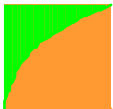
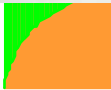


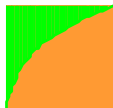
Operational predictions of the potential flight distance for soaring in **wind** & **thermals**

Olivier Liehti

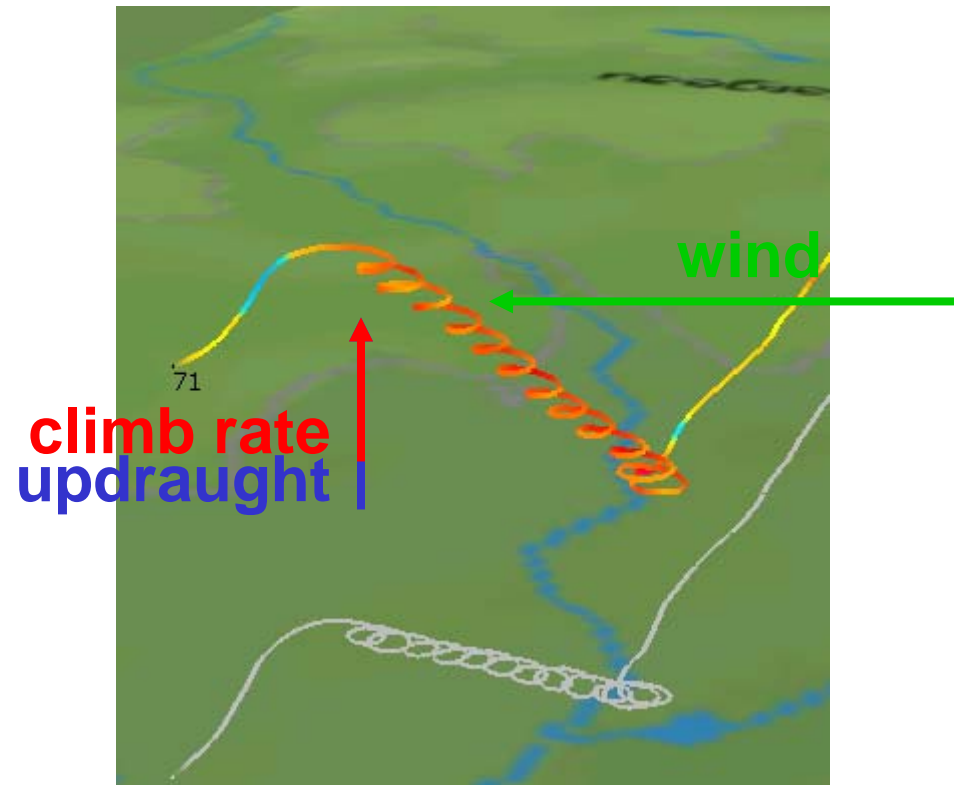
A&K, Winterthur, Switzerland





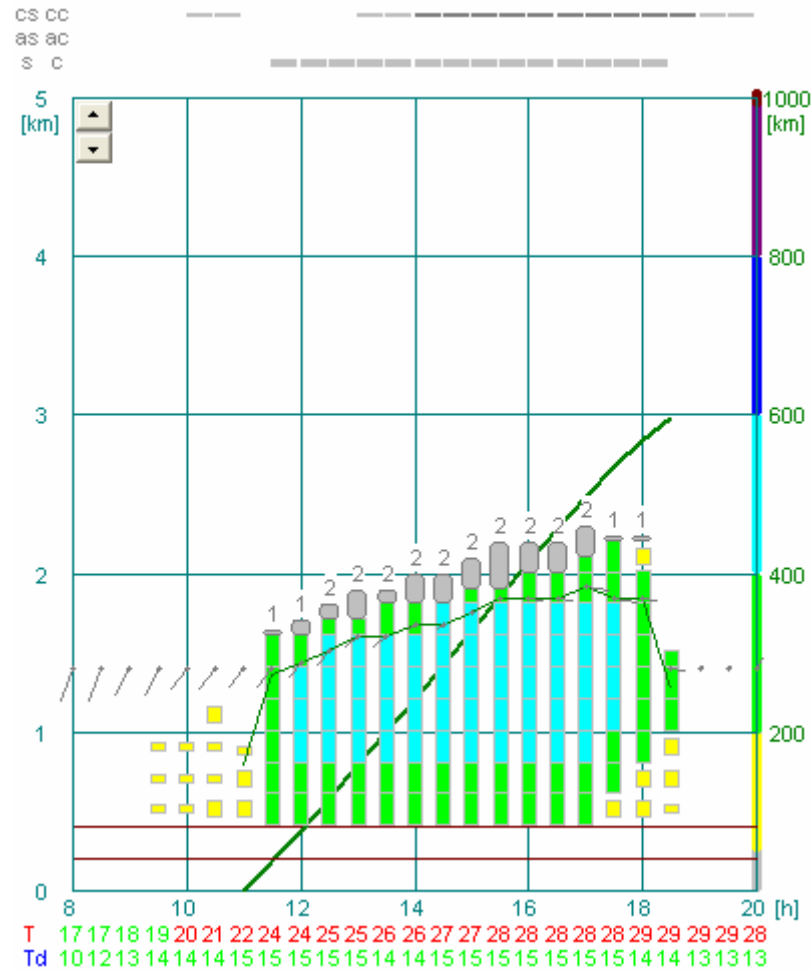


Gliders climb in thermals

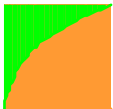


Operational predictions

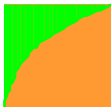
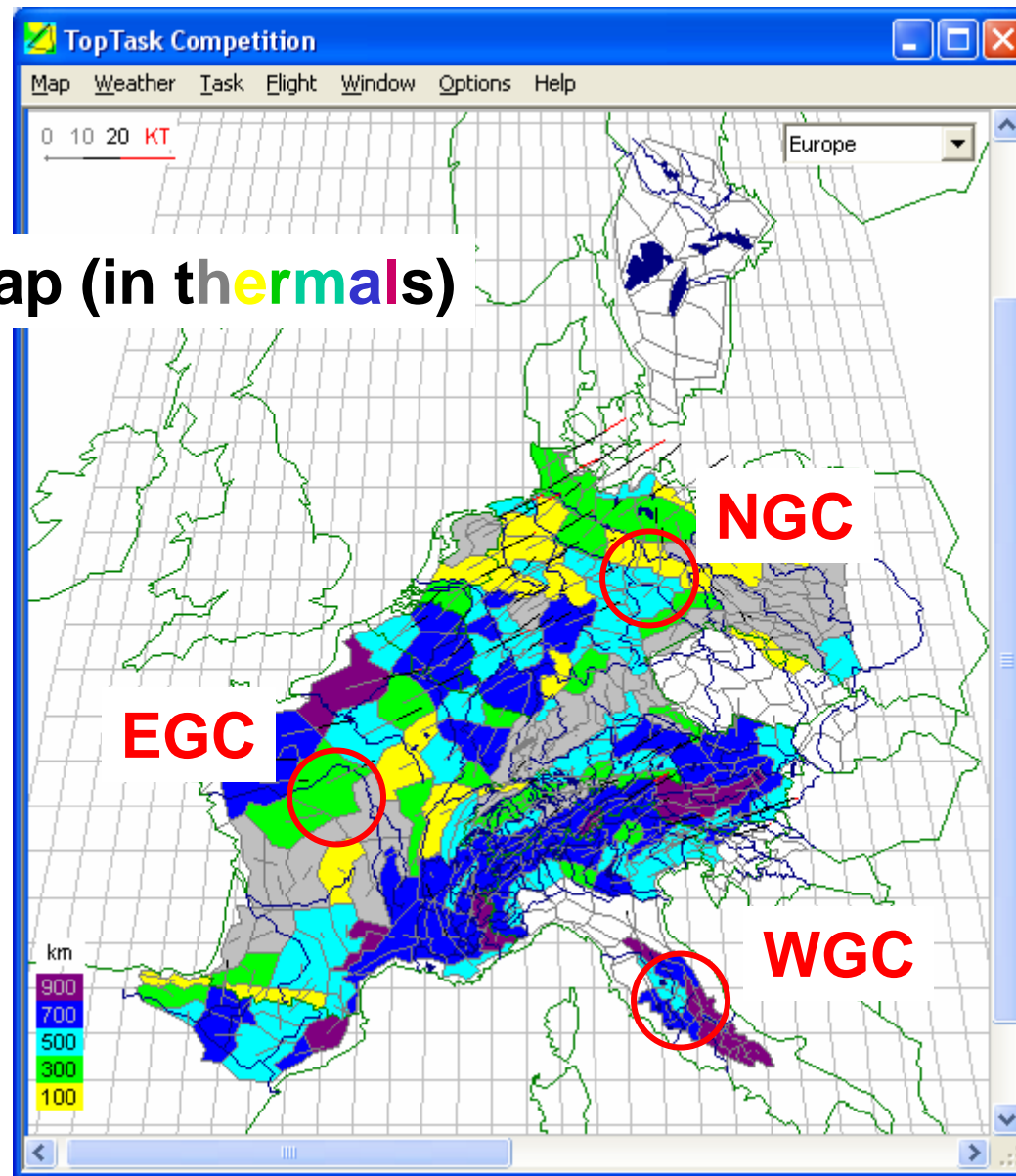
NWP of
thermals

