Aircraft Noise Management at Helsinki Airport

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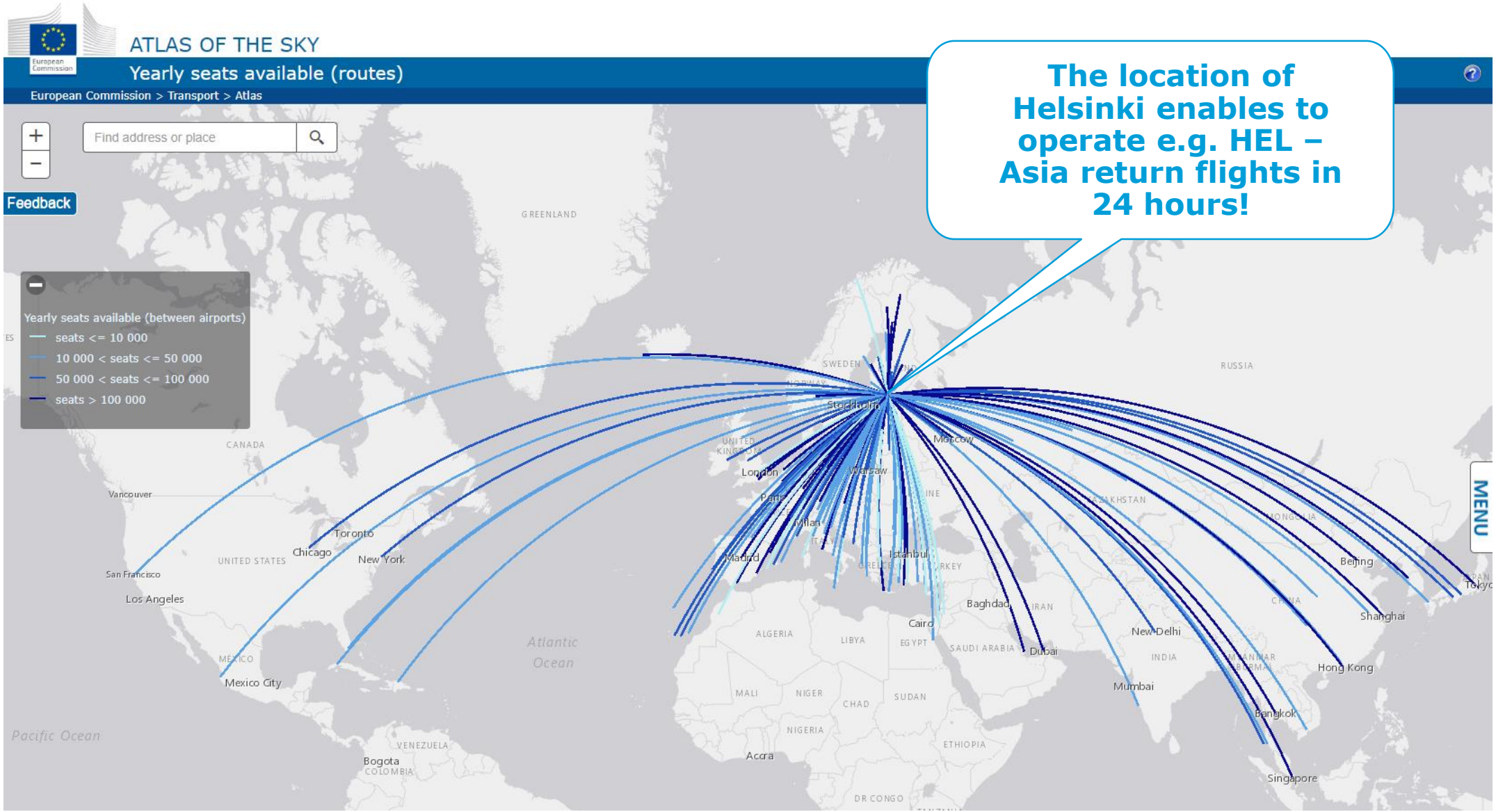
Finavia operates a network of 21 airports in Finland

Helsinki Airport is the leading Nordic airport in terms of long-haul transits

- Shortest route between Europe and Asia
- 21 M passengers in 2019
- EUR 1 billion development program going on to expand the capacity to 30 M passengers

Shortest Route between Europe and Asia

Over 20 direct destinations & more than 120 weekly departures to Asia



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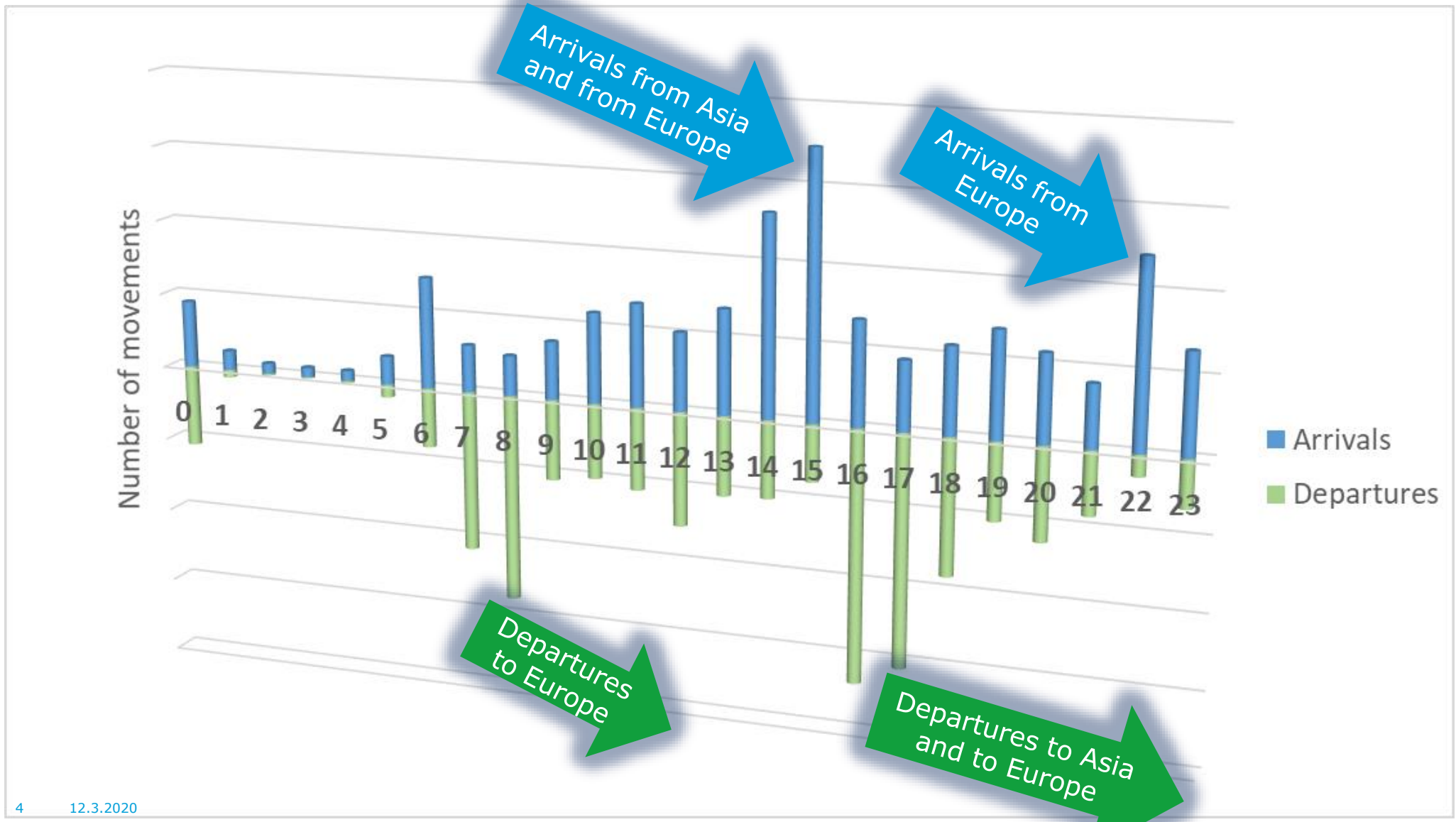
Hourly distribution of departures and arrivals



