



ESA - MOST Dragon 2 Programme

**2011 DRAGON 2 SYMPOSIUM**

中国科技部-欧洲空间局合作“龙计划”二期

**“龙计划”二期2011年学术研讨会**

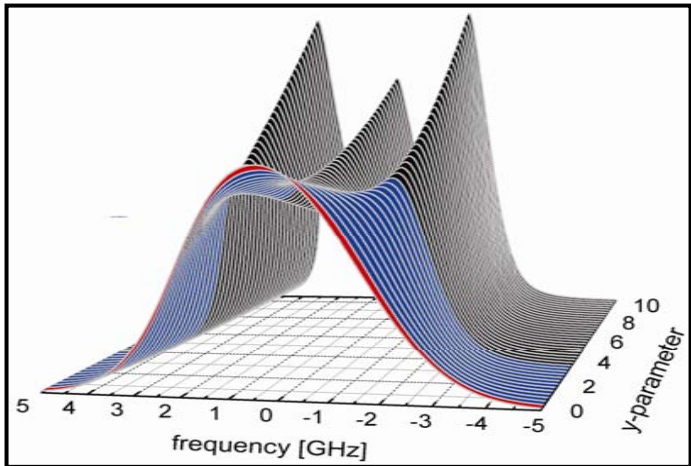
## Project Summary

**ID 5291 Lidar Cal/Val**

**Friday 24 June 2011**



# Main Results (1/2)



- Airborne and ground based lidar instrument developed in Europe and China for the validation of the first wind lidar in space on ADM-Aeolus from ESA (expected launch in 2013).
- Airborne Demonstrator for instrument on ADM-Aeolus developed at DLR and deployed during several airborne and ground campaigns during last years.
- Principle of wind retrieval for ADM-Aeolus validated with airborne demonstrator.
- First Rayleigh-Brillouin line shape measurements in air, performed in the laboratory and in the atmosphere from a mountain observatory in Germany.

# Main Results (2/2)



- Ground-based Doppler lidar tested in 8th WMO intercomparison of High Quality Radiosonde Systems in July 2010.
- Meteorological Service for the Guangzhou Asian Games in November 2010. (a)
- Intercomparison campaign of lidar and radiosonde winds started in March 2011. (b)
- Sea surface reflectance in UV studied for different wind speeds and incidence angles.

# List of Publications (1/2)

1. **Reitebuch O.**, Lemmerz C., Nagel E., Paffrath U., Durand Y., Endemann M., Fabre F. and Chaloupy M. (2009): “The Airborne Demonstrator for the Direct-Detection Doppler Wind lidar ALADIN on ADM-Aeolus. Part I: Instrument Design and Comparison to Satellite Instrument”, Journal of Atmospheric and Oceanic Technology, Vol.26.
2. **Paffrath U.**, Lemmerz C., Reitebuch O., Witschas B., Nikolaus I. and Freudenthaler V. (2009): “The Airborne Demonstrator for the Direct-Detection Doppler Wind lidar ALADIN on ADM-Aeolus. Part II: Simulations and Rayleigh Receiver Radiometric Performance”, Journal of Atmospheric and Oceanic Technology, Vol.26.
3. **Li, Z.**, Lemmerz, Ch., Paffrath, U., Reitebuch, O., Witschas, B. (2010): “Airborne Doppler Lidar Investigation of Sea Surface Reflectance at a 355-nm ultraviolet wavelength”, Journal of Atmospheric and Oceanic Technology, Vol.27.
4. **Witschas B.**, Vieitez M. O., van Duijn E.-J., Reitebuch O., van de Water W., Ubachs W. (2010): “Spontaneous Rayleigh-Brillouin scattering of ultraviolet light in nitrogen, dry air, and moist air”, Applied Optics, Vol.49.
5. **Witschas (2011)**: “Analytical model for Rayleigh–Brillouin line shapes in air”, Applied Optics, Vol. 50.
6. **Witschas (2011)**: Doctoral Dissertation “Experiments on spontaneous Rayleigh-Brillouin scattering in air”, Friedrich-Schiller University, Jena, Germany.

# List of Publications (2/2)

1. **Zhangjun Wang**, Zhishen Liu, Liping Liu, Songhua Wu, Bingyi Liu, Zhigang Li, Xinzhao Chu, “Iodine-filter-based mobile Doppler lidar to make continuous and full-azimuth-scanned wind measurements: data acquisition and analysis system, data retrieval methods, and error analysis” *Applied Optics* **49**, 6960-6978 (2010).
2. **Zhi-shen Liu**, De-cang Bi, Xiao-quan Song, Zhi-gang Li, Jin-jia Guo, Jin-bao Xia, Song-hua Wu, Xi-tao Wang, Qi-wei Yin, Yang Chen, “Airborne Doppler lidar based on iodine filter” *Proceedings of the 25th ILRC, St. Petersburg, Russia*, 11-14 (2010).
3. **Bing-Yi Liu**, Zhi-Shen Liu, Xiao-Quan Song, Song-Hua Wu, De-Cang Bi, Xi-Tao Wang, Qi-Wei Yin, Yang Chen, “Mobile Doppler lidar with inertial navigation system for moving measurements” in *Proceedings of the 25th ILRC, St. Petersburg, Russia*, 98-101 (2010).
4. **Zhi-Shen Liu**, Song-Hua Wu, Huang Li, Zhang-Jun Wang, De-Cang Bi, Rong-Zhong Li, Bing-Yi Liu, Zhi-Gang Li, “Operational observations of three dimensional wind with incoherent Doppler wind lidar” in *Proceedings of the 25th ILRC, St. Petersburg, Russia*, 286-289 (2010).
5. **Zhang-Jun Wang**, Zhi-Shen Liu, Song-Hua Wu, Bing-Yi Liu, Zhi-Gang Li, Xin-Zhao Chu, Wen-Tao Huang, “Automated and full-azimuth-scanned wind measurements in PPI and RHI modes with a mobile Doppler wind lidar based on iodine filters” in *Proceedings of the 25th ILRC, St. Petersburg, Russia*, 297-300 (2010).
6. **Song-Hua Wu**, Zhi-Shen Liu, Huang Li, Zhang-Jun Wang, De-Cang Bi, Rong-Zhong Li, Bing-Yi Liu, Zhi-Gang Li, “Doppler wind lidar measurements of the land and sea breeze in Qingdao coastal area”, in *Proceedings of the 25th ILRC, St. Petersburg, Russia*, 313-316 (2010).

# Project Planning – 2011 and 2012 (1/2)

- Ongoing pre-launch validation activities of the ADM-Aeolus mission
  - Analysis of airborne measurements from Iceland and Greenland
  - Develop cal/val strategy for ADM-Aeolus with sites in Europe and China
  - Intercomparison campaign of lidar and radiosonde winds started in March 2011.
  - Analyses of mobile Doppler lidar data in previous and on-going campaigns.



# Project Planning – 2011 and 2012 (2/2)

- **Ongoing investigation of spontaneous Rayleigh-Brillouin (SRB) scattering in air**
  - Implementation of new findings from a recent ESA laboratory study concerning SRB scattering in air into the analysis algorithms of the A2D.
  - Investigating the possibility of deriving atmospheric temperature from A2D measurement data by resolving the SRB line shape and comparing it to an appropriate theoretical line shape model (e.g. Tenti S6 model).
  
- **Publication of results**

