

# TTYtutka

27.3. 2007 1(4)

## *Thunder* Lightning Detection System

### GENERAL

à TTYtutka Thunder detection system is owned and operated by the Institute of Power Engineering of Tampere University of Technology (TUT), Finland. TUT has at the moment five co-operation partners: Tampere Water Ltd, Kangasala Water Ltd, Fortum Heat&Power Ltd, Koillis-Satakunnan Sähkö Ltd and Ilkka Lilja Ltd. Additionally, we are developing the new StrikeStar II lightning detection system together with Astrogenic systems ([www.astrogenic.com](http://www.astrogenic.com)), Sweden.

à The system includes 5 lightning detectors and 5 electric field mills, manufactured by Boltek Corp. ([www.boltek.com](http://www.boltek.com)).

à With lightning detectors we can watch on-line lightning strokes and movements of lightning fronts on computer screen. In addition, we can get earlier days lightning data on the screen.

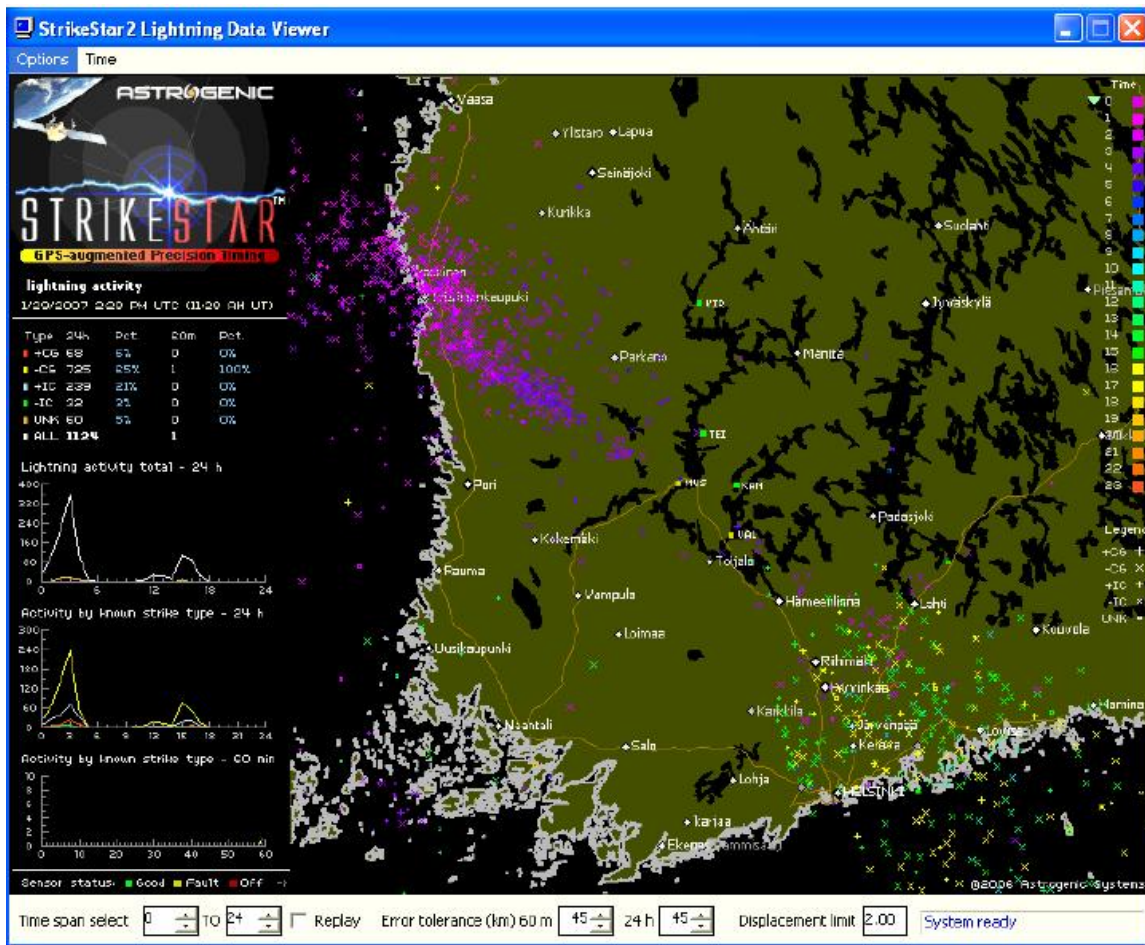
à With field mills we can watch on-line the changes of electric field around measurement points (radius 15 km). With this information we can prepare ourselves for the possibility of lightning on Tampere area. The system alerts of the possibility of lightning approximately 30 minutes before the first lightning stroke. This alert is also possible to be got on a mobile phone as SMS text message.

à The system includes following parts: GPS precession timing based lightning data presenting software StrikeStar 2, Field mill data and lightning stroke data presenting program WASP, Ut2sms software for mobile phone alerts and Salama 2006 program for data analyzing.

à Our co-operation partners can also see all the data on our webpage.

à To conclude, the system can locate lightning strikes approximately to 1 km radius of its occurred position and give alerts approximately 30 minutes before the first lightning stroke on computer screen and on mobile phone. Additionally, earlier day's data can be viewed for e.g. fault analyzing purposes.

## STRIKESTAR 2 LLS and STRIKESTAR LDV



à The StrikeStar LDV is lightning data viewing software and the StrikeStar LLS is a server based core processing program for lightning strike data. LLS triangulates locations of strokes by matching data from different sensors using GPS based time stamp information and initial location approximations.