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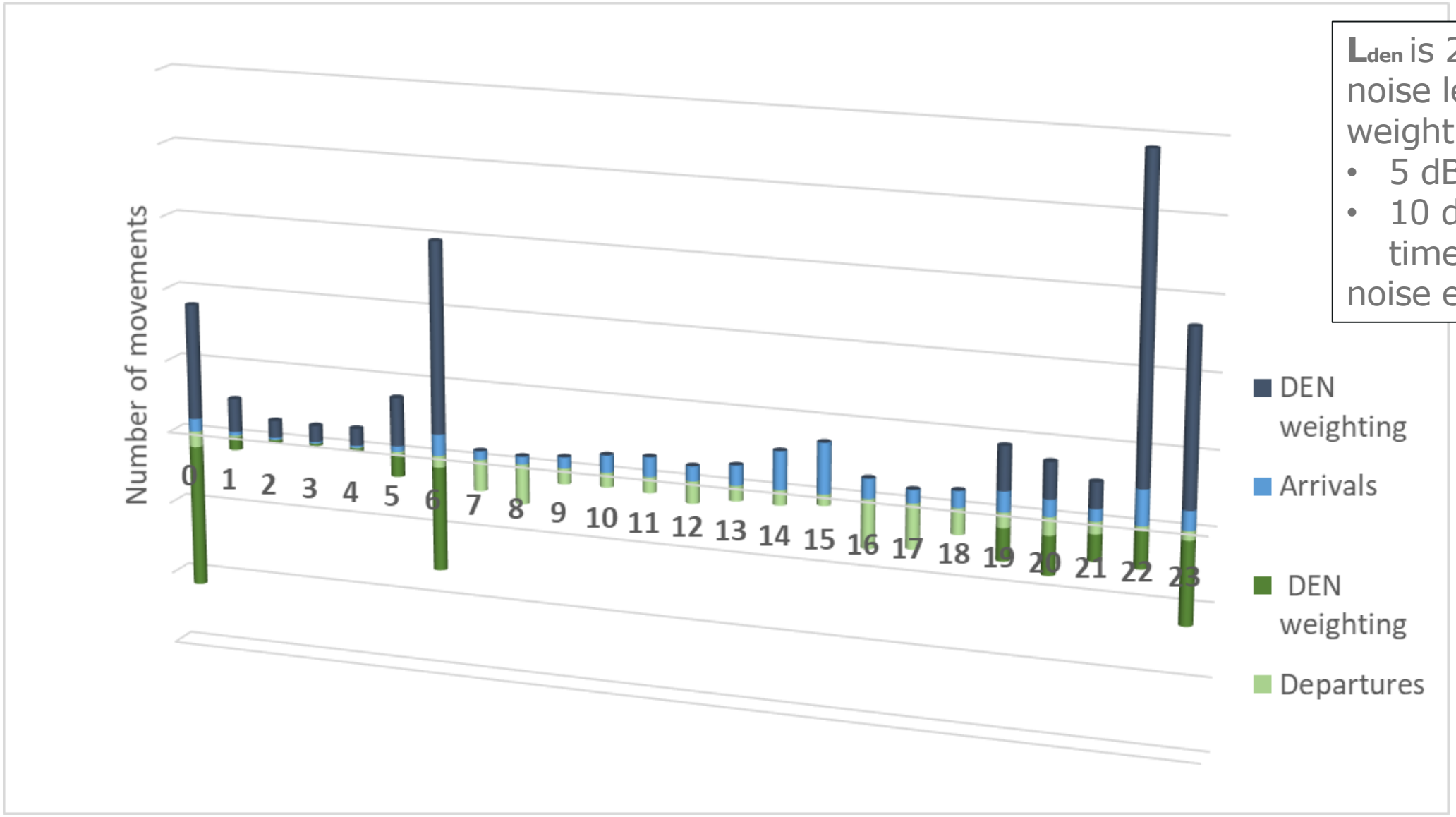
Impact of Day-Evening-Night weighting (L_{den})



L_{den} is 24h equivalent noise level with a weighting penalty of:

