Role and activities of RTH/RSMC Offenbach

(revised 3 March 2010)

Summary

The RTH Offenbach is one of the 15 Regional Telecommunication Hubs within the Main Telecommunication Network (MTN) of the Global Telecommunication System (GTS). RTH Offenbach is the operational counterpart of the Incident and Emergency Centre (IEC) of the IAEA with respect to the distribution of the notification of an accident and additional information. In the framework of the IAEA Convention on Early Notification and Assistance RTH Offenbach has to make sure that the NHMSs are informed as fast as possible of a nuclear accident. Additionally, in the context of the CTBTO/WMO backtracking arrangements Offenbach is one of the WMO-RSMCs for atmospheric dispersion modelling/backtracking.

Rationale

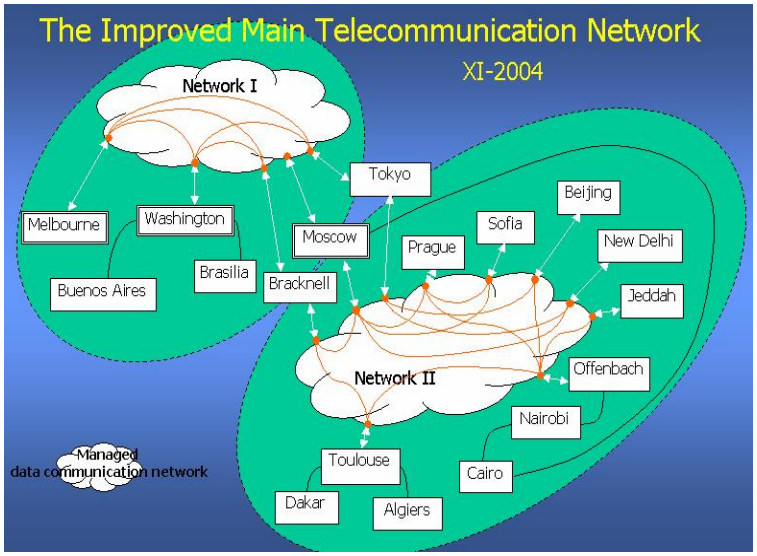
One of the main tasks of WMO within the framework of the IAEA Convention on Early Notification of Nuclear Accidents is to make sure that the NMHSs are informed as fast as possible of a nuclear accident in order

- to enable them to prepare a timely and competent expertise on the meteorological consequences of a nuclear emergency and
- to further the cooperation between the relevant national institutions responsible for meteorology and radiation protection

Consequently, the "REGIONAL AND GLOBAL ARRANGEMENTS FOR THE PROVISION OF TRANSPORT MODEL PRODUCTS FOR ENVIRONMENTAL EMERGENCY RESPONSE, SUPPORT FOR NUCLEAR ENVIRONMENTAL EMERGENCY RESPONSE" state with respect to Notification of WMO:

> *"In the framework of the Convention on Early Notification of nuclear accidents, the IAEA informs the WMO Secretariat and the RTH Offenbach (Germany) of the status of the emergency. If needed, the IAEA will request support from the WMO RSMCs. Beginning with a site area emergency, RTH Offenbach will disseminate the EMERCON message on the GTS in the form of an alphanumeric bulletin in plain-text English language under the abbreviated heading WNXX01 IAEA for global distribution to the NMCs and RSMCs. (See also the WMO Manual on the Global Telecommunications System, WMO Publication-No. 386).*
>
> *When the IAEA no longer requires WMO RSMC support, the IAEA will send an EMERCON termination message to the RSMCs, WMO Secretariat and RTH Offenbach. RTH Offenbach will disseminate the ERMERCON termination message on the GTS in the form of an alphanumeric bulletin in plain-text English language under the abbreviated heading WNXX01 IAEA for global distribution to the NMCs and RSMCs."*

Thus the RTH Offenbach which is one of the 15 Regional Telecommunication Hubs within the Main Telecommunication Network (MTN) of the Global Telecommunications System (GTS) (see figure) is the operational counterpart of the Incident and Emergency Centre (IEC) of the IAEA with respect to the distribution of the notification of an accident and additional information.



