

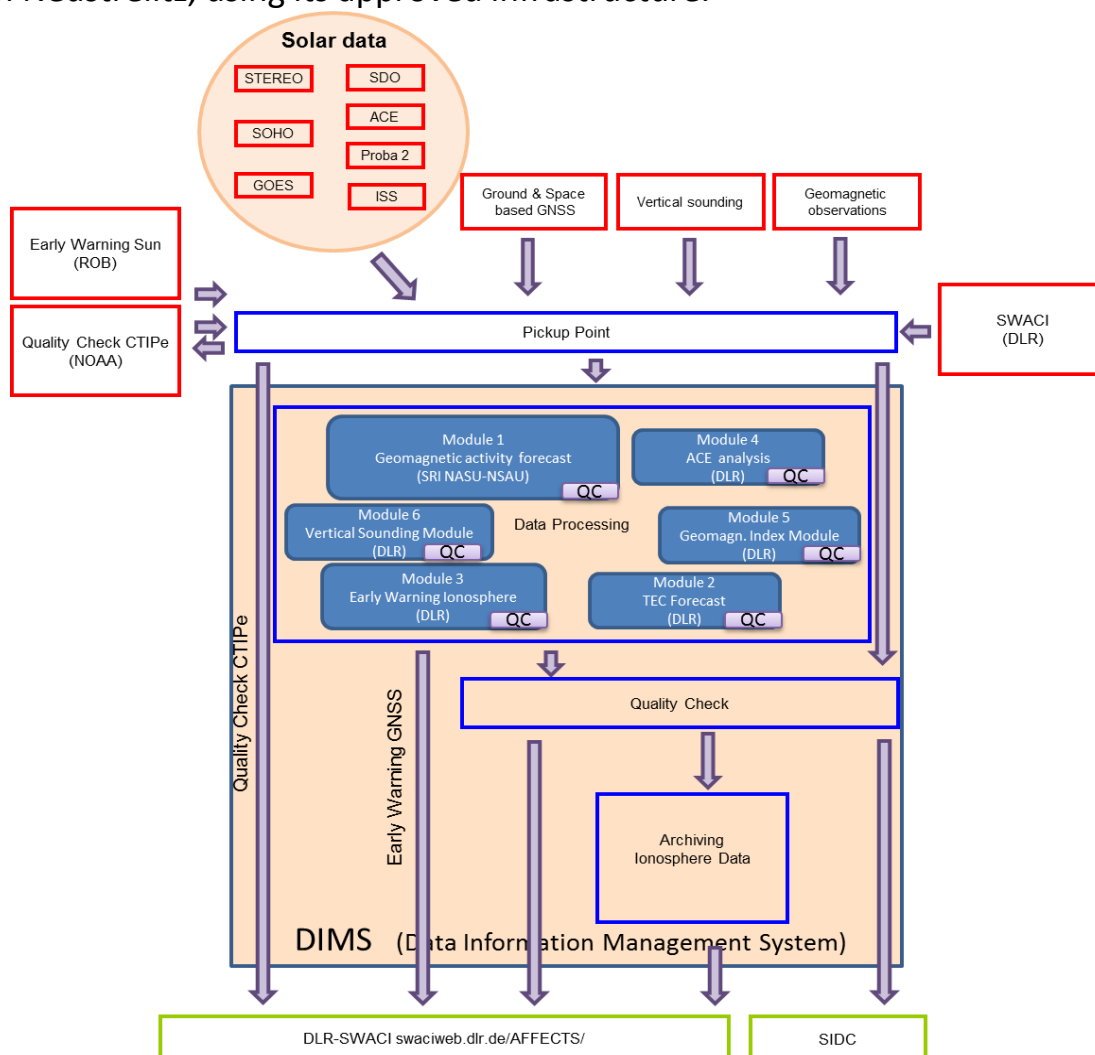
Forecast System Ionosphere



General description

A Forecast System Ionosphere (FSI) is developed as part of the FP7 AFFECTS project (Advanced Forecast For Ensuring Communication Through Space).

It is intended to help European citizens mitigating the impact of space weather events on its communications systems. For this purpose the FSI will operationally provide a prediction of space weather related geomagnetic and ionospheric perturbations for Europe. Solar observations and measurements are used for forecasting of geomagnetic activity and Total Electron Content (TEC). Additionally, high latitude geomagnetic monitoring and early warning for GNSS users is incorporated in the FSI. The FSI is developed as a subsystem of the Space Weather Application Center - Ionosphere (SWACI) running at the DLR in Neustrelitz, using its approved infrastructure.