- 5 dB for evening
- 10 dB for night time

noise events

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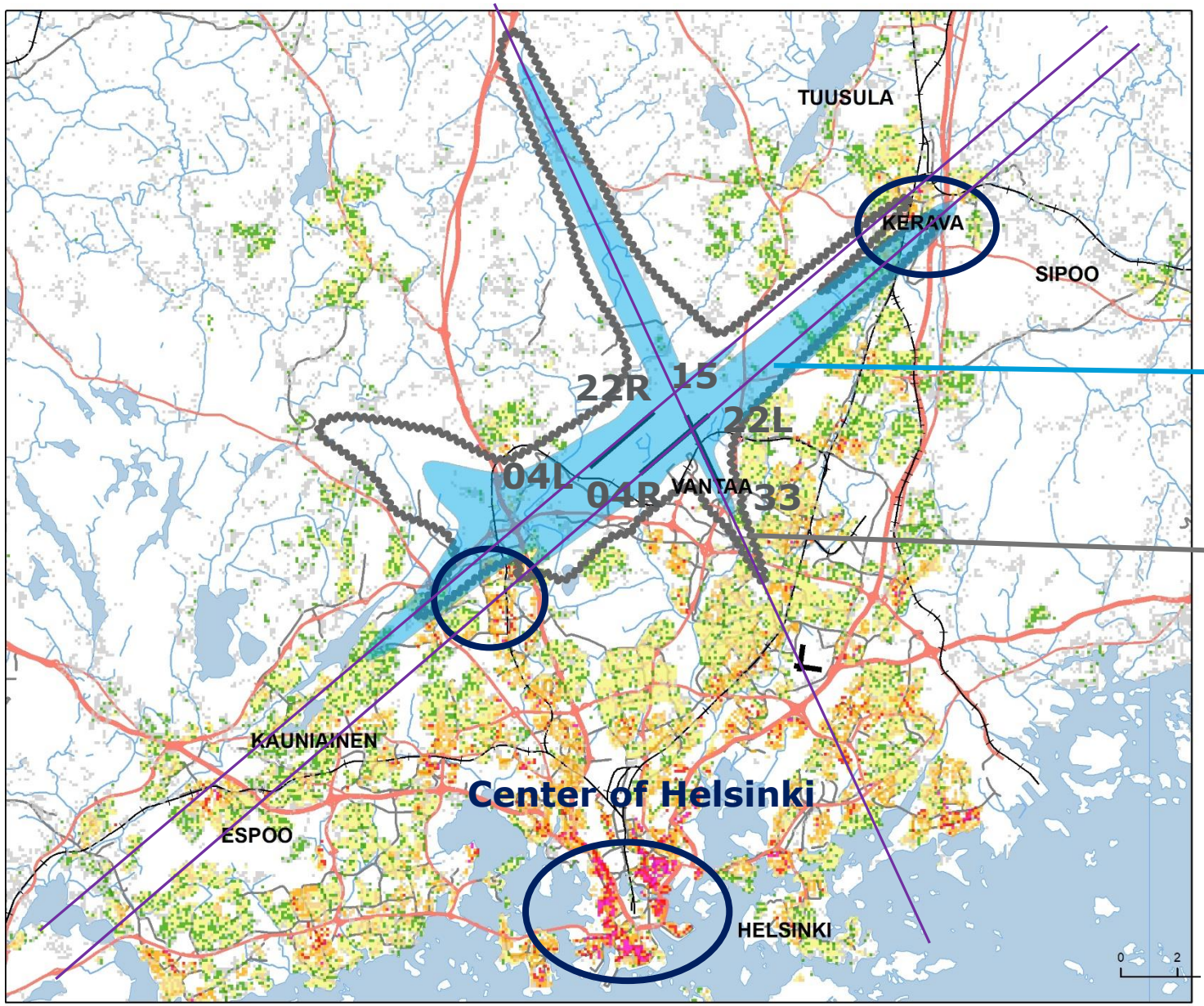
Geography and L_{den} 55 dB noise area

L_{den} 55 dB is a standard noise level applied in land-use planning and reporting



2018

Forecast for land-use planning

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Examples of applied operational means of noise management

Optimised Runway usage

CDO with Low Power / Low Drag

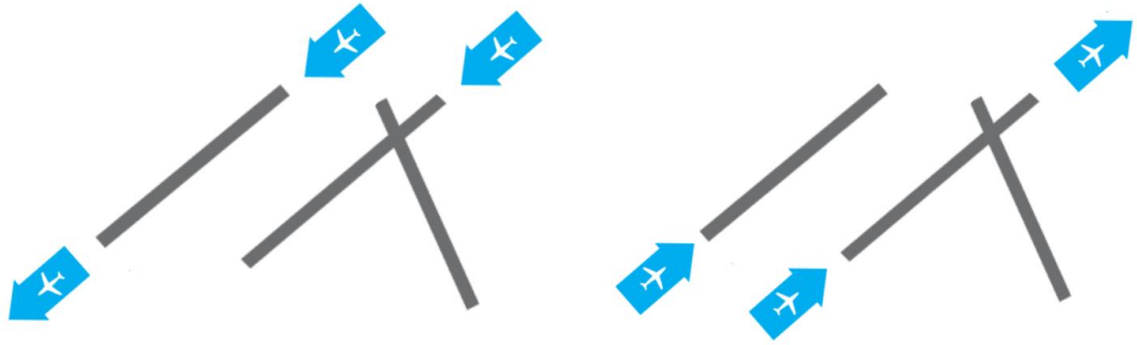
Night Time Noise Charges

Noise Abatement Departure Procedures

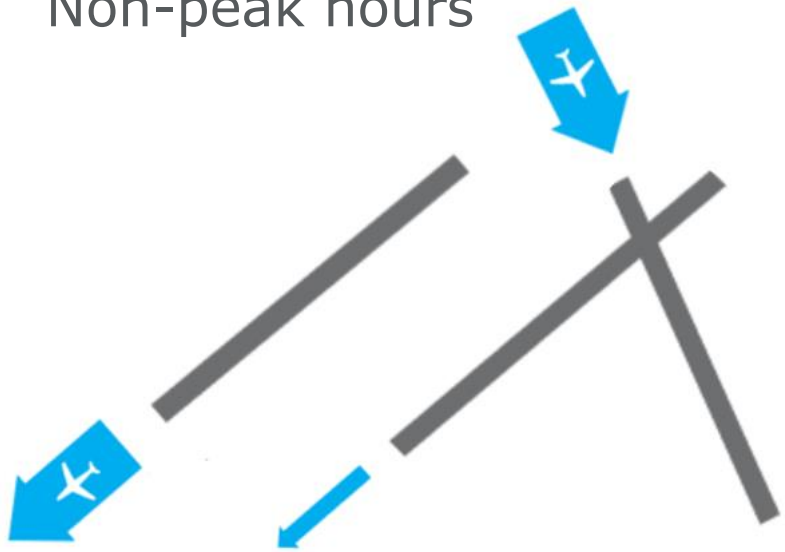
Optimised runway usage

- In practice, the most effective operational means of noise management
- Different RWY configurations for different times of the day
  - During peak hours, independent approaches to parallel runways needed for capacity
  - At other times the noise optimised use of runways subject to weather conditions and other contributing factors