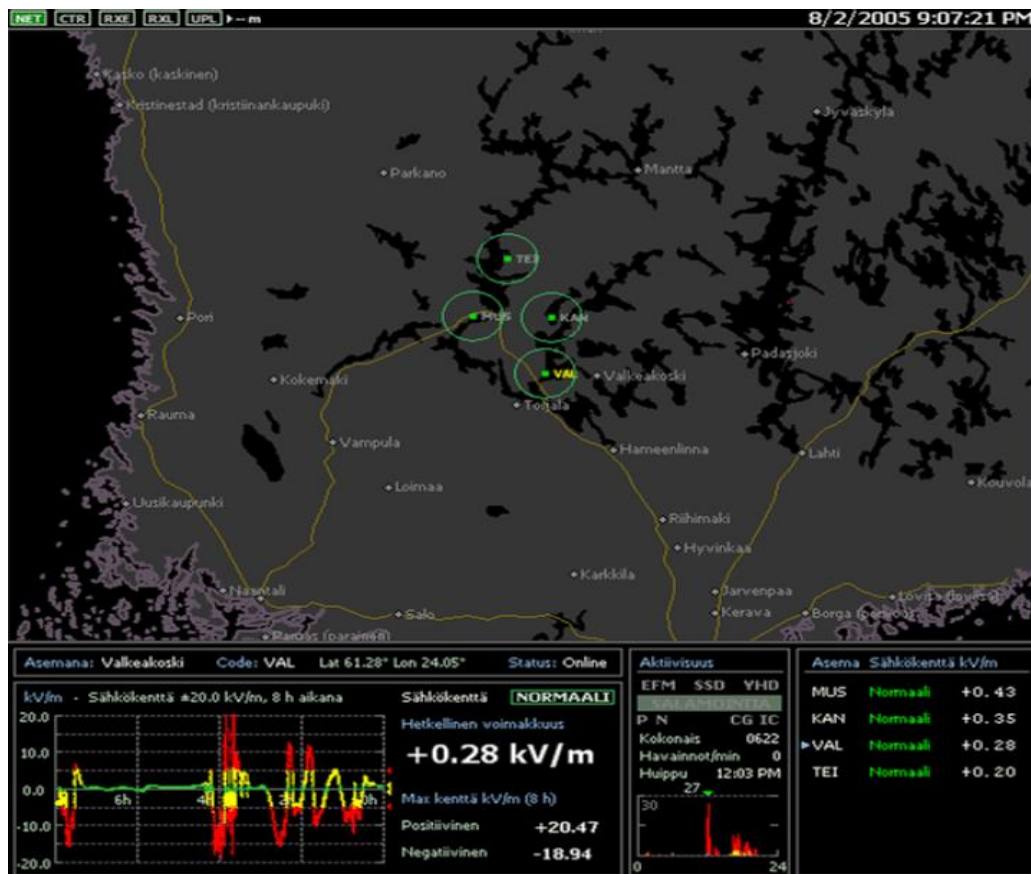
à LDV is a monitoring application which runs alongside LLS. LDV visualizes triangulated stroke data on a map and is capable of showing the entire days lightning activity, the last 60 minutes of activity, or a lightning density plot for the past 60 minutes.

à LDV can present different lightning types (pos/neg cloud-to-ground stroke or pos/neg intra-cloud stroke) on the map with different individual markings. In addition, at different time occurred lightning strokes are presented by individually colored marks (in the figure on the right edge).

à TTYtutka system is running now on four different background maps: Nordic region, South of Finland, the region of Pirkanmaa and the region of Tampere. Different background maps, suitable for user's own purposes, are easy to generate and add to the system afterwards.

à All the data is transferred by using FTP transfer to our webpage.

## WASP (Wide Area Strom Probe Client)



à WASP client includes both the lightning stroke information and the field mill data.

à The application features alarms for high and very high electric fields, as well as strike alert sounds.

à Field mill values can be viewed independently at measurement points at 5 minute base all the way up to 24 hour base.

à The fifth electric field mill to Raikku (Kangasala) will be taken on-line during summer 2007.

à Independent data from different measurement points can also be viewed on our website.

“Lightning detectors and field mills are widely used on different solutions, for example in industry and in agriculture field mills are used to start up diesel generators to insure uninterrupted power supply. Also in industry, which uses explosives, field mills are used to secure the safety of workers.”

“With the information provided by the TTYtutka thunder detection system power electric companies can prepare themselves for the possibility of lightning better than ever before. They can observe thunder fronts development on real time and they can get, for example, precisely time-stamped lightning stroke locations for fault analyses. “

FOR MORE INFORMATION, PLEASE, VISIT OUR WEBSITE

[www.tut.fi/svt/ukkostutka](http://www.tut.fi/svt/ukkostutka)

OR CONTACT

M. Sc. student Tomi Karvonen  
p. +358 40 516 9889  
e. [tomi.j.karvonen@tut.fi](mailto:tomi.j.karvonen@tut.fi)

Docent Kari Kannus  
p. +358 3 3115 2366  
mobile: +358 400 88 7722  
e. [kari.kannus@tut.fi](mailto:kari.kannus@tut.fi)

Ilkka Lilja  
Ilkka Lilja Oy Ltd  
Tel: +358-14-3722134  
<http://www.iloy.fi/?language=english>  
email: [ilkka.lilja@iloy.fi](mailto:ilkka.lilja@iloy.fi)