List of Modules

Modules	Description		
Module 1: geomagnetic activity forecast Delivery SRI NASU-NSAU	<p>The geomagnetic forecast module predicts the geomagnetic index Dst 3 hours in advance. Kp or ap forecast can also be provided.</p>		
	<table border="1"> <tr> <td>Input</td> <td>ACE data for last 24 hours Previous Dst values for last 40 days.</td> </tr> </table>	Input	ACE data for last 24 hours Previous Dst values for last 40 days.
	Input	ACE data for last 24 hours Previous Dst values for last 40 days.	
	<table border="1"> <tr> <td>Output</td> <td>Dst forecast (3h lead time, 1 h cadence)</td> </tr> </table>	Output	Dst forecast (3h lead time, 1 h cadence)
Output	Dst forecast (3h lead time, 1 h cadence)		
<table border="1"> <tr> <td>Other parameter</td> <td></td> </tr> </table>	Other parameter		
Other parameter			
Module 2: TEC forecast DLR	<p>The Total Electron Content (TEC) forecast module is designed to predict TEC over Europe 6, 12 & 24 hours in advance. The advantage of this TEC forecast module is the use of a new TEC perturbation model, which predicts TEC during ionospheric disturbances caused by strong solar wind. Therefore it uses geomagnetic forecast and ACE solar wind measurements.</p>		
	<table border="1"> <tr> <td>Input</td> <td>EU TEC map nowcast Dst forecast ACE measurements</td> </tr> </table>	Input	EU TEC map nowcast Dst forecast ACE measurements
	Input	EU TEC map nowcast Dst forecast ACE measurements	
	<table border="1"> <tr> <td>Output</td> <td>EU TEC forecast map EU TEC quality map</td> </tr> </table>	Output	EU TEC forecast map EU TEC quality map
Output	EU TEC forecast map EU TEC quality map		
<table border="1"> <tr> <td>Other parameter</td> <td>F10.7cm radioflux index</td> </tr> </table>	Other parameter	F10.7cm radioflux index	
Other parameter	F10.7cm radioflux index		
Module 3: Early Warning Message DLR	<p>This module generates an early warning message which is primarily directed to users of GNSS systems. It uses solar alert disseminated by ROB and translates it to the special needs of GNSS users.</p>		
	<table border="1"> <tr> <td>Input</td> <td>Presto alert (ROB) ACE measurements</td> </tr> </table>	Input	Presto alert (ROB) ACE measurements
	Input	Presto alert (ROB) ACE measurements	
	<table border="1"> <tr> <td>Output</td> <td>Early warning message Statistics</td> </tr> </table>	Output	Early warning message Statistics
Output	Early warning message Statistics		
<table border="1"> <tr> <td>Other parameter</td> <td></td> </tr> </table>	Other parameter		
Other parameter			
Module 4: ACE Analysis DLR	<p>The ACE analysis module applies preanalysis and correlations studies on ACE measurements in preparation for the TEC forecast module.</p>		
	<table border="1"> <tr> <td>Input</td> <td>ACE measurements EU TEC map nowcast</td> </tr> </table>	Input	ACE measurements EU TEC map nowcast
	Input	ACE measurements EU TEC map nowcast	
	<table border="1"> <tr> <td>Output</td> <td>ACE analysis, ACE Plot</td> </tr> </table>	Output	ACE analysis, ACE Plot
Output	ACE analysis, ACE Plot		
<table border="1"> <tr> <td>Other parameter</td> <td></td> </tr> </table>	Other parameter		
Other parameter			
Module 5: Geomagn. Index Module DLR	<p>Magnetometer measurements which are provided for the AFFECTS consortium are analyzed and prepared to be used for TEC forecast.</p>		
	<table border="1"> <tr> <td>Input</td> <td>Magnetometer measurements</td> </tr> </table>	Input	Magnetometer measurements
Input	Magnetometer measurements		

Modules	Description	
	Output	Magnetometer chain data plot
	Other parameter	
Module 6: Vertical Sounding Module DLR	The slab thickness is calculated on the basis of vertical sounding data and TEC measurements.	
	Input	Vertical sounding EU TEC maps
	Output	Slab thickness profiles

Table 1 Module Description

4. Acknowledgements

The research leading to these results have received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under the grant agreement №263506 (AFFECTS).

5. Disclaimer

The FSI is created on best efforts basis and is provided "as is" without warranties of any kind. The forecasts issued by the products are accurate to the best knowledge of the developers; however, the developers can not be held responsible for any damage, loss of profit and similar charges rising out of the use of this product and its output. In particular, the developers of this product can not be held responsible for the consequences of any action, or the lack of, based on the forecast provided by this product. Any such consequences shall be at sole responsibility of the respective decision makers.

6. Contact information

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