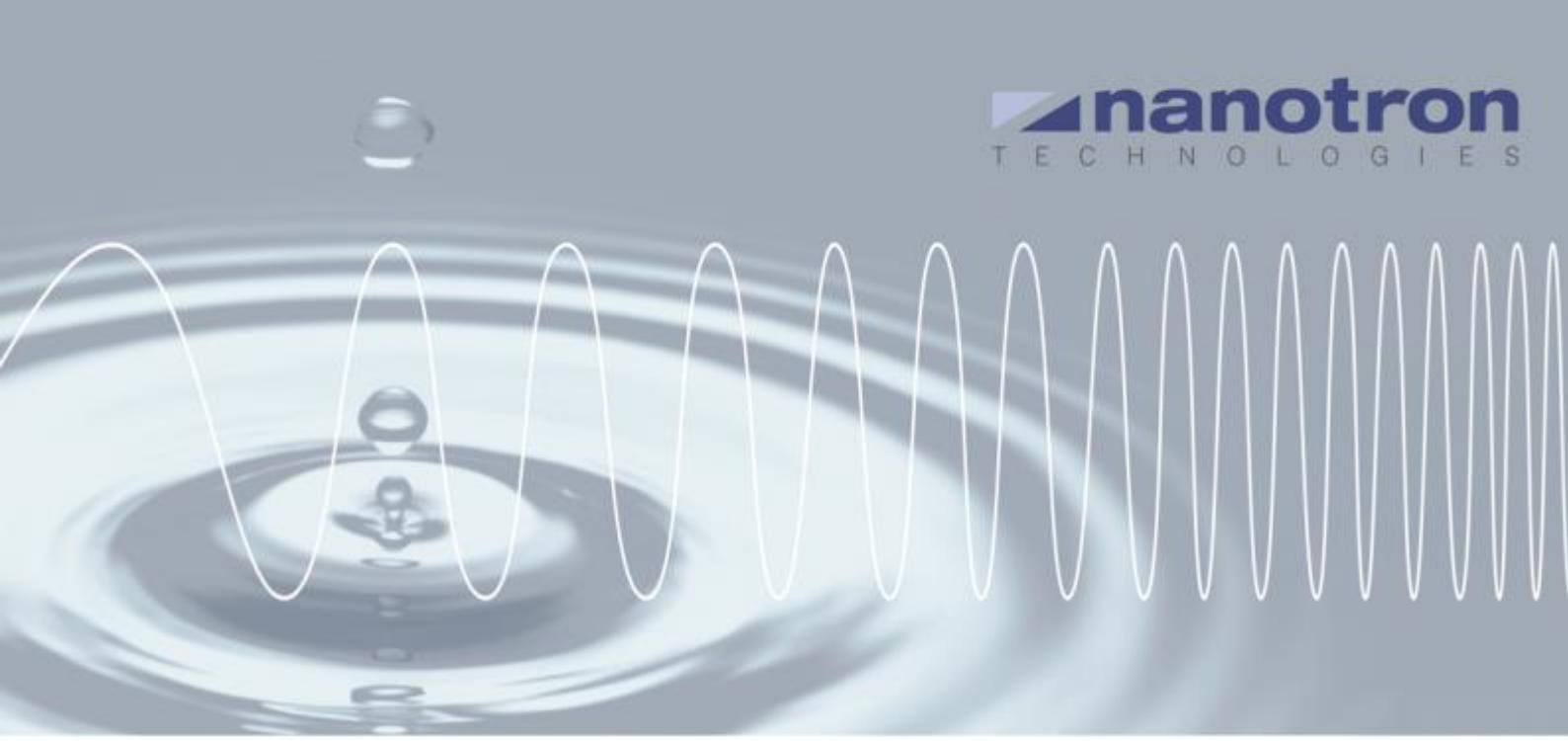

nanoLES 3 Real Time Location Engine

Creating high Performance Location and Monitoring Solutions

Introduction

nanoLES (Location Engine Server) *3 Live* is nanotron's location engine for Real Time Location System (RTLS) solutions. As the core of nanotron's Location Awareness ecosystem *nanoLES* runs as a standalone application or as a background service. *nanoLES* is available for Windows and Linux.

Location Technology

TDOA Positions: *nanoLES* calculates native TDOA based positions for unlimited tags using precise time of arrival stamps (TOA) from the anchor infrastructure.

Location Blinks: *nanoLES* supports applications with highest throughput by relying on high precision and efficient location blinks.

Anchor Synchronization: Anchors are synchronized wirelessly with sub-nanosecond precision to provide high location accuracy for real-time TDOA.

Multi-Radio Support: *nanoLES* seamlessly supports nanotron's Chirp and Ultra-wideband (UWB) anchor based solutions for wide applications demands. Customers benefit from the long range, low energy and radio robust Chirp technology as well as the UWB technology for high location accuracy.

Automatic Anchor Authentication provides a very convenient licensing mechanism.

