RIEGL®
LASER MEASUREMENT SYSTEMS

RIEGL Laser Measurement Systems GmbH, 3580 Horn, Austria
Tel.: +43-2982-4211, Fax: +43-2982-4210, E-mail: office@riegl.co.at
RIEGL USA Inc., Orlando, Florida 32819, USA
Tel.: +1-407-248-9927, Fax: +1-407-248-2636, E-mail: info@rieglusa.com
RIEGL Japan Ltd., Tokyo 1640013, Japan
Tel.: +81-3-3382-7340, Fax: +81-3-3382-5843, E-mail: info@riegl-japan.co.jp

www.riegl.com