



A G E N D A

Version 0.7.: May 15, 2019

~~~ Real-Time-IRI Task Force Meeting ~~~ 20 May 2019, Monday (8:30AM – 5:00PM)

- 0830 Real-time IRI Task Force Meeting Registration at UMass Lowell Inn & Conference Center
0845 Welcome remarks by Prof. Julie Chen,
Vice Provost for Research, UMass Lowell
0850 Opening remarks by Prof. Bodo Reinisch
0900 **IRI: Standard and Real-Time Solutions**
Dieter Bilitza and IRI Consortium
0930 **Global and local ionosphere as modeled by IRTAM**
Ivan Galkin, Bodo Reinisch, Artem Vesnin, and Dieter Bilitza
0950 **GAMBIT Database and Explorer of IRTAM maps**
Ivan Galkin
- 1000 Break
- Chair Bodo Reinisch**
1030 **Analytic and Experimentation Capabilities for Arctic HF Communications**
Jennifer Forsyth
1100 **Ionospheric modeling using Empirical Orthogonal Function: TEC and incoherent scatter radar data scenarios**
Shunrong Zhang
1130 **A forecasting IRI based on Deep Learning: feasibility study**
Ivan Galkin, Artem Vesnin, Paul Song, Bodo Reinisch, and Dieter Bilitza
- 1200 Lunch
- Chair Ivan Galkin**
1300 **Symbiosis of Ionosonde & IRI Electron Density Profile**
Bodo Reinisch, Dieter Bilitza, and Ivan Galkin
1330 **Enhance GNSS data for global ionospheric mapping: absolute TEC, variability indices, irregularities detection**
Artem Vesnin
1400 **Storm-time low thermosphere temperature enhancement and TAD: TIMED GUVI observations**
Yongliang Zhang, Larry J. Paxton, and Robert K. Schaefer

1430 Break

Chair Dieter Bilitza

1500 **Inter-comparison of ionospheric models during extremely quiet condition**

Sean Elvidge

1530 **A Parameterized Model of X-ray Solar Flare Effects on the Lower Ionosphere and HF Propagation**

Edlyn V. Levine, Peter J. Sultan¹, Lucien J. Teig

1600 **Ionosphere nowcast using collaboration of GIRO and COSMIC**

Iurii Cherniak, Ivan Galkin, Irina Zakharenkova, Bodo Reinisch, William Schreiner, and Dieter Bilitza

1615 **Correlation of IRTAM and FPMU Data Confirming the Application of IRTAM to Support ISS Program Safety and Review of Bottomside FPMU data**

William "Drew" Hartman

1645 **Final discussions**

~~~ **DAY TWO: International GIRO Forum** ~~~

**21 May 2019 Tuesday (8:30AM – 3:00PM); UML Inn and Conference Center**

**SECTION 1 FORUM REGISTRATION AND OPENING PRESENTATIONS**

0830 GIRO Forum Registration at UMass Lowell Inn & Conference Center

**Time Topic**

0845 Opening: 50 years of Digisonde realm

0900 Global Ionospheric Radio Observatory -- GIRO

0910 GIRO member roundtable

**Presenter**

Bodo Reinisch

Bodo Reinisch

Attendees

**SECTION 2 SCIENCE PROJECTS WITH GIRO**

**Chair Bodo Reinisch**

**Time Topic**

0930 GIRO science data products and associated services: Review

1000 OI Trace Extraction: Improvement of Automation with Propagation Modeling

1030 Break

1100 Empirical ionospheric modeling with GIRO data and science applications

1130 TechTIDE: multi-instrument TID detection, evaluation, and mitigation

1200 Lunch

**Chair Gary Sales**

1300 IDI: Ionosonde-derived Ionospheric Disturbance Index

1330 Science and engineering of sensing TIDs with Digisondes

1400 Multi-mode signal tracking using Intelligent Early Vision system

1430 RayTRIX: raytracing through disturbed ionosphere

1500 Adjourn

**Presenter**

Ivan Galkin

Shawn Kraut

Larisa Goncharenko

Ivan Galkin

Bodo Reinisch

Tobias Verhulst

Ivan Galkin

Bodo Reinisch

1800 Social Event: Boston Harbor on "Odyssey"

~ ~ ~ **DAY THREE: International GIRO Forum** ~ ~ ~  
**22 May 2019 Wednesday (8:30AM – 5:00PM) : UML ICC (am) and LDI (pm)**

**SECTION 3      PROGRESS IN DIGISONDE HARDWARE**

| Time | Topic                                            | Presenter   |
|------|--------------------------------------------------|-------------|
|      | <b>Chair</b> <b>Ivan Galkin</b>                  |             |
| 0830 | Digisonde 4D overview and upgrade kits           | Ryan Hamel  |
| 0900 | FPGA solutions for next generation of Digisondes | Chris Granz |
| 0930 | Near future plans for Digisonde development      | Ryan Hamel  |
| 1000 | Break                                            |             |