Peak hours



Non-peak hours



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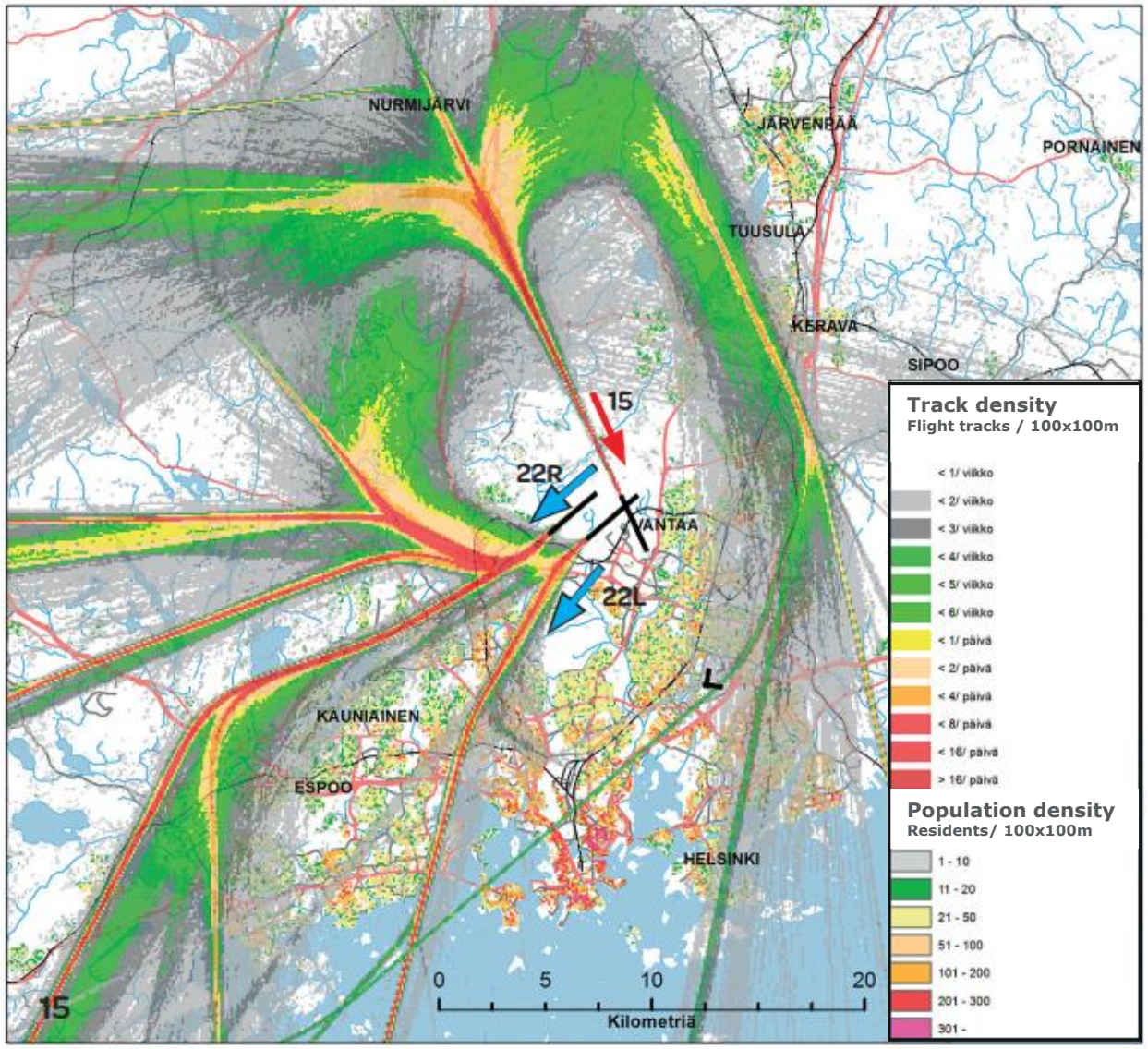
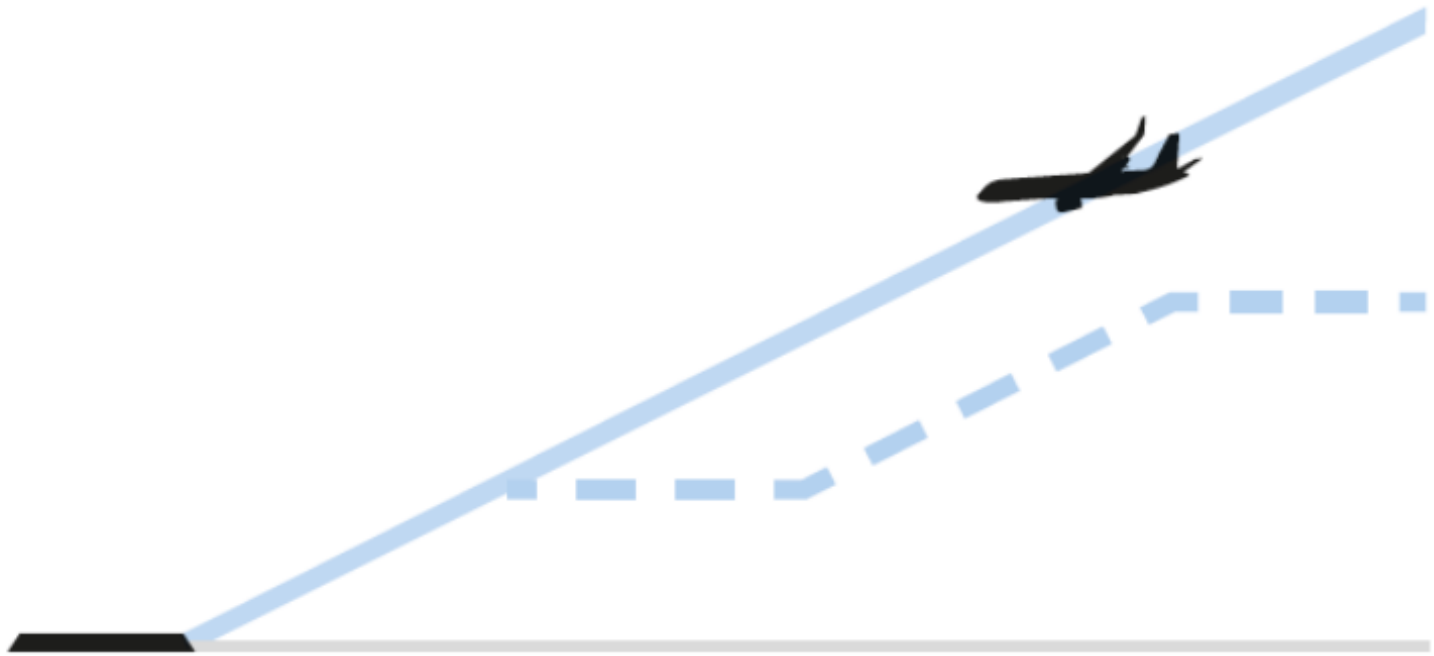
Preferential runways due to noise

- Preferential runways whenever possible during non-peak hours:
  - RWY 15 for arrivals
  - RWY 22R for departures, during daytime also 22L
- If downwind or crosswind component exceeds a limit, another runway configuration giving the best headwind is used
- Use of RWY 15 for arrivals is especially important during night
  - Significance of the night time operations to L_{den} noise contours
  - Minimum number of noise-exposed people