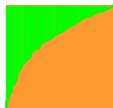
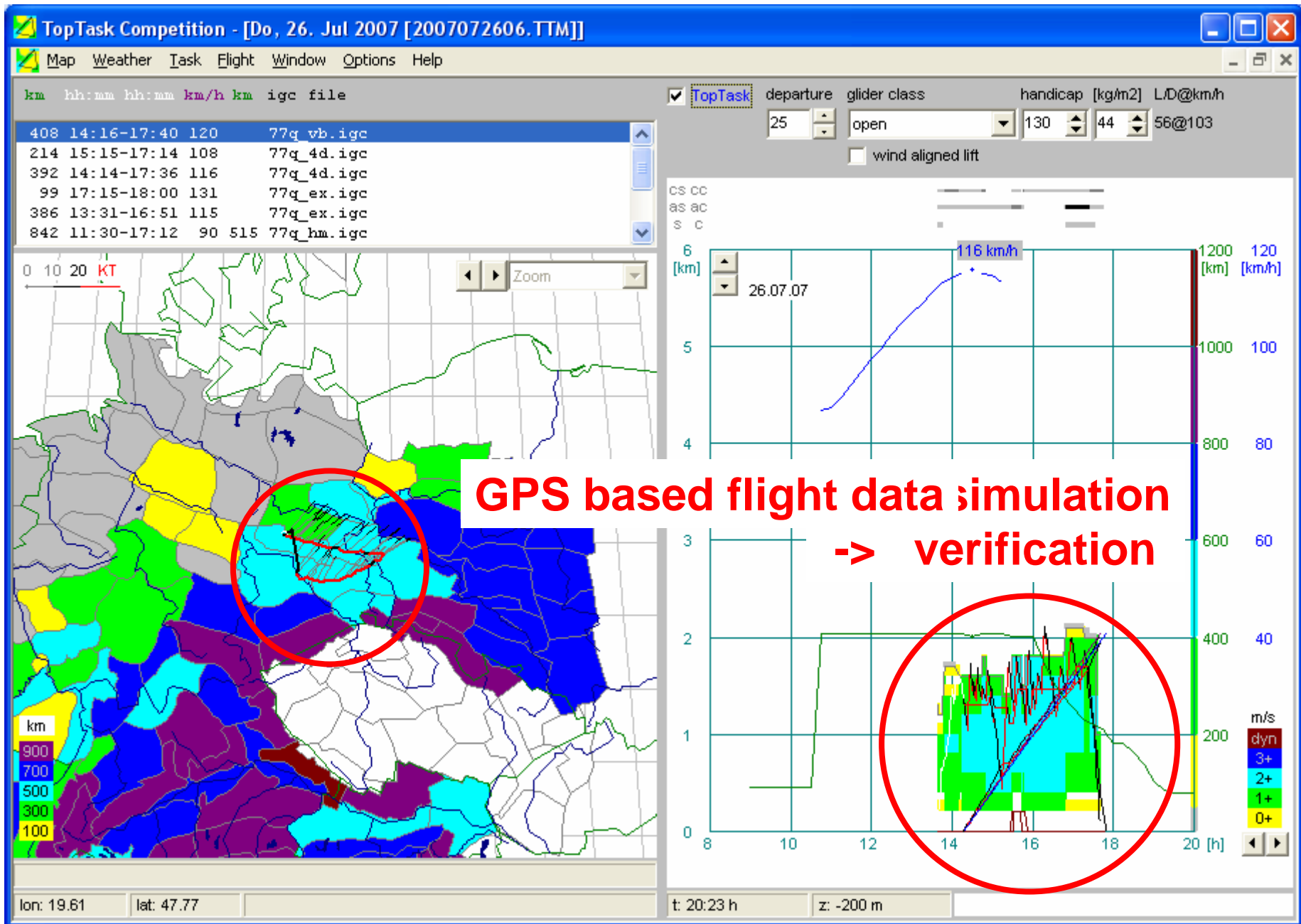


PFD in thermals

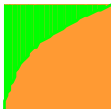
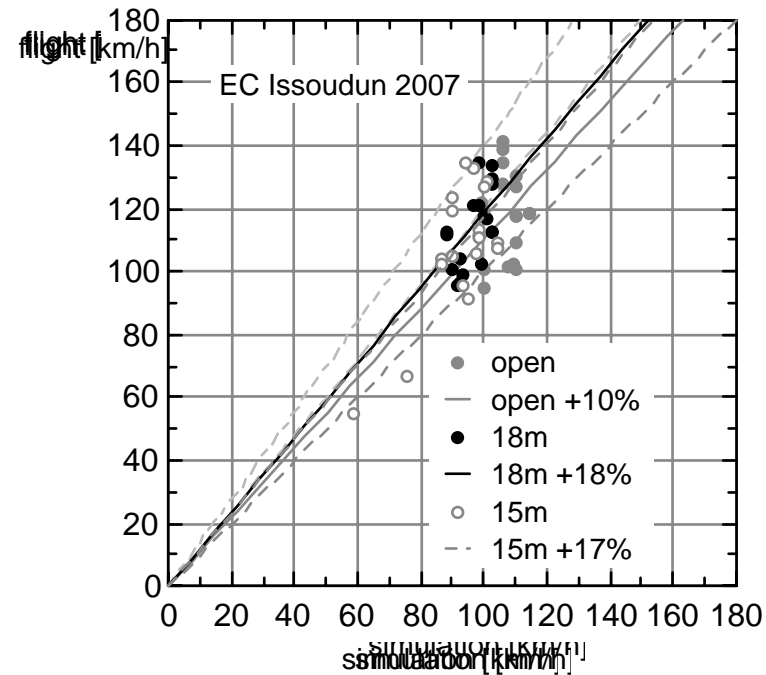


PFD map (in thermals)

