What is Environmental Noise Management?

Environmental Noise Management Solutions
Brüel & Kjær University, Denmark

Agenda

- What is environmental noise management?
- The 4 generations of environmental noise management
Two market leaders combine strengths to give you better solutions and service:

- Now no.1 in airport AND urban noise management
- Strong local presence – worldwide
- State of the art airport and urban noise management solutions and services
- Together we offer products:
  » for all aspects of outdoor environment management
  » that are the preferred solutions by a wide range of experts around the world
Our Offerings

- **NoiseOffice:**
  Subscription based services to improve noise management at airports

- **Software Modules:**
  Subscription-based environment applications

- **Air quality modules for airports**

- **High-quality, robust noise monitoring terminals & microphones**

- **ANOMS and ENM:**
  State of the art airport and urban noise management systems

- **Lima & Predictor:**
  Powerful noise calculation software

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**NoiseOffice**

- **Managed Noise Solutions**
  - Business outcomes
  - Not just technology

- **Total Package:**
  - Technology provision
  - Hosting
  - Management
  - Operations
  - Reporting
  - Consultant Portal

- **Benefits:**
  - Simplifies business
  - Results beyond question
  - Savings in total cost of ownership
Modules

- Software as a service
  - Subscription based – no capital outlay
  - Web based centrally hosted – no deployment
- Focused objectives – easy to use
- Long term contracts – partnering to success
- Current modules:
  - WebTrak
  - WebTrak Fly Quiet
  - AirTrak CarbonManager
  - Flight Ops
- Future modules:
  - NoiseSentinel

NoiseSentinel

- Providing long term outdoor noise monitoring for consultants
- Simplifies operations and improves quality:
  - Equipment - supply, installation & maintenance
  - Operation – collection, verification & data management
  - Integration – noise levels, sound recording, weather & cameras
  - Access – secure data download to Excel and Evaluator
- Cheaper, easy financing: reduces capital outlay with a predictable, small monthly fee
- Improved satisfaction: Lets you focus on data analysis and advice
Modern, Robust Noise Monitoring Terminals

- Modern, robust noise monitoring terminals for all applications, needs and budgets
- A wide range of standard and customised accessories – whatever you need, we can deliver a solution

The Broadest Calculation Software Portfolio

- A product for every situation
  - Predictor 7810 – the intuitive solution, mature and modern
  - Lima 7812 – the most advanced noise calculation system available
- A growth path that gives you the product you need as your needs change
- Common functions and benefits:
  - Global reference software with tiling and controlled calculation optimisation
  - Fastest calculations – independently tested
  - Advanced geometry handling to easily model real-life
Major Calculation Software Release

- **Predictor Version 7:**
  - Next generation software
  - Incorporating powerful Lima performance
  - Improved efficiency and usability

- **Lima Version 6:**
  - Strengthening its position as the most advanced system
  - Including workflow automation
  - Making complex tasks easier

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Portable Noise Monitoring – Type 3655

- High-speed Internet communication
- Auto-calibration
- Up to 32GB Data Storage
- Automated SMS Text Messaging
- Class 1 accuracy to IEC 61672
- Hot swap Li-Io batteries
- Remote 3G broadband operation
- 3 different configurations for different needs

……. weighing less than 7kg
Managing Environmental Noise

- Many and varied tasks:
  - noise complaints
  - noise abatement
  - noise policing
  - noise mapping
  - noise planning & management
  - reporting & information
  - data handling

Different actions and methods

Managing Environmental Noise

- Many different sources:
  - transportation noise
  - Industrial noise
  - neighbourhood noise
  - different recreational activities

Different evaluation approaches
**Noise Mapping**

- Map of current and future situation
  - Often calculated
  - Sometimes based on measurements
- Different types of maps, e.g.:
  - Long-term vs “peak” data, often source-related
  - Population noise exposure statistics
- Interaction with GIS and GIS data

**Noise Planning**

- Policy making
- Noise zoning
- Land use planning
- Intermodal studies
- Based on some calculation
- Soundscapeing
**Noise Abatement**

- Activated by noise limit exceedance identification or action plan
- Reduction techniques:
  - Administrative e.g. stop operation, reduce speed
  - Technical e.g.: silencers, barriers, double glazing
- Reduction areas
  - At receiver e.g. insulation
  - In propagation path e.g. barriers
  - At source e.g. quiet road surface
- Guided by measurements and calculations

**Noise Policing**

- Active enforcement of legislation
- Many techniques:
  - Spot checks of limits e.g.:
    » Motorcycle noise re silencers
  - Noise monitoring
    » Permanent
    » Semi-permanent
Noise Complaint Handling

- Activated by complainant:
  - Spot-checks
  - Manned measurements
  - Monitoring
  - User-activated monitoring
  - Event correlation
  - In-depth analysis
- Result: OK or not
- May lead to monitoring, abatement, ...

