

# African Capacity Building Workshop on Space Weather Effects on GNSS | (smr 3741)

Monday, 3 October 2022 **Programme in Trieste Local time (CEST)**

09:00 - 09:30 Registration

*Upon arrival, Visitors not staying in the ICTP Guest Houses, are kindly requested to complete registration formalities at the Adriatico Guesthouse. The Registration Desk will be open at the Leonardo building lobby from 9.00 to 9.30*

*Time zone: You can choose your time zone (in place of Europe/Rome) on the top right of the page and the programme time will be modified accordingly*

Location: Budinich Lecture Hall (LB) - Lobby

09:30 - 16:30

Location: ICTP ( Budinich Lecture Hall (LB) )

09:30 **Opening Remarks 30'**

Speaker: Bruno NAVA (ICTP, Italy), Sharafat GADIMOVA (UNOOSA, Austria), Keith GROVES (Boston College, USA), Joseph OLWENDO (Pwani University, Kenya), Claudio CESARONI (Istituto Nazionale Geofisica e Vulcanologia, Italy)

10:00 **Tributes to Pat Doherty 30'**

10:30 **Coffee break 30'**

11:00 **ICG and its programme on GNSS 30'**

Speaker: Sharafat GADIMOVA (UNOOSA, Austria)

11:30 **GNSS fundamentals I 1h0'**

Speaker: John RAQUET (Integrated Solutions for Systems, USA)

12:30 **Lunch 1h30'**

14:00 **GNSS fundamentals II 1h0'**

Speaker: John RAQUET (Integrated Solutions for Systems, USA)

15:00 **Coffee break 30'**

15:30 **GNSS fundamentals III 30'**

Speaker: John RAQUET (Integrated Solutions for Systems, USA)

16:00 **Discussion 30'**

Tuesday, 4 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

09:30 **Sun-Earth Interaction I 1h0'**

Speaker: Christine AMORY (Sorbonne Universités, France)

- 10:30 **Coffee break & Group photo** 30'
- 11:00 **Sun-Earth Interaction II** 1h0'  
Speaker: Christine AMORY (Sorbonne Universités, France)
- 12:00 **Lunch** 2h0'
- 14:00 **Introduction to Ionospheric physics** 1h0'  
Speaker: Sandro RADICELLA (Boston College, USA)
- 15:00 **Coffee break** 30'
- 15:30 **Introduction to Inospheric modelling** 1h0'  
Speaker: Bruno NAVA (ICTP, Italy)
- 16:30 **Discussion** 30'

19:00 - 21:30 Social dinner

## Wednesday, 5 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

- 09:30 **Equatorial Ionosphere: Dynamics, Scientific Results and Opportunities** 1h0'  
Speaker: Babatunde RABIU (Kogi State University, Nigeria)
- 10:30 **Coffee break** 30'
- 11:00 **Ionospheric irregularities** 1h0'  
Speaker: Keith GROVES (Boston College, USA)
- 12:00 **Lunch** 2h0'
- 14:00 **Study time** 3h0'

## Thursday, 6 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

- 09:30 **TEC evaluation from GNSS measurements** 1h0'  
Speaker: Claudio CESARONI (Istituto Nazionale Geofisica e Vulcanologia, Italy)
- 10:30 **Coffee break** 30'
- 11:00 **Single Frequency Ionospheric Corrections for Galileo** 1h0'  
Speaker: Bertram ARBESSER-RASTBURG (Austrian Institute of Navigation (AIN/OVN), Austria)
- 12:00 **Lunch** 2h0'
- 14:00 **Measuring Small-Scale TEC Spatial Variations and Irregularities Using Ground-Based GNSS Networks** 1h0'  
Speaker: Xiaoqing PI (California Institute of Technology, USA)
- 15:00 **Coffee break** 30'
- 15:30 **GNSS Metrology pertaining to ionospheric measurements** 1h0'  
Speaker: Jayachandran THAYYIL (University of New Brunswick, Canada)
- 16:30 **Discussion** 30'

## Friday, 7 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

- 09:30 **Ionospheric studies using GNSS based techniques over west Africa** *1h0'*  
 Speaker: Olivier OBROU (Université FHB de Cocody UFR SSMT Laboratoire de Physique de l'Atmosphère, Cote d'Ivoire)
- 10:30 **Coffee break** *30'*
- 11:00 **Current performance of IGS ionospheric products and future improvements.** *1h0'*  
 Speaker: Andrzej KRANKOWSKI (University of Warmia and Mazury in Olsztyn (UWM), Space Radio-Diagnostics Research Centre (SRRC/UWM), Poland)
- 12:00 **Lunch** *2h0'*
- 14:00 **Low latitude ionosphere - Ionospheric Irregularities Across African Sector: Observation perspective** *45'*  
 Speaker: Joseph OLWENDO (Pwani University, Kenya)
- 14:45 **The ESA Monitor Project: Ionospheric Scintillation Variability over Africa** *45'*  
 Speaker: Yannick BENIGUEL (I.E.E.A., France)
- 15:30 **Coffee break** *30'*
- 16:00 **Ionospheric effects on SBAS** *45'*  
 Speaker: Todd WALTER (Stanford University, USA)
- 16:45 **Discussion** *15'*