Continuous Descent Operations - CDO



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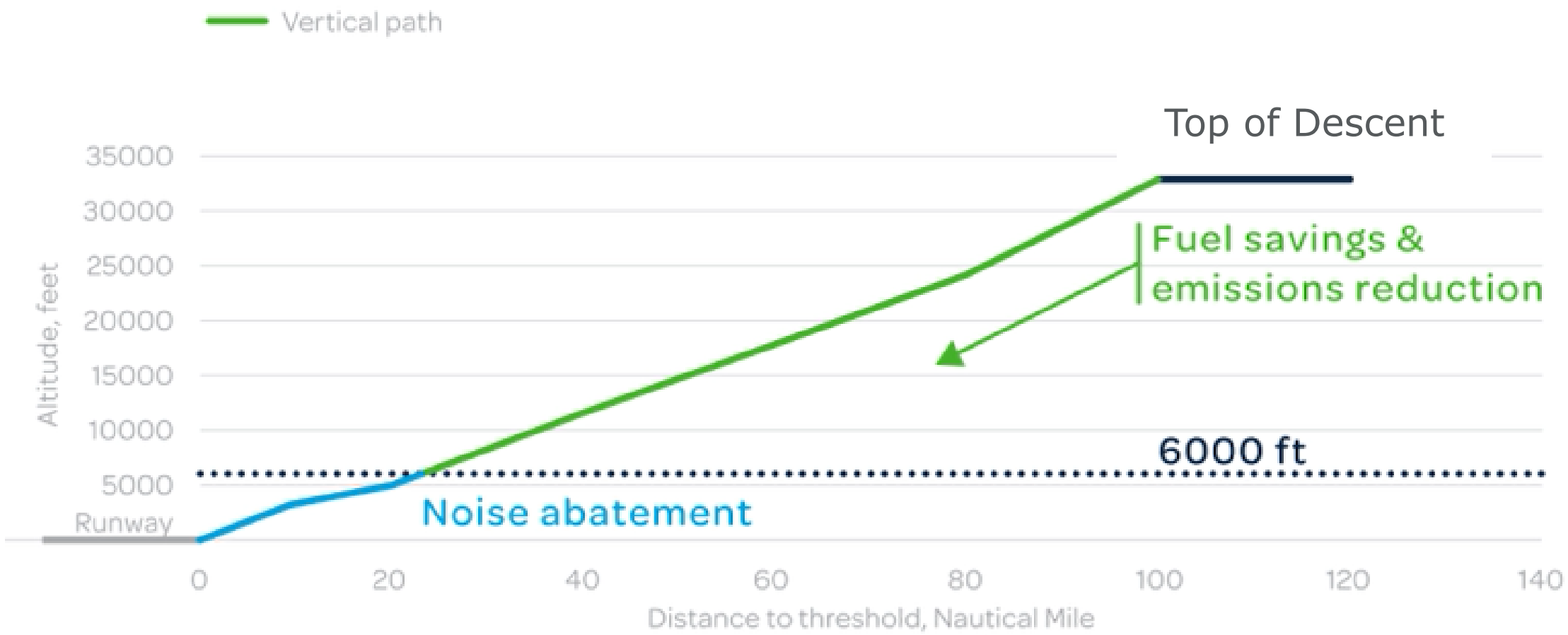
PRIORISATION OF CDO PHASES