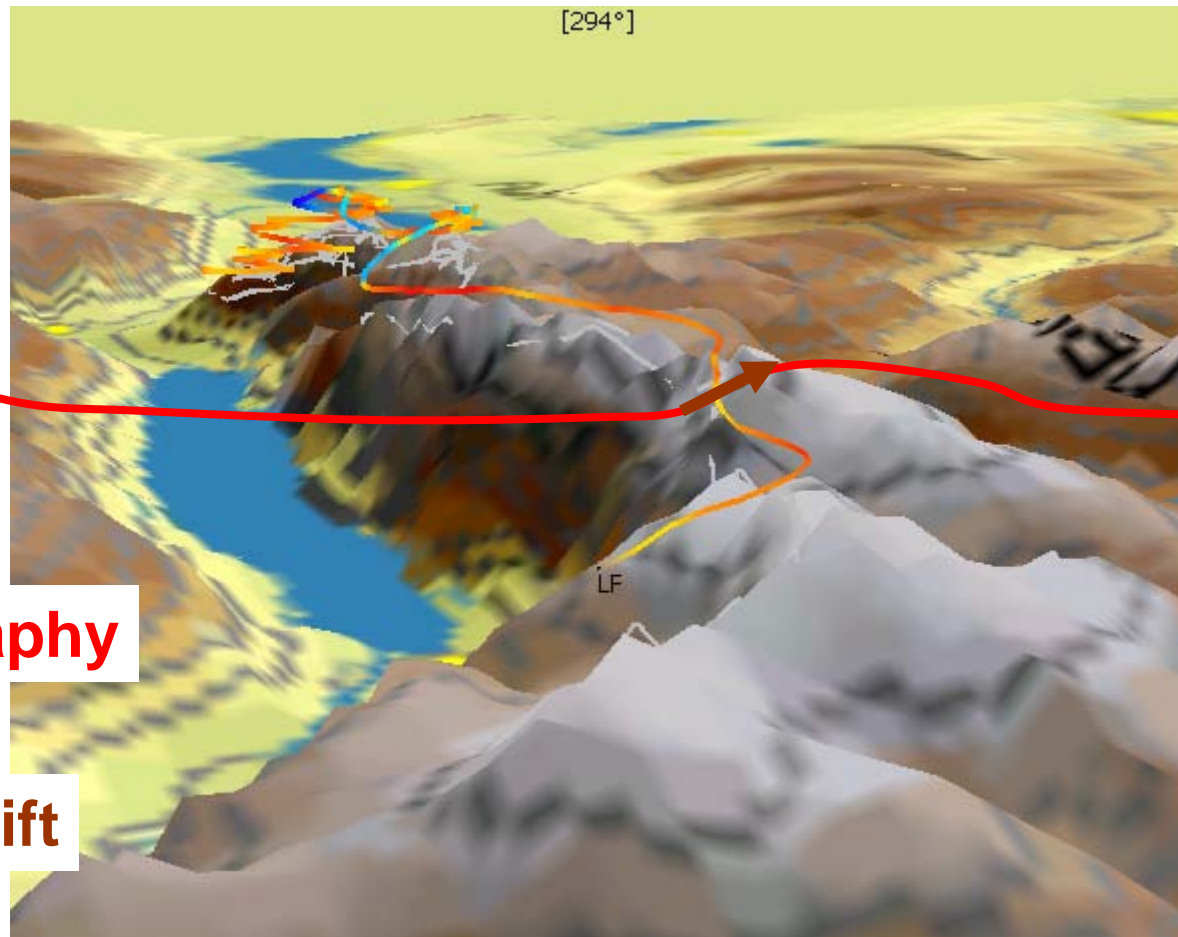




Verification: flight speed - simulated speed (winning competition flights in thermal lift)



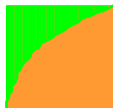
Gliders fly in **dynamic lift**



wind

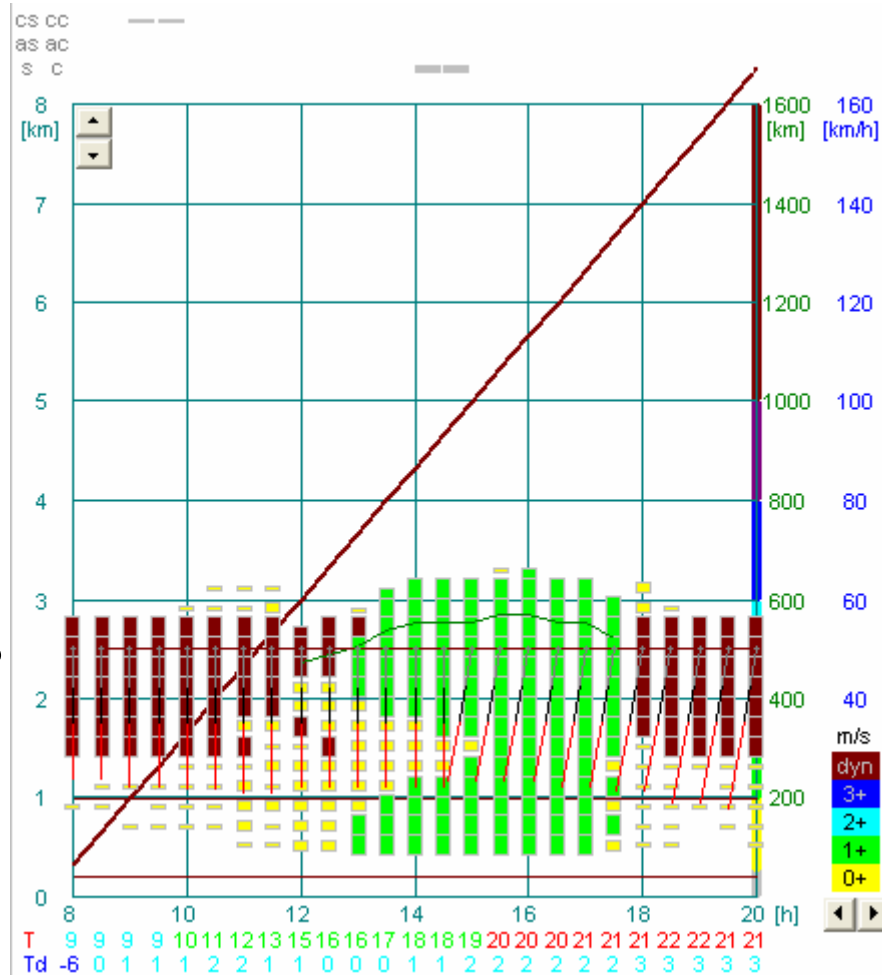
+ orography

= slope lift



Operational predictions

**NWP of
ridge lift
&
thermals**

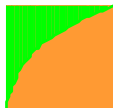
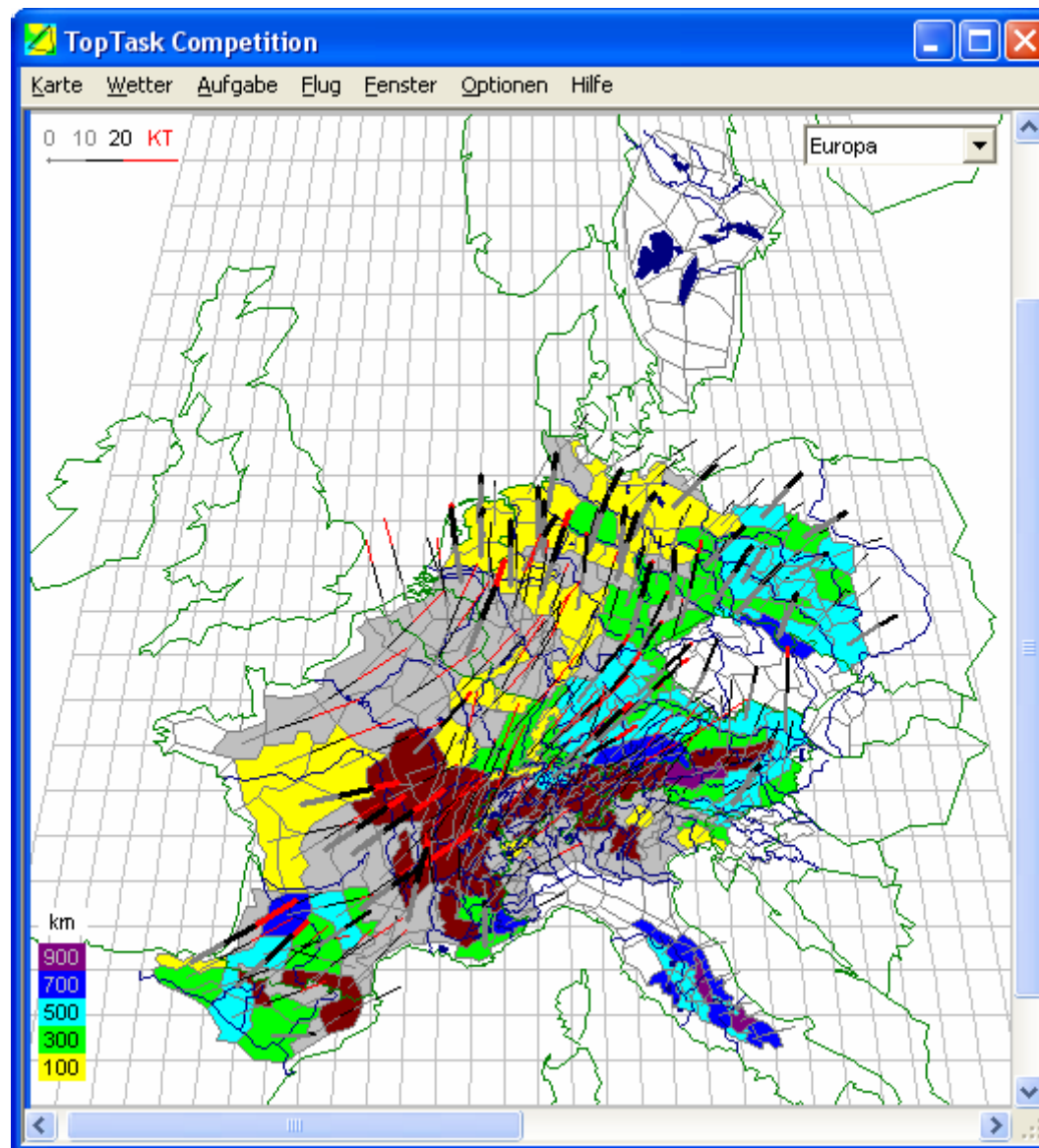