TOA Data Queue: The integrated TOA Data Queue compensates network delays.

nanoLES 3 Highlights

- **Native TDOA location with precise TOA**
- **Location Meta Data**
- **World-wide access to location data**
- **Windows and Linux**

Radio Technology

- Technology-independent Wireless Anchor Synchronisation
- Identical system integration cycle for Chirp and UWB radio technology

Scalability

- Scales to several thousand tags
- Sea of anchor technology

Geometries Simplified

Multi-Sections: *nanoLES* supports breaking down complex area geometries into sections to enable various location awareness applications. Users can mix and match 0D (presence), 1D (tunnel), 2D (area) and 3D (space) sections. *nanoLES* provides parallel processing of tag blinks in multiple sections.

Section Ambiguity Resolution: Section transitions are supported with RSSI based ambiguity scores. Section-specific location data are available to adapt the ambiguity resolution to applications.

Bidirectional Communication

Concurrent Data Transmission: A location blink may contain user payload allowing user data exchange while collecting location data.

Direct Backchannel Access: The backchannel interface enables sending application and configuration messages to tags, actuators or sensors.

Key Features

Network Scalability: The flat Sea of Anchor infrastructure enables spatial system scalability through an unlimited number of anchors. Typical scalability challenges caused by master/slave networks are avoided.

Common API: The common technology-independent API ensures one identical system integration cycle for Chirp and UWB.

World-wide Location Access: Remote access supports convenient management access to *nanoLES* from all over the world. Multi-client read access supports location and status reports.

Extended Feature Set

Management Interface

Full Accessibility: *nanoLES* has a management interface to bring up the RTLS easily and to configure and control the location server. In addition, the accessibility to optimize the system performance and to visualize the location results is provided.

Enhanced Logging: Location data record and replay supports backup, analysis and demonstrations. The complete Location Engine is fully controllable with scripts to automate and customize applications.

Location Meta Data

Ease of Use: *nanoLES* provides simple and straightforward location data accessibility for highest flexibility during positioning, post-processing and system integration, see Figure 1.

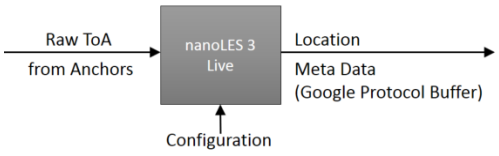

Figure 1: nanoLES easy accessibility

API Support: Developers get API and Parser support for the easy location meta data access to post-process easily via C++, Java, C#, Ruby and more.

Google Protocol Buffer: *nanoLES* implements the Google Protocol Buffer Data Structure. This compact and efficient binary data format extends the location data directly available while having smallest communication efforts.

Location Data Processing

Boundary: The location boundary supports automated outlier elimination comprising polygon and box boundaries, contours and borders as well as obstacle definitions.

Filter: *nanoLES* position adaption filters provide a Kalman filter including a motion model. The max TDOA distance filter provides plausibility checks.

Location Accuracy Indicators: With GDOP and MSE, *nanoLES* enables handling the location data according to the indicated accuracy.

Productivity Toolset - Toolbox 3

Seamless Tool Integration: Toolbox 3 is a productivity toolset around *nanoLES* 3 to enable rapid get-to-market by reducing the software effort required for system integration.

Toolbox 3 provides tools to configure, control and analyze the RTLS as well as to visualize locations, see Figure 2.

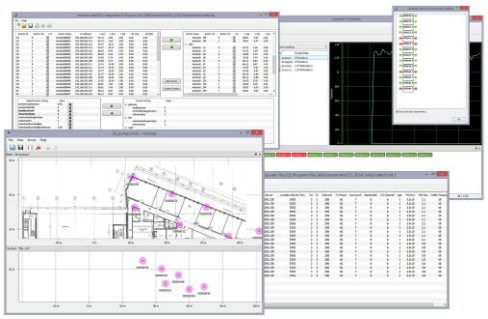

Figure 2: Toolbox 3 for Enhanced Productivity

Ordering Information

Order No.	Description
SNLES03	nanoLES 3 Live
KN01TB3	nanotron Toolbox 3
KNRINT02EA	RTLS Integration Kit
SN03SWAT	Node Configuration Device (NCD)
BNUT01STP5	Tag Pack

Product Brief [PRELIMINARY]

Nanotron is a leading provider of electronic location awareness solutions. If knowing what, where and when is mission-critical to your business, rely on nanotron with Location Running. Nanotron's solutions deliver precise position data augmented by context information in real-time. Location Running means, reliably offering improved safety and increased productivity, 24 hours a day, 7 days per week: Location-Awareness for the Internet of Things (IoT).

Nanotron Technologies GmbH is a wholly owned subsidiary of Sensera Limited (ASX: SE1), an IoT solution provider that delivers sensor-based products transforming real-time data into meaningful information, action and value.

Visit www.nanotron.com or for more information on nanotron's complete line of products and tools or write to us at nanotron Technologies GmbH, Alt-Moabit 60, 10555 Berlin, Germany.

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