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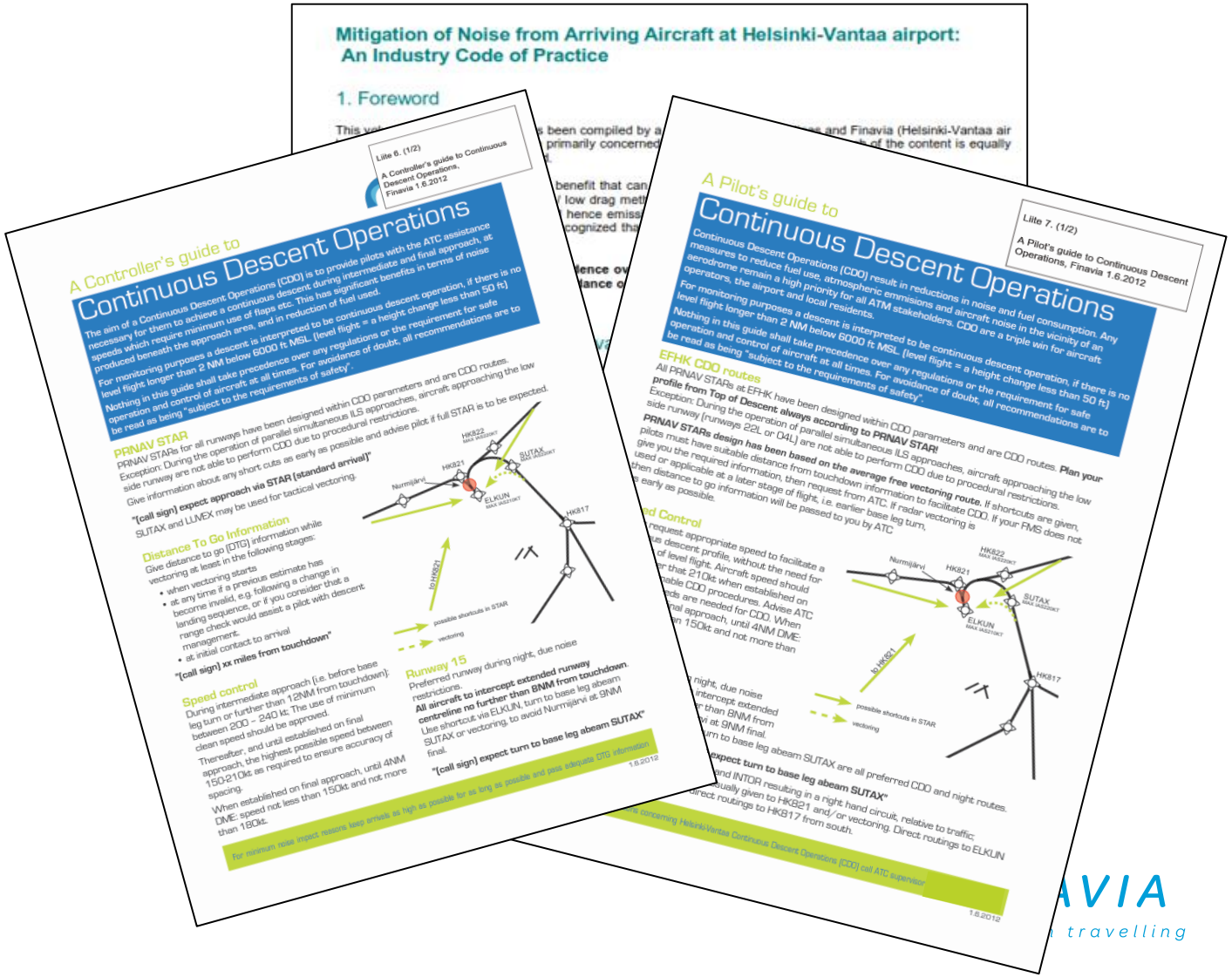
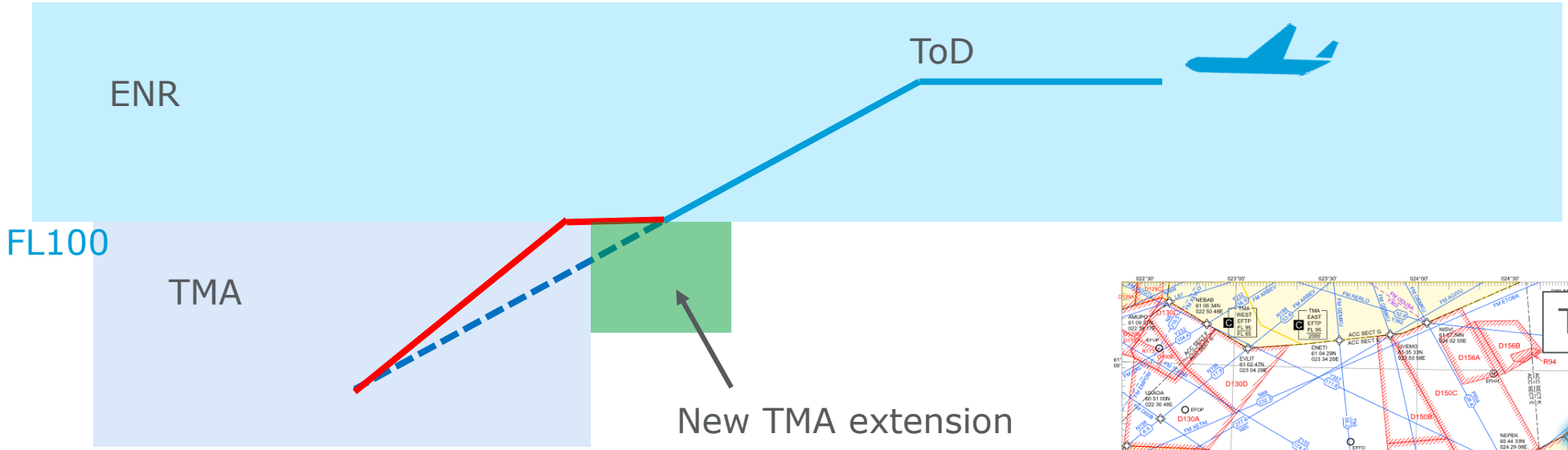
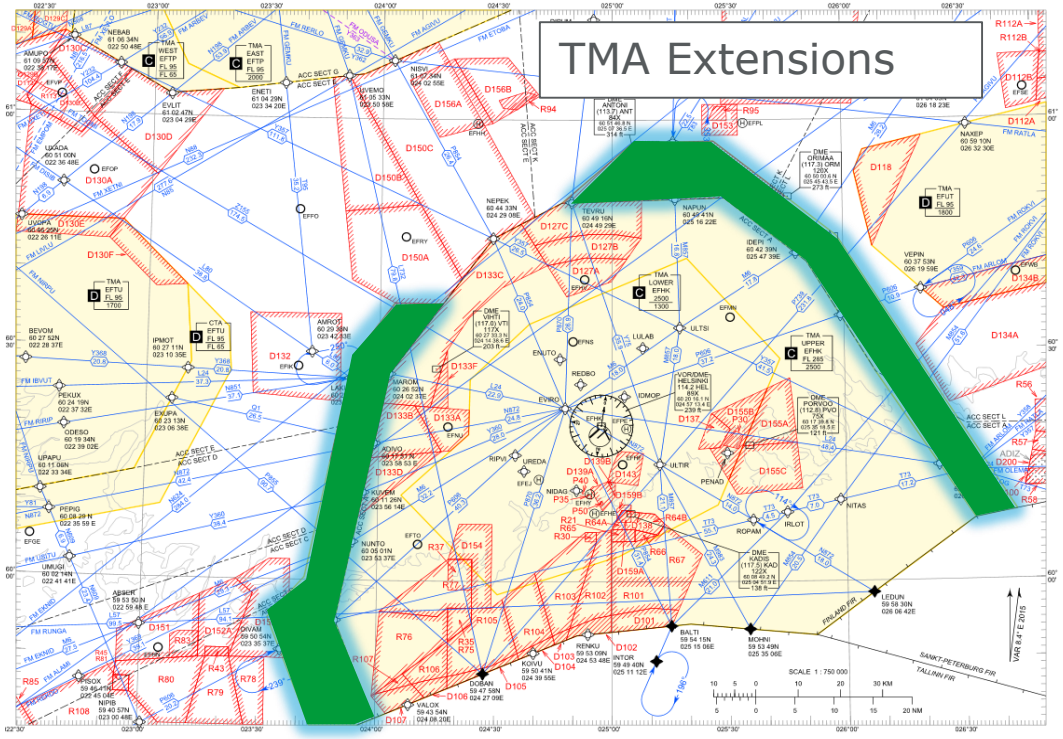
Co-operation for CDO implementation

- CDO target levels set in the environmental permit of the airport
- First CDO implementation project started in 2008
  - Involvement of major airlines, ANSP, local air traffic control, area control center and the airport
  - Agreed Industry Code of Practice
  - Instruction for pilots to plan profile from ToD according to RNAV STAR
  - Guidance leaflets to pilots and to air traffic controllers to share information in addition to AIP publications
  - Airspace changes to support optimal vertical profiles



Airspace modifications to enable CDO with optimised vertical profiles in controlled airspace