**PFD in
ridge lift
&
thermals**

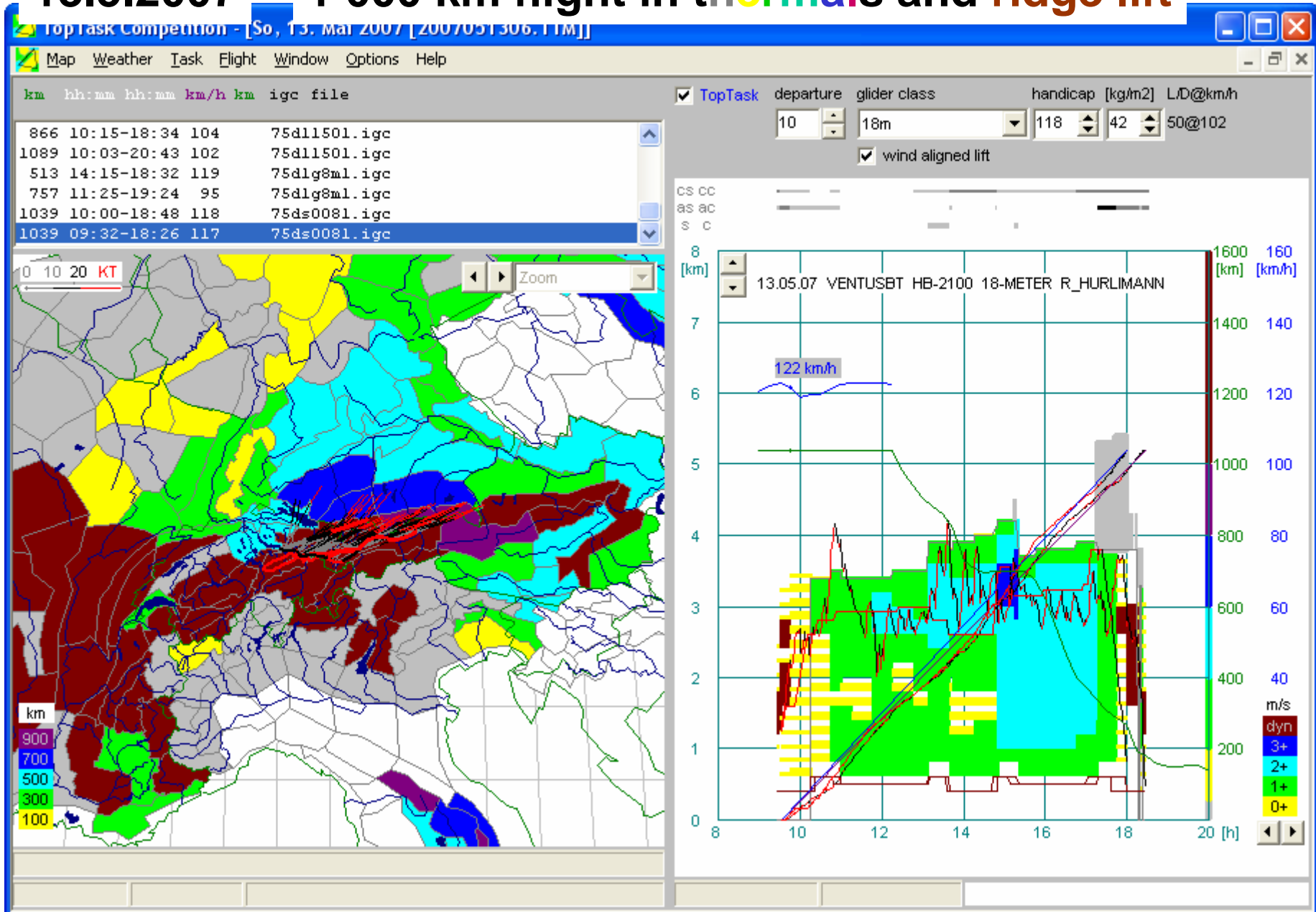


PFD in thermals and ridge lift

13.5.2007

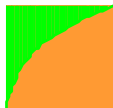
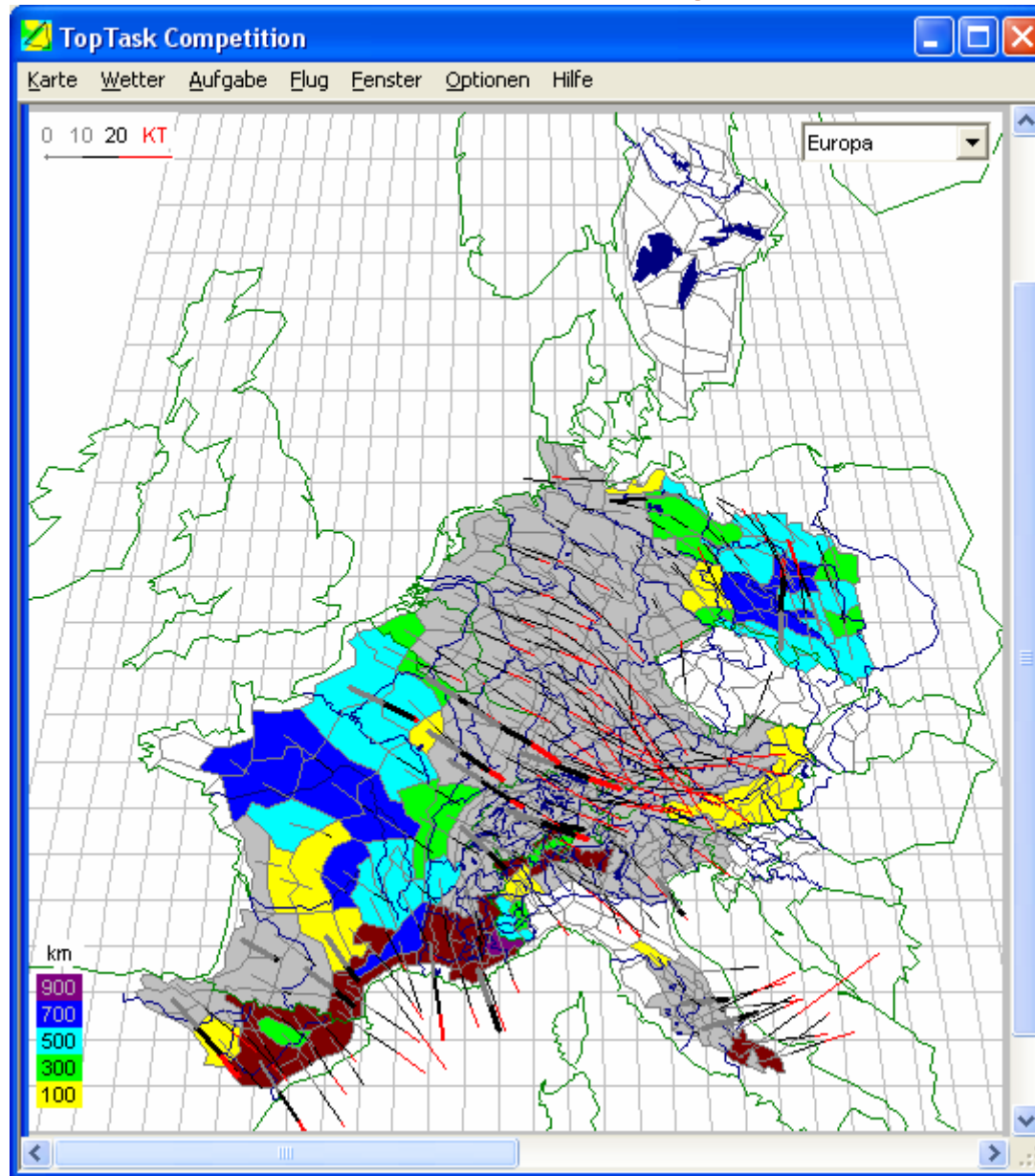