Monday, 10 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

- 09:30 **The modern status of the theory of the high frequency wave propagation in the ionosphere I** *1h0'*  
 Speaker: Nikolay ZERNOV (Saint Petersburg State University, Russia)
- 10:30 **Coffee break** *30'*
- 11:00 **The modern status of the theory of the high frequency wave propagation in the ionosphere II** *1h0'*  
 Speaker: Nikolay ZERNOV (Saint Petersburg State University, Russia)
- 12:00 **Lunch** *2h0'*
- 14:00 **IGS ROTI Fluctuations maps: product, service, applications and future developments.** *45'*  
 Speaker: Andrzej KRANKOWSKI (University of Warmia and Mazury in Olsztyn (UWM), Space Radio-Diagnostics Research Centre (SRRC/UWM), Poland)
- 14:45 **Climatology of GNSS scintillations at high latitudes** *45'*  
 Speaker: Anton KASHCHEYEV (University of New Brunswick, Canada)
- 15:30 **Coffee break** *45'*
- 16:15 **The MADRIGAL database** *30'*  
 Speaker: Anthea COSTER (M.I.T. - Atmospheric Sciences Group Haystack Observatory, USA)
- 16:45 **Discussion** *15'*

Tuesday, 11 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

- 09:30 **GNSS Astronomy: measuring the solar EUV flux rate footprint on the**

- ionosphere with the GNSS, and beyond** 1h0'  
 Speaker: Manuel HERNANDEZ-PAJARES (UPC-IonSAT, Spain)
- 10:30 **Coffee break & Group photo** 30'
- 11:00 **Measuring Ionospheric Irregularities with GNSS** 1h0'  
 Speaker: Jade MORTON (University of Colorado, USA)
- 12:00 **Lunch** 2h0'
- 14:00 **GNSS Reflectometry Fundamentals** 1h0'  
 Speaker: Jim GARRISON (Purdue University, USA)
- 15:00 **Coffee break** 30'
- 15:30 **GNSS Reflectometry & Ionospheric Measurements** 45'  
 Speaker: Jade MORTON (University of Colorado, USA)
- 16:15 **Discussion** 45'

## Wednesday, 12 October 2022

09:30 - 17:00

Location: ICTP ( Budinich Lecture Hall (LB) )

- 09:30 **Study time** 2h30'
- 12:00 **Lunch** 2h0'
- 14:00 **Low cost instruments for SW applications** 45'  
 Speaker: Anton KASHCHEYEV (University of New Brunswick, Canada)
- 14:45 **Low cost GNSS receiver for ionospheric monitoring** 45'  
 Speaker: Miquel GARCIA-FERNANDEZ (Universitat Politecnica de Catalunya, Spain)
- 15:30 **Coffee break** 30'
- 16:00 **Ionospheric irregularities from Radio Occultation data** 45'  
 Speaker: Charles CARRANO (Boston College, USA)
- 16:45 **Discussion** 15'

## Thursday, 13 October 2022

09:30 - 17:00

Location: SISSA Lecture Hall

- 09:30 **The NeQuick model** 1h0'  
 Speaker: Yenca Migoya ORUE (ICTP, Italy)
- 10:30 **Coffee break** 30'
- 11:00 **Ionospheric response to geomagnetic storms** 1h0'  
 Speaker: Joseph OLWENDO (Pwani University, Kenya)
- 12:00 **Lunch** 2h0'
- 14:00 **Detecting Equatorial Plasma Bubbles in GNSS Observation Data and Beyond** 45'  
 Speaker: Rezy PRADIPTA (Boston College, USA)
- 14:45 **Modelling the equatorial plasma bubbles** 45'  
 Speaker: John RETTERER (Boston College, USA)
- 15:30 **Coffee break** 30'
- 16:00 **ICON/GNSS data processing for TONGA Earthquake** 45'  
 Speaker: Anthea COSTER (M.I.T. - Atmospheric Sciences Group Haystack Observatory, USA)

16:45 **Discussion** 15'

Friday, 14 October 2022

09:30 - 15:00

Location: ICTP ( Budinich Lecture Hall (LB) )

09:30 **Meteorological phenomena effects in the ionosphere** 1h0'

Speaker: Sandro RADICELLA (Boston College, USA)

10:30 **Coffee break** 30'

11:00 **Present Status of ionospheric and GNSS research infrastructure in Africa** 1h0'

Speaker: Babatunde RABIU (Kogi State University, Nigeria)

12:00 **Lunch** 2h0'

14:00 **Closing remarks** 1h0'

Speaker: Bruno NAVA (ICTP, Italy), Keith GROVES (Boston College, USA), Joseph OLWENDO (Pwani University, Kenya), Claudio CESARONI (Istituto Nazionale Geofisica e Vulcanologia, Italy)