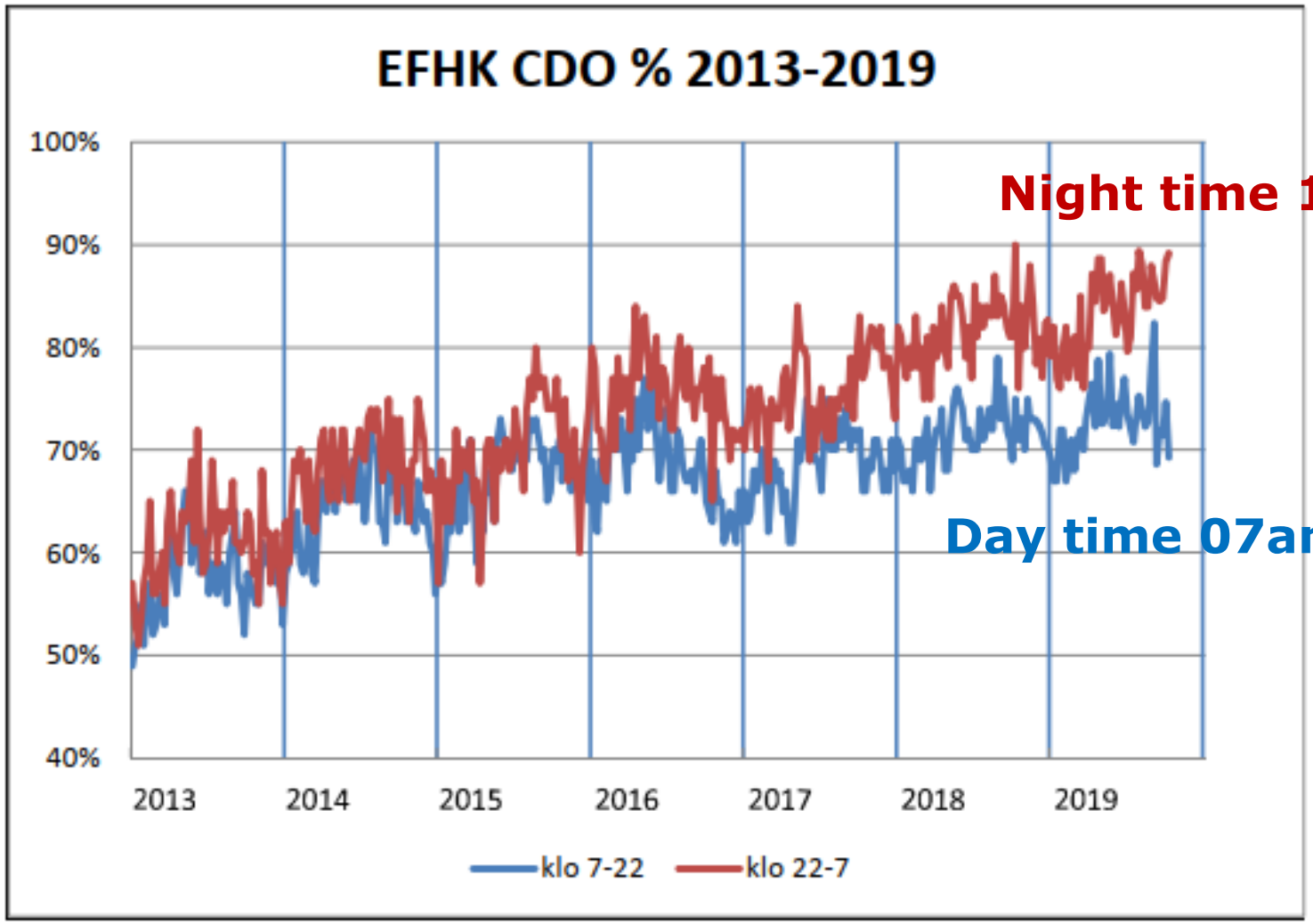




- Optimal vertical profiles of newer aircraft are shallow
- New TMA extensions implemented between FL065 and FL100 to enable optimised vertical profiles from Top of Descent

Trend of CDO Performance

Locally applied criteria for flight segments below 6000 ft, focus on noise



Night time 10pm-07am

Day time 07am-10pm

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CDO and Low Power / Low Drag

- CDO performance is already good and difficult to improve further
- Further noise benefits to be achieved by combining CDO with the method of Low Power / Low Drag
- Noise mitigation potential of avoiding early landing gear deployment
- Practical implementation under discussion within the *CEM working arrangement*
  - CEM = Collaborative Environmental Management, a co-operation framework according to Eurocontrol's specification
  - Involves all key stakeholders like major carriers, ATC and the airport

- Active information sharing to pilots and ATCOs
  - A video published by Finavia: https://www.youtube.com/watch?v=uDl2g98o4Dk

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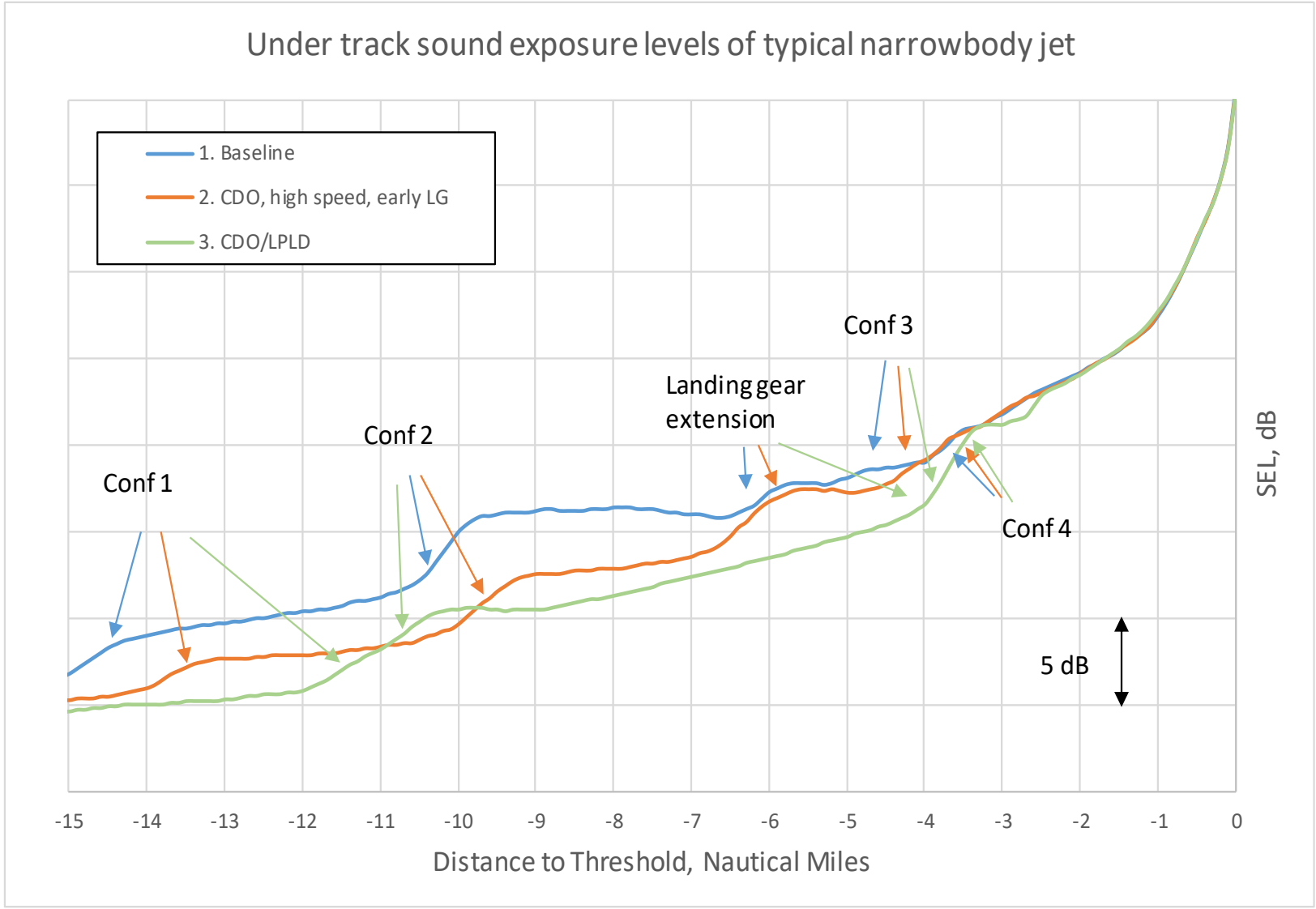
Estimates of noise mitigation potential