13.5.2007 1'000 km flight in thermals and ridge lift

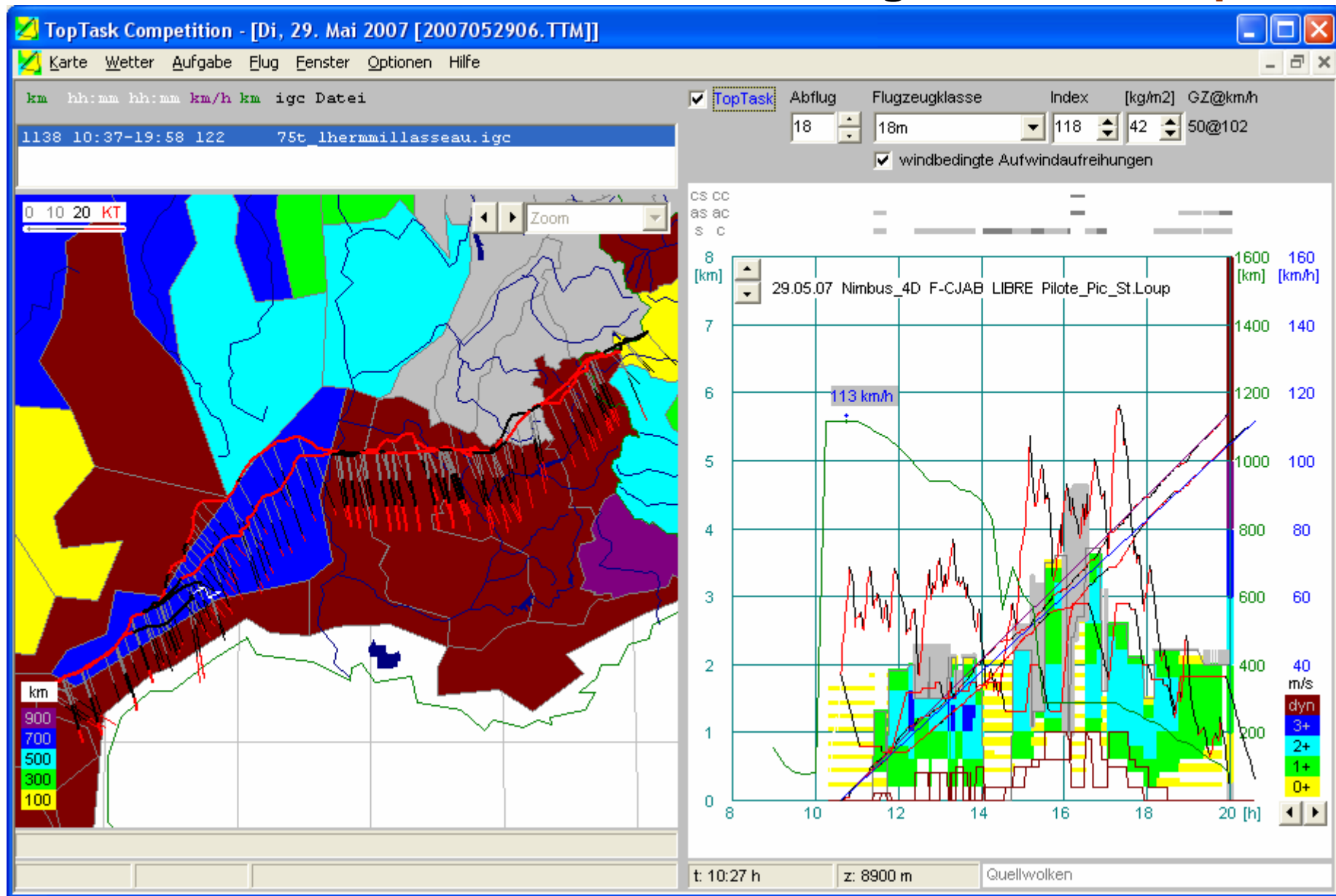


PFD in thermals and dynamic lift

23.5.2007

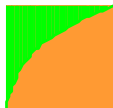
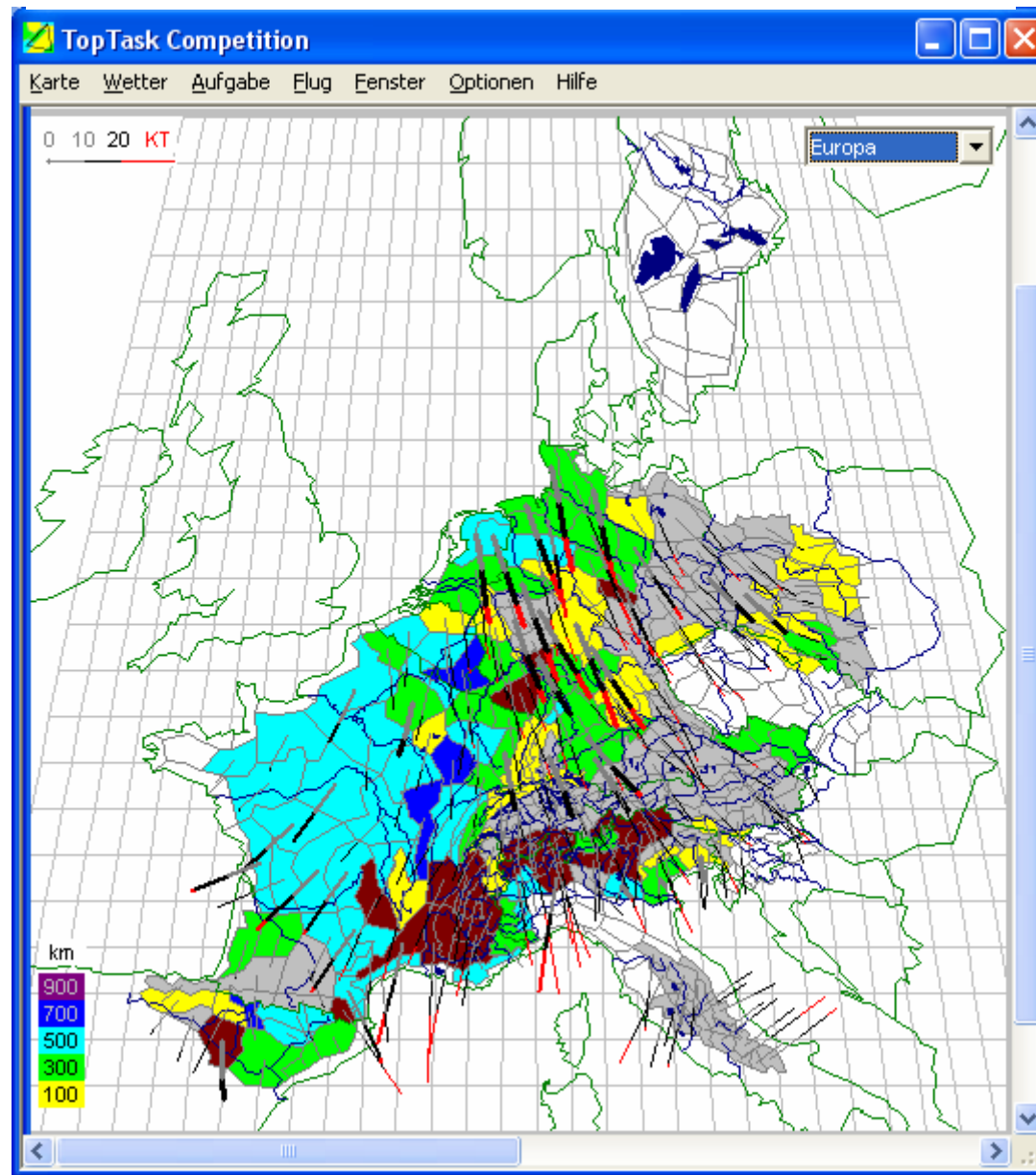