Noise Reporting & Information

- Reports - integrated in tools
- Information to the Public – dedicated web-solutions
Data Handling

- Import/export
- GIS
- Database
- Security
- Flexibility
- Scenarios & timelines
- Integrate in tools/organisation

A Range of Solutions from Brüel & Kjær

- Noise calculation software: Predictor 7810 and Lima 7812
- Sound Level Meters and Analyzers, e.g.:
  - 2250/2270 Handheld Analyzer
  - 2240 Sound Level Meter
- Post-processing Software e.g.:
  - Evaluator 7820
  - 2250 Utility Software BZ5503
- Noise monitoring and management systems:
  7843 ENM Software and wide range of NMTs
- Diverse solutions:
  - PULSE Road Surface measurement system
  - Matron Complaints Analysis System
  - 3638 Exhaust Noise Inspector
  - Soundscape equipment
A Complete Solution

Standard products and configurable services:

- System Installation ensures a trouble free start-up
- On-site training for optimal utilisation of your investment
- System maintenance to ensure continued trouble-free operation in an ever-changing world
- Additional training & advice to get the most out of your system
- Calibration & repair to ensure correct results and high up-time
- Hosting of the server eases installation, improves technical support and offers alternative financing of purchase

Environmental Noise Management Evolution

- The 4 generations of environmental noise management
  - Developed for airports
  - Suitable for other applications
Environmental Capacity (Airport Example)

- Traditional master planning focus is on physical capacity – terminals, runways etc
- EIS studies don’t identify the capacity impact
- Environmental capacity can become the limiting factor
- Environmental capacity degrades over time
- Mastering environmental capacity enables airports to continue to grow

Lochard Law of Environmental Capacity

\[ E = T - I \]

Where

- \( E \) = Environmental Capacity
- \( T \) = Community tolerance
- \( I \) = Environmental impact

Environmental capacity is generated by…

- \textit{Reducing environmental impact} by proactive management of operations
- \textit{Increasing community tolerance} through collaboration with stakeholders
Fourth Generation Environment Management

- **Maturity**
  - Passive
    - Ignorance
      - What noise?
      - What can you do?
  - Reactive
    - Measurement
      - Measure
      - Report
      - Defend & Contest
  - Proactive
    - Model and forecast
      - Compliance
      - Budgets & penalties
  - Collaborative
    - Abatement
      - Reduces environmental impact
    - Environment Capacity
      - Balances impact reduction and tolerance creation

- **Time**
  - 1st Generation
  - 2nd Generation
  - 3rd Generation
  - 4th Generation

Balanced Program

**Impact Reduction Initiatives**
- Fleet transition
- Acquisition and insulation
- Procedure adherence
- Noise budgets, surcharges*
- Curfews and access limits*
- Continuous descent approach*

**Tolerance Building Initiatives**
- Noise sharing
- Information sharing
- Community forums
- Self-service online interaction
- Roundtables
- Community education

* Not commonly used in the US
### Summary

- **Environmental noise management**
  - All aspects of dealing with noise under your jurisdiction
  - Common overall methodology and terminology:
    - Many and varied tasks:
      » noise complaints
      » noise abatement
      » noise policing
      » noise mapping
      » noise planning & management
      » reporting & information
      » data handling
    - Many different techniques

- **The 4 generations of environmental noise management**
  - Developed for airports, suitable for other applications
  - Growth may be constrained by environmental capacity
    » Strategic impact can be overlooked during master planning
    » \( E = T - I \)
  - Fourth generation environment management:
    » Collaborative approach with real empowerment and information sharing
    » Balanced programme of initiatives – Impact and Tolerance
    » New concepts, new technologies