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Night time noise charges

- Incentive in favour of quieter fleet and other operating times than core night
  - Noise charges applicable for arrivals and departures of jet aeroplanes between 11 pm and 6 am, so that the charge is significantly higher between 00:30 am and 05:30 am
  - The charge depends on certified noise levels

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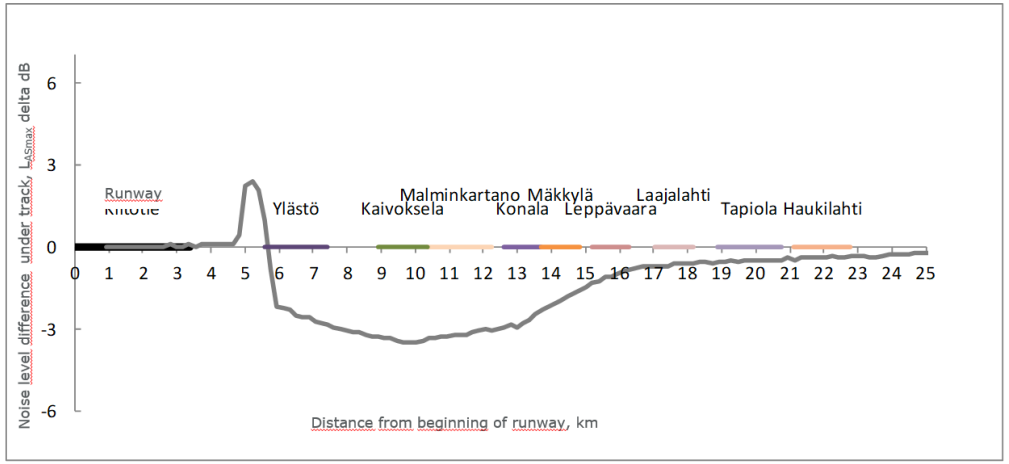
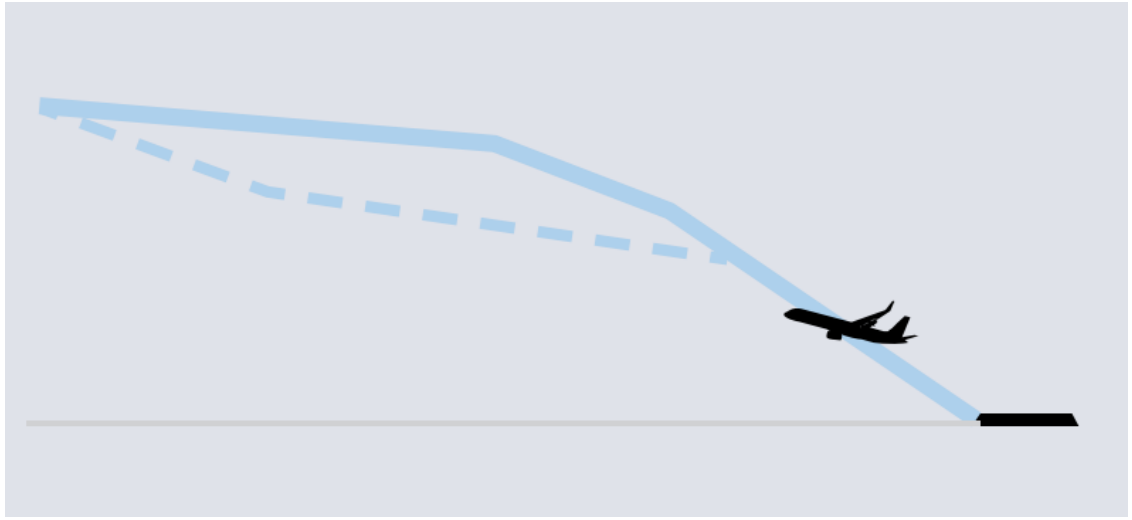
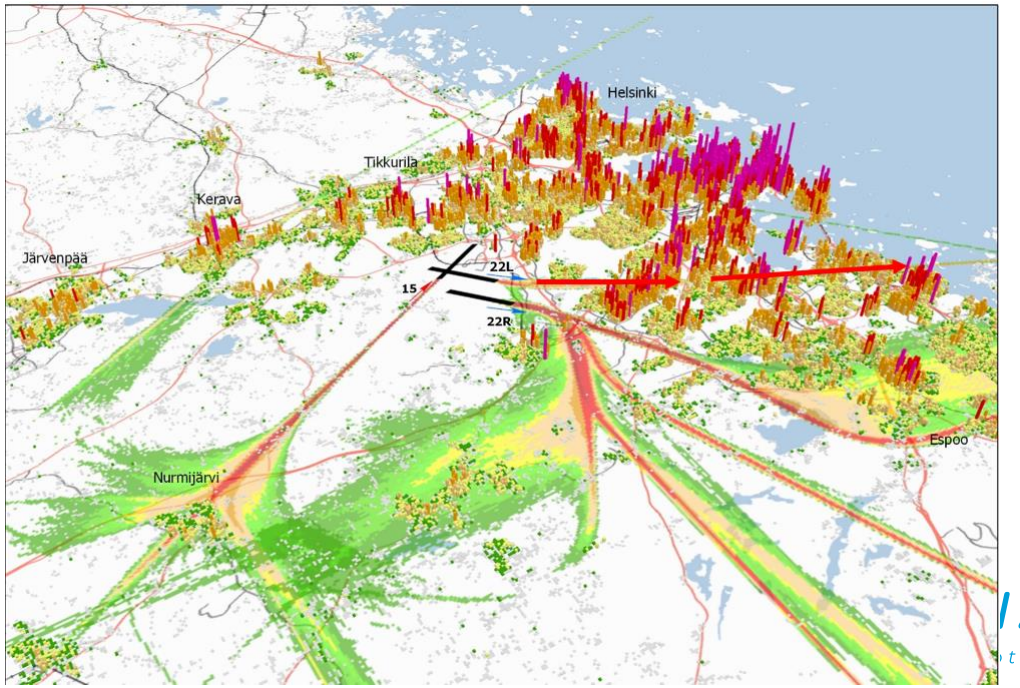
Noise Abatement Departure Procedures (NADP)

- NADP1 procedure implemented for RWY 22L to support increased use of the runway for departures
  - Objective to improve departure capacity
    - 22R is the primary runway for departures
- Delayed acceleration to gain higher altitude
- Reduction in max noise levels over residential areas







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