1'100 km flight in **wave/slope lift**

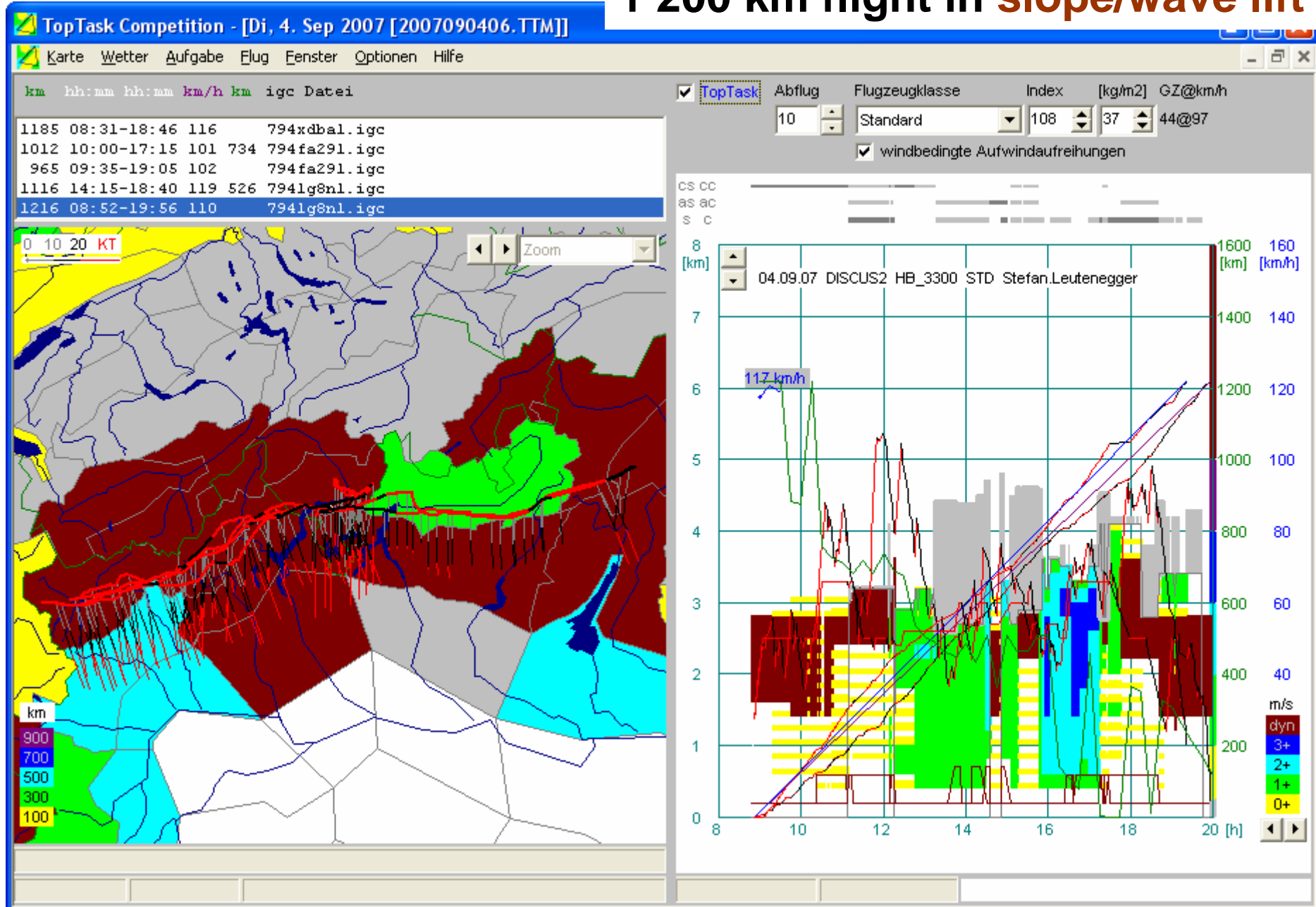


PFD in thermals and dynamic lift

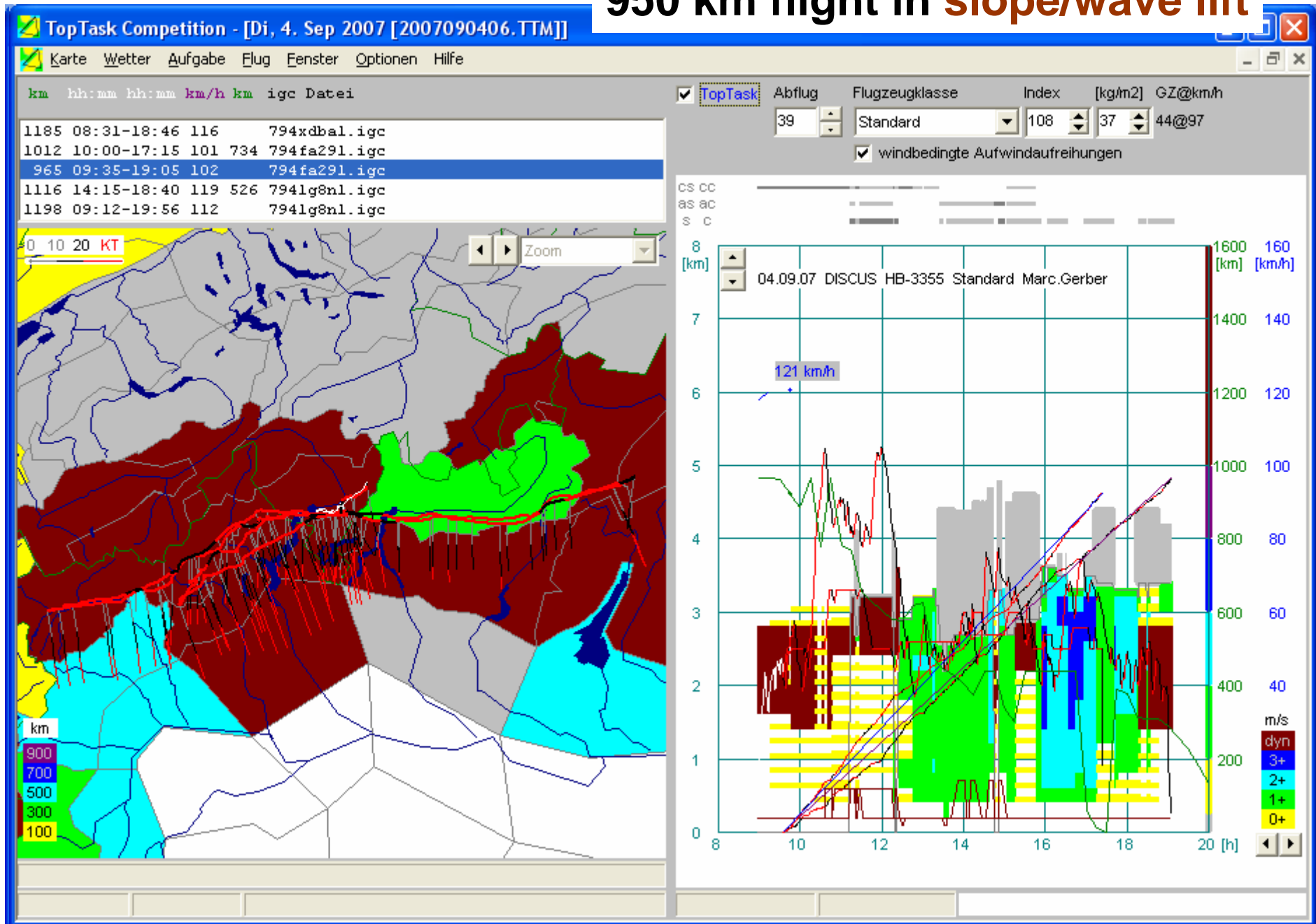
4.9.2007



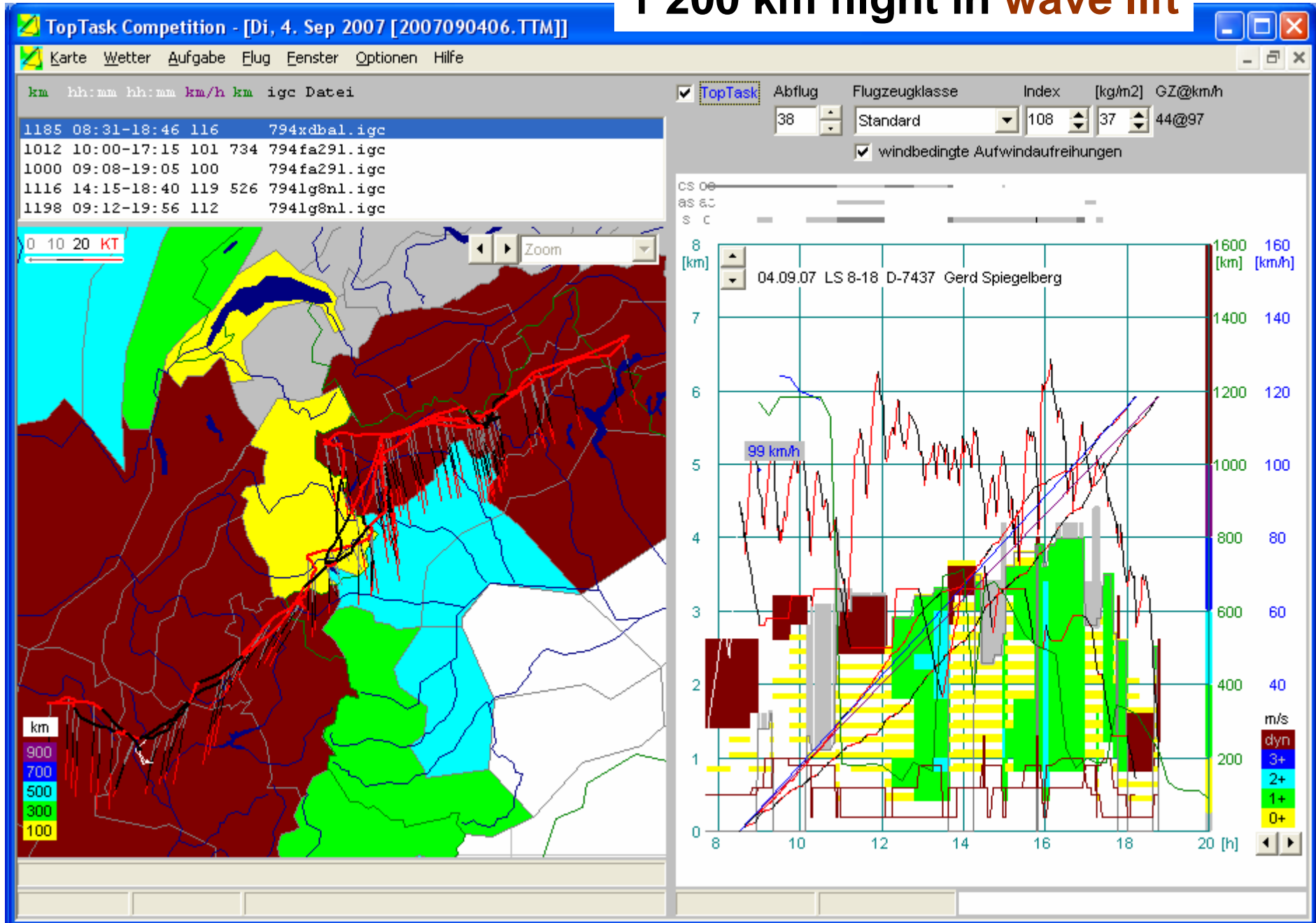
1'200 km flight in slope/wave lift



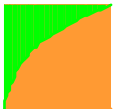
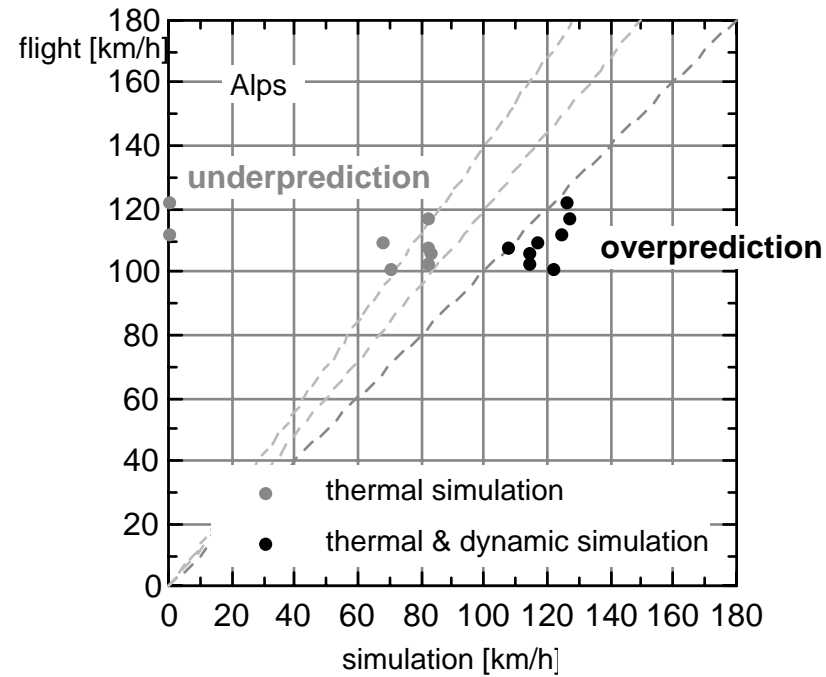
950 km flight in slope/wave lift



1'200 km flight in wave lift

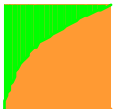


Verification: flight speed & simulated speed (long flights in **dynamic lift**)



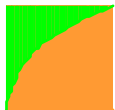
Summary

- operational NWP for **thermal** updraughts
- operational NWP for **dynamic** updraughts
- **GPS based flight traces: climb rate, flight altitude, ground speed**
- **the height, the strength, and the spatial distribution of updraughts is recorded.**
- **NWP of updraughts is tuned with flight data**



Conclusions

- the ground speed for soaring flights in **thermal** lift is slightly underestimated (7% ... 17% on average) for champions
- the ground speed for soaring flights in **dynamic** lift is slightly overestimated (0% ... 20%) for long flights
- meteorological flight planning for soaring flight is available operationally in useful quality for both **thermal** and **dynamic** lift





