Although some of the following specifications represent upper or lower limits, like e.g. the maximum number of grid meshes, they may be exceeded in certain cases depending on the computer configuration and the combination of parameters being used.

**A. Hardware requirements**

Computer platform: PC with Windows Vista/7/8 and DVD-ROM. Minimum RAM 2 GB. Minimum free hard disk space 20 GB. One free USB slot (for the licence key).

**B. Program**

1. Source groups
   (a) Aircraft traffic:
      i. Division of aircraft into at most 10 aircraft groups (default: 9).
      ii. Division of the LTO into 6 phases.
      iii. Specification of traffic by a movement journal (monitor calculation) or by general traffic information (scenario calculation).
      iv. Up to 6 arrival and 6 departure runways.
      v. Up to 20 departure routes for each departure runway.
      vi. Parameterization of exhaust dynamics as a function of aircraft group and LTO phase.
   (b) APU, GPU, GSE, engine startups:
      i. Up to 30 position areas.
      ii. Position areas with rectangular or polygon-like shape.
      iii. Specification of APU heat flux per aircraft group and mean heat flux for GPU; thermal plume rise according to German Guideline VDI 3782 Part 3.
      iv. 3 different load conditions for APU.
   (c) Motor vehicles:
      i. Definition of motor roads by systems of line segments with a uniform traffic scenario.
      ii. Up to 5 vehicle groups (default: 4).
      iii. Up to 10 traffic scenarios (default: 8).
      iv. Up to 200 motor roads, each containing up to 20 line segments.
      v. Parameterization of vehicle-induced turbulence.
   (d) Other sources:
      i. Up to 200 other sources in form of point, line, rectangular or polygon-like sources.
2. Trace substances
   (a) Up to 20 trace substances (default: fuel burn, $NO_x$, $NO_2$, HC, Benzene, CO, $CO_2$, $SO_x$, PM10).
   (b) Optionally automatic generation of NO and $NO_2$ emission rates from provided $NO_x$ emission rates.
   (c) Conversion of NO to $NO_2$ according to German Guideline VDI 3782 Part 1 (stability-dependent conversion rates).
   (d) No deposition or sedimentation (conservative estimate of airside concentration).
3. Emissions
   (a) Default emission values provided for all default sources and substances.
   (b) Aircraft traffic:
      i. Fuel consumption and emission indices per LTO phase and aircraft group or individually for each movement (monitor calculation).
      ii. Optionally insertion of ICAO certification values.
      iii. Optionally insertion of performance-based values derived by the model ADAECAM.
      iv. Emissions up to a height of 1500 m above ground and source distances up to 50 km.
      v. Optionally simple emission calculation according to ICAO document 9889.
   (c) APU, GPU, GSE, engine startups:
      i. For each aircraft group:
      APU, GPU: fuel consumption and emission indices.
      GSE: emissions per handled aircraft, 4 stand types.
      Engine startups: emission per starting aircraft.
      ii. Individual APU and startup emissions (monitor calculation).
   (d) Motor vehicles:
      i. Emission per vehicle and kilometre for each vehicle group and traffic scenario.
      ii. Data base with default values for different reference years.
   (e) Other sources:
      Emission per year.
4. Traffic
   (a) Aircraft traffic (monitor calculation):
      i. Movement journal with individual aircraft movements.
      ii. Automatic insertion of missing aircraft data from the data base.
      iii. Individual flight profiles or group profiles.
      iv. Individual taxiing and queueing times.
      v. Actual take-off weight estimated from great-circle distance to destination.
      vi. Time resolution of individual movements down to 5 seconds.
   (b) Aircraft traffic (scenario calculation):
      i. Annual movements and relative distribution among runways, departure routes, and position areas for each aircraft group.
      ii. Average day courses for arrival and departure and average week and year courses for each aircraft group.
      iii. Average taxiing time per taxiway and waiting time per departure runway. Alternatively mean taxiing speed.
   (c) APU, GPU:
      Specification of operation times (normal running for APU) at arrival and departure as a function of position area and aircraft group. APU: automatic setting of operation times for stabilization and high load.

(d) GSE:
Distribution of emissions per aircraft over arrival and departure as a function of aircraft group.

(e) Motor vehicles:
Specification of average day, week, and year courses for landside and for airside traffic. Optionally individual average time courses.

(f) Other sources:
Specification of average day, week, and year course for each source.

5. Time period
   (a) Minimum time period one day, maximum period one year.
   (b) Determination of concentration values on the basis of hourly means.
   (c) Shorter time periods accessible with non-default settings.
6. Dispersion model
   (a) Dispersion model LASAT 3.3 (Lagrangian dispersion model according to German Guideline VDI 3945 Part 3) and auxiliary programs from the program package LASAT 3.3.
   (b) Support of multithreading (usage of all processor cores).
7. Calculation area
   (a) Horizontal mesh size from 10 m to 2000 m.
   (b) Up to 6 nested grids with an increase of mesh size by a factor 2 to the next coarser grid.
   (c) Up to 200 times 200 meshes per grid.
   (d) Vertically up to 50 arbitrary intervals from ground up to at maximum 2000 m.
8. Terrain
   (a) Characterization by an average roughness length.
   (b) Flat terrain or terrain profile (provided in the file format DMN, ARCINFO, or ATKIS).
9. Buildings
   (a) Up to 50 buildings.
   (b) Top of buildings parallel to the ground, bottom at ground.
   (c) Rectangular or polygon-like shape.
   (d) Buildings accounted for in the finest grid.
10. Meteorology
    (a) Specification of wind speed, wind direction, and Monin-Obukhov length (alternatively, stability class according to the German classification scheme Klug/Manier) in form of a
        i. time series as provided by the DWD (*Deutscher Wetterdienst*, German Meteorological Service),
        ii. time series in DMN format,
        iii. USAT data file (supersonic anemometer provided by the company METEK).
    (b) Internal generation of boundary layer profiles with the meteorological preprocessor of LASAT (standard profiles of LASAT or profiles according to the German Regulation *TA Luft*).
    (c) For complex terrain, generation of three-dimensional wind and turbulence fields with a diagnostic wind field model.
11. Results
    (a) For each substance, the total mass emitted in the specified time period by each source group; for aircraft traffic, breakdown into aircraft groups and LTO phases.
    (b) Long-time and short-time (percentiles or values according to EU directives) concentration distributions for each calculation grid.
    (c) Time series of hourly concentration at specified monitor (receptor) points.
    (d) Statistical uncertainty of each concentration value.
12. User interface
    (a) Interactive setup of a project.
    (b) Definition of source objects with the help of digitized maps.
    (c) Execution of emission and dispersion calculations.
    (d) Evaluation and preparation of a movement journal.
    (e) Concentration visualization in form of graphics and tables.
    (f) Merging of results from calculations over successive time periods.
    (g) Optionally command line execution of most of the essential calculation steps.
    (h) File editor.
    (i) Supported languages: English, German.
13. Files
    (a) Input and output data in form of text files (ASCII) with fully documented formats.
    (b) Concentration files optionally in ArcInfo-readable format.
    (c) Graphics in form of PNG and PDF files.

**C. Documentation**

All LASPORT documentation provided in English.

1. Program manual (model, installation, handling, files, formats; approx. 150 pages).
2. Documented example applications (step by step description; approx. 40 pages).
3. LASAT 3.3 program manual (approx. 270 pages).
4. Example projects.
5. Supplementary documentation.