The number of automatic Lidars and ceilometers with profiling capability installed over Europe has increased over the past two years. National Meteorological and Hydrological Services (NMHS) in Germany, France, the Netherlands and the United Kingdom, in particular, are deploying Lidars and ceilometers to cover their national territories with the objective to reach a spatial density of nearly one device every 100 km (e.g. Haij and Klein Baltink 2007; Flentje et al. 2010). These investments have been made because of the Lidars/ceilometers ability to detect volcanic ash, but the network is potentially of great value in monitoring clouds and pollution and evaluating their representation in NWP models. Ultimately, incorporation of such data could lead to improved prediction of air quality and hazardous weather.

Although the name ceilometer suggests that their sole purpose is to detect cloud-base, modern ceilometers are able to provide continuous accurate and reliable profiles of backscatter from aerosols and clouds. In the past, Lidars were strictly research instruments. Similarly modern Lidars are becoming more automated and can now contribute efficiently to continuous monitoring of air quality and weather.

Several communities have expressed their interest in exploiting data that can be derived from automatic Lidars/ceilometers in Europe: for evaluation of the representation of clouds and aerosols in operational weather forecast models run by National Met Services, for evaluation of climate models, for aerosol transport surveillance and air traffic safety (eg VAAC services, national aviation control entities), for air quality applications (eg EU FP7/GMES MACC-II programme), for greenhouse gas monitoring applications (eg. GAW, ICOS programme). Hence, efforts should be made to provide Lidar/ceilometer data in a harmonized way in Europe.

COST ES-0702 supported a series of expert meetings attended by those operating automatic profiling Lidars/ceilometers which has established: 1) Automatic profiling Lidars/Ceilometers are reliable and low-cost instruments (10 to 100k?) which can operate unattended for many days and provide accurate and calibrated attenuated backscatter profiles every 30-60 seconds with a vertical resolution typically of 10-100 m. 2) Means of monitoring data quality and self calibrating the absolute Lidar/ceilometer sensitivity have been implemented and tested, based on various techniques (integrated cloud returns, sunphotometer optical depth, ?). 3) Initial work forward modeling the aerosol and cloud backscatter profile predicted from operational NWP models and comparing with observations are very encouraging suggesting that the observations can be used for evaluating model performance, and, more importantly, for data assimilation. 4) At a COST expert meeting held January 2012, representatives of European NMHSs agreed to work towards harmonization of data formats, data exchange, using common retrieval algorithms and calibration procedures.