PFD in thermals

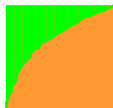
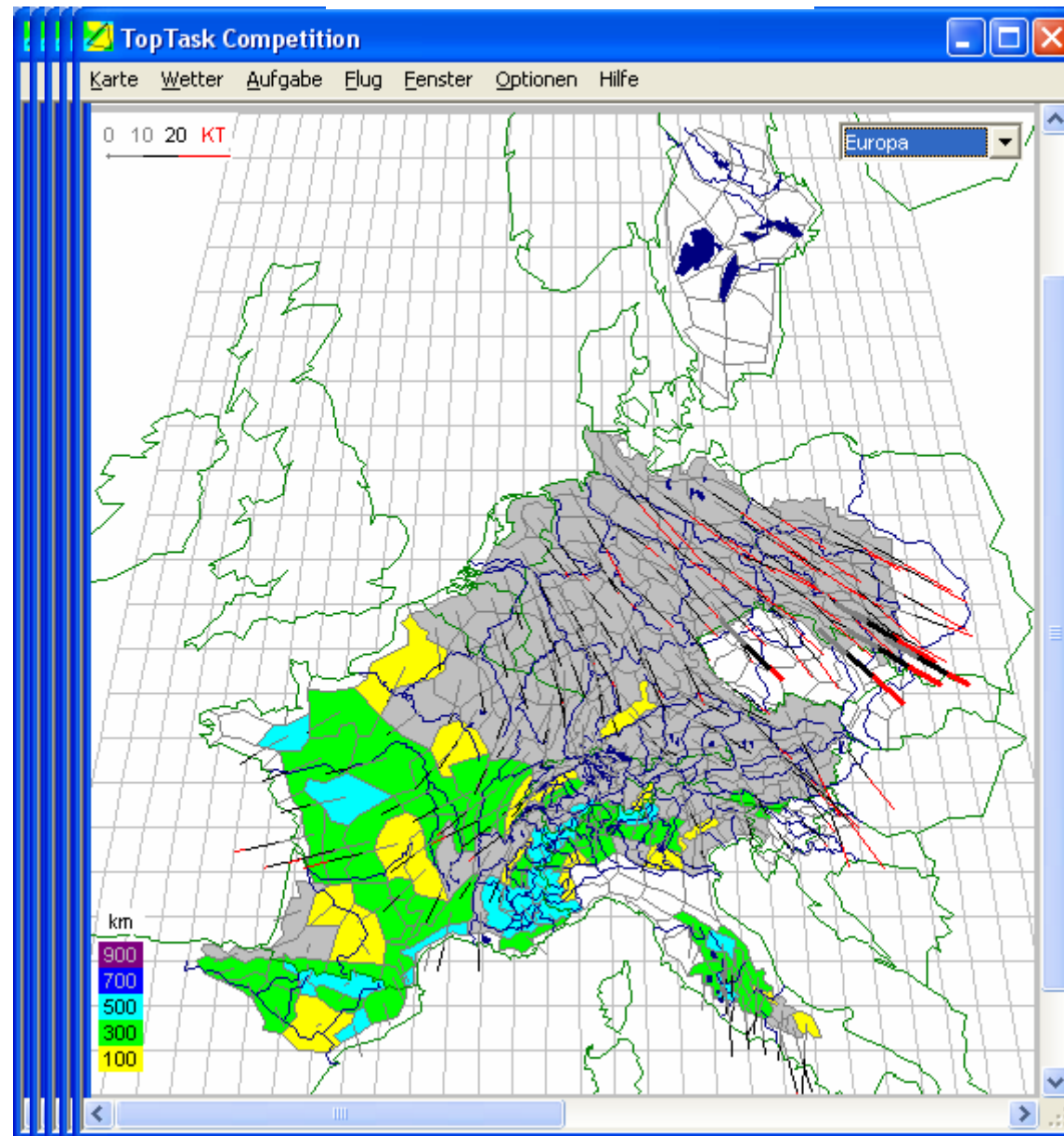
4.9.2007

5.9.2007

6.9.2007

7.9.2007

8.9.2007



PFD in thermals and ridge lift

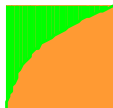
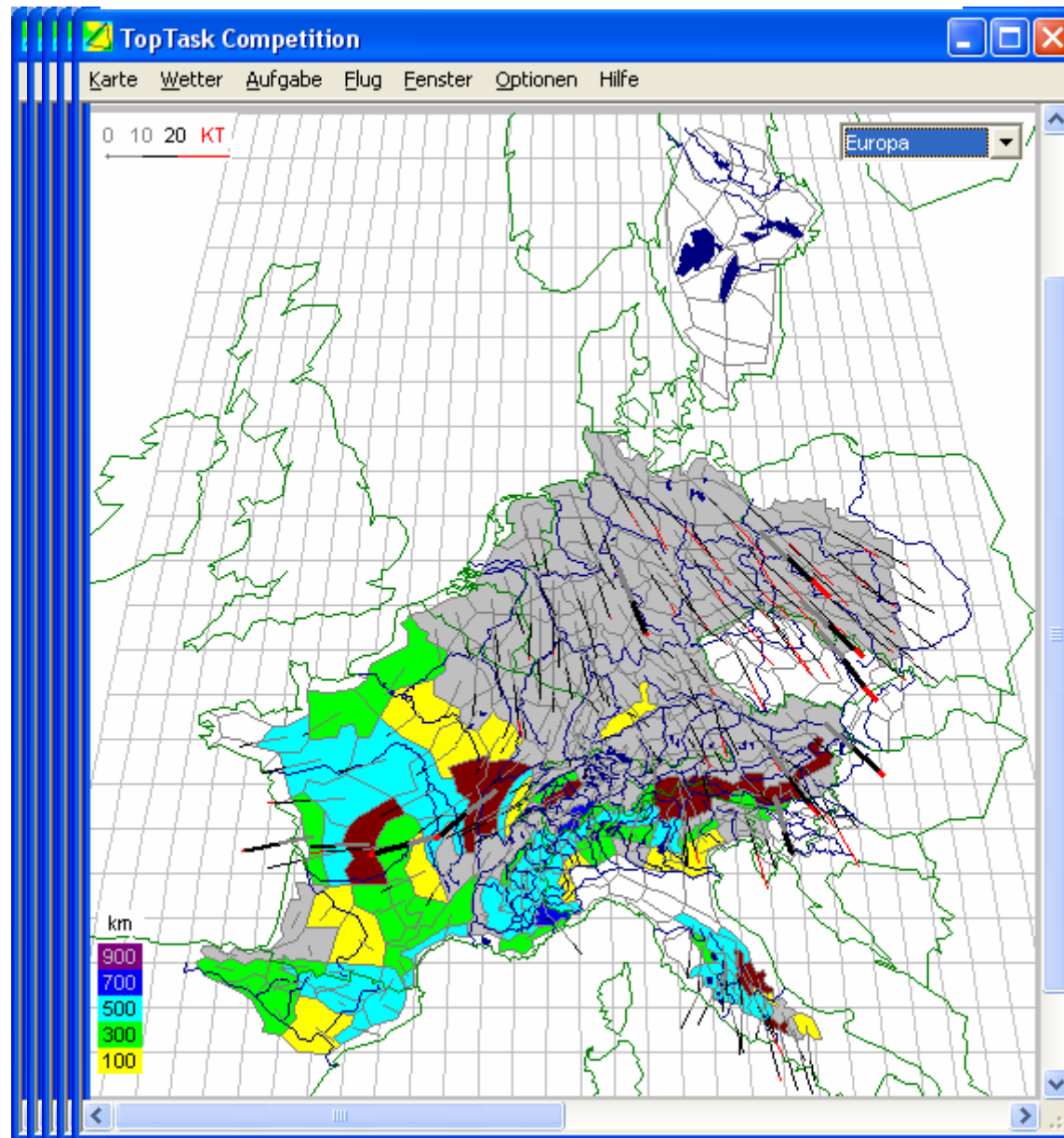
4.9.2007

5.9.2007

6.9.2007

7.9.2007

8.9.2007



METEOSAT HRV Loop