**SECTION 4      LOWELL GIRO DATA CENTER**

|      |                                                                    |             |
|------|--------------------------------------------------------------------|-------------|
|      | <b>Chair</b> <b>Bodo Reinisch</b>                                  |             |
| 1100 | Maximizing “Experience Index” of GIRO repositories and their front | Ivan Galkin |
| 1120 | GIRO Cloud and <i>Globus</i> : what does it take?                  | Ivan Galkin |
| 1140 | Expanding GIRO to include other ionosonde resources                | Ivan Galkin |
| 1200 | Lunch                                                              |             |

*Change of location to Lowell Digisonde International, Wannalancit Building, 175 Cabot Street, Suite 200*

|      |                                                                                                                                   |                                |
|------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 1330 | Site visit to Lowell Digisonde International<br>(Wannalancit building on 175 Cabot Street)<br>Including wine and cheese reception | Lowell Digisonde International |
| 1400 | Working Group Session 1<br>(see Appendix A)                                                                                       | Lowell Digisonde International |
| 1500 | Working Group Session 2                                                                                                           | Lowell Digisonde International |
| 1600 | Working Group Session 3                                                                                                           | Lowell Digisonde International |

1700    Adjourn

~ ~ ~ DAY FOUR: International GIRO Forum ~ ~ ~  
**23 May 2019 Thursday (8:30AM – 5:00PM): UML ICC (am) and LDI (pm)**

**SECTION 5      PROGRESS IN DIGISONDE SOFTWARE**

*Location: UML Inn and Conference Center*

**Chair Bodo Reinisch**

|      |                                                          |             |
|------|----------------------------------------------------------|-------------|
| 0900 | ARTIST: an intelligent system <i>Figurine</i>            | Ivan Galkin |
| 0930 | Going GPU: parallel implementation of CQP raytracing     | Chris Granz |
| 0945 | Progress in interactive data analysis software designs   | Ivan Galkin |
| 1000 | Digisonde ESC going Real-Time Linux: a set of characters | Ivan Galkin |
| 1030 | Break                                                    |             |
| 1100 | Advanced techniques of SAO Exploring                     | Ivan Galkin |
| 1115 | Advanced techniques of Drift Exploring                   | Ivan Galkin |
| 1130 | Advanced techniques of TID Exploring                     | Ryan Hamel  |
| 1145 | Advanced techniques of DUX and Sky6-ploring              | Ivan Galkin |
| 1200 | Lunch                                                    |             |

**SECTION 6      DIGISONDE FIELD OPERATIONS**

*Location: Lowell Digisonde International, 175 Cabot Street, Suite 200*

| <b>Time</b> | <b>Topic</b>                                                        | <b>Presenter</b>  |
|-------------|---------------------------------------------------------------------|-------------------|
| 1330        | Concept of DCART operations with remote commanding demo             | Ryan Hamel        |
| 1400        | System fault isolation with BIT hands on                            | Ryan Hamel        |
| 1415        | Common errors in DPS-4D measurement programming                     | Ivan Galkin       |
| 1430        | Tools for manual and automated monitoring of digisonde data quality | Ivan Galkin       |
| 1445        | Closing remarks and Certificate of Completion                       | Prof. B. Reinisch |

|      |                         |                                |
|------|-------------------------|--------------------------------|
| 1500 | Working Group Session 4 | Lowell Digisonde International |
| 1600 | Working Group Session 5 | Lowell Digisonde International |

**~ ~ ~ DAY FIVE: International GIRO Forum ~ ~ ~**  
**24 May 2019 Friday (9:00AM – 12:00PM) : LDI**

|      |                         |                                |
|------|-------------------------|--------------------------------|
| 0900 | Working Group Session 6 | Lowell Digisonde International |
| 1000 | Working Group Session 7 | Lowell Digisonde International |
| 1100 | Working Group Session 8 | Lowell Digisonde International |

**Appendix A: Working Group Offerings**

| TOPIC                               | CURATOR         |
|-------------------------------------|-----------------|
| Observatory Site Preparation 1      | David Kitrosser |
| Observatory Site Preparation 2      | Ryan Hamel      |
| DPS Troubleshooting and Maintenance | Ryan Hamel      |
| Signal Processing                   | Ryan Hamel      |
| GPU setup and operation             | Chris Granz     |
| SAO Explorer 1                      | Ivan Galkin     |
| SAO Explorer 2                      | Steve Mendonca  |
| ARTIST 5                            | Ivan Galkin     |
| DIDBase with ADRES                  | Ivan Galkin     |
| Drift Explorer                      | Ivan Galkin     |
| LGDC Data Services via Web Portal   | Ivan Galkin     |
| GAMBIT Explorer Installation        | Ivan Galkin     |
| DCART Operation                     | Ryan Hamel      |
| Oblique sounding setup              | Ryan Hamel      |