

## UNIVERSITY OF BATH DEPARTMENT OF ELECTRONIC AND ELECTRICAL ENGINEERING

### IDENTITY

#### UNIVERSITY

UNIVERSITY OF BATH  
 Centre for Space Atmospheric and  
 Oceanic Science  
 Department of Electronic and Electrical  
 Engineering  
 Bath, United Kingdom

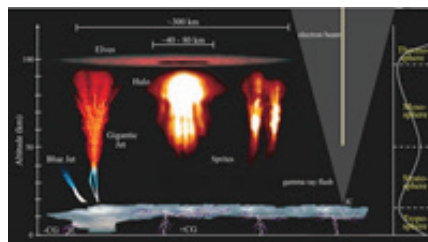
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### PRESENTATION

The University of Bath is an internationally competitive higher education institution in Southwest England of the United Kingdom which attracts more than ~13000 students from around the world to study towards a large variety of undergraduate and postgraduate degrees. The University employs more than ~1500 academic staff for conducting research and teaching which is supported by an administration with more than ~1200 employees. The annual turnover of the University exceeds ~£160M which mainly aggregates from private sponsorship, grant income and tuition fees.



### SPECIAL EQUIPMENT

The University of Bath conducts lightning and sprite observations from La Grande Montagne on the plateau d'Albion. For these observations, optical instruments and radio receivers are used

- \* ULF/ELF magnetic field
- \* ELF/VLF/LF/MF electric field
- \* arrays of radio receivers
- \* high speed photosensors

The network was deployed from July to September 2011. It was operating successfully during several nearby sprite producing thunderstorms. The recorded waveforms are very consistent and exhibit small time delays which reflect the propagation of the electromagnetic waves across the network. These time delays are used to determine the bearing, elevation angle and distance to the source of the arriving electromagnetic energy. Time differences between the arrival of the direct (or ground) wave and the first hop sky wave allow to determine the altitude of the emitting source.

### PARTNERSHIPS PROMOTION

- (1) Summer school for students to learn about the operation of experimental equipment used for research on lightning discharges and discharge processes above thunderclouds.
- (2) Deployment of a volumetric array of broadband radio receivers to map the radio sky on the plateau d'Albion.
- (3) Optical observatory with high speed imager and photometers in collaboration with Prof. Mike Kosch, SANSA, South Africa.
- (4) Ionospheric observations with Riometer in collaboration with Prof. Honary Farideh, Lancaster University, UK.
- (5) Microwave observations with Radiometer in collaboration with Biaggio Forte, University of Bath,

### SKILLS AND KNOW-HOW

#### Competences

- (1) Radio Remote Sensing of lightning discharges and transient luminous events above thundercloud in various frequency ranges from ULF/ELF/VLF/LF/MF.
- (2) Experimental measurements with arrays of radio receivers on the plateau d'Albion.
- (3) Optical observations of lightning and transient luminous events with fast scanning photosensors.
- (4) Array analyses for low frequency radio waves.
- (5) Organisation of summer schools and conferences

### RESEARCH THEMES

Radio Remote Sensing of Lightning Discharges and Transient Luminous Events from the Plateau D'Albion

### WEBSITE LINK

<http://lsbb-new.prod.lamp.cnrs.fr/recherche/couplages-multiphysique/aleas-logiques/reseau-radio-interferometrique/>

### KEY WORDS

*Atmospheric Electricity  
 Lightning Discharges  
 Transient Luminous Events  
 High Energy Atmosphere  
 Radio Remote Sensing  
 Ultra Low Frequency  
 Extremely Low Frequency  
 Very Low Frequency  
 Low Frequency*