Tasks of the RTH Offenbach

In case of an accident occurrence and/or whether emergency meteorological support is required. RTH Offenbach will

(a) receive a message from IAEA (as a telefax and as an email),

(b) verify its content by a phone call to the IEC of the IAEA,

(c) put the EMERCON message on the GTS in the form of an alphanumeric bulletin in plain-text English language under the abbreviated heading WNXX01 IAEA for global distribution to the NMCs and RSMCs,

(d) check that the Lead-RSMCs has received the same information (telefax) and

(e) foreword the telefax with the notification or additional information to the Lead-RSMCs if they did not get it directly from the IAEA.

Regular tests

The communication between IAEA and RTH Offenbach is tested every month. According to the actual valid procedures the tests are performed each third Thursday a month except from one unannounced test per year. Once every quarter RSMCs and the delivery (but not the distribution) of products are included. These regular communication tests normally do not include the distribution of the information via the GTS.

The GTS link will be tested at least once per year and IAEA will decide when. Additionally, GTS messages are distributed in the framework of full scale tests like ConvEx-3 exercises.

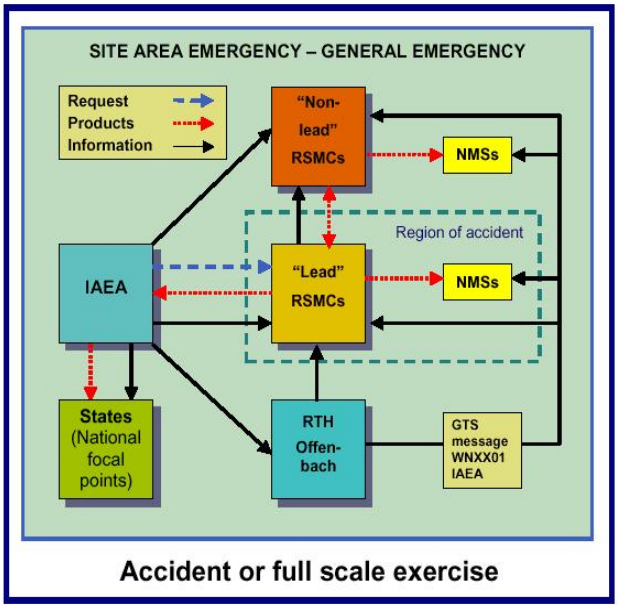
The figures show the flow of information

(a) in case of an accident or a full scale exercise (like ConvEx-3) and at least one extended test per year (right),

(b) the quarterly communication test including RSMCs (bottom left),

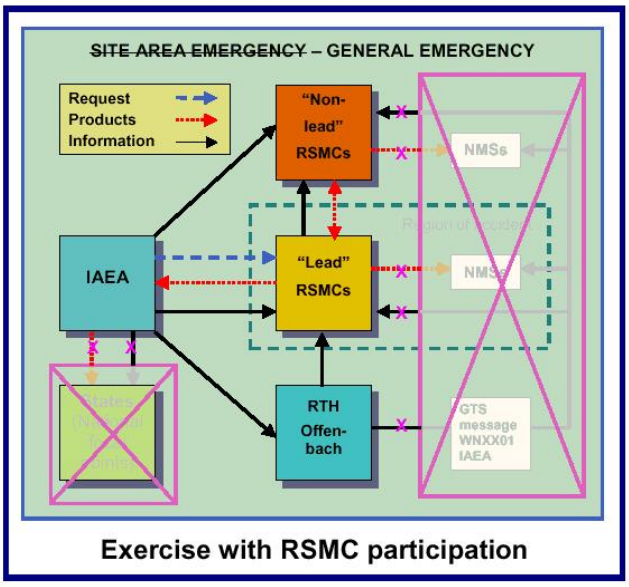
(c) the monthly communication tests between the IAEA and RTH Offenbach (bottom right).

are visualised in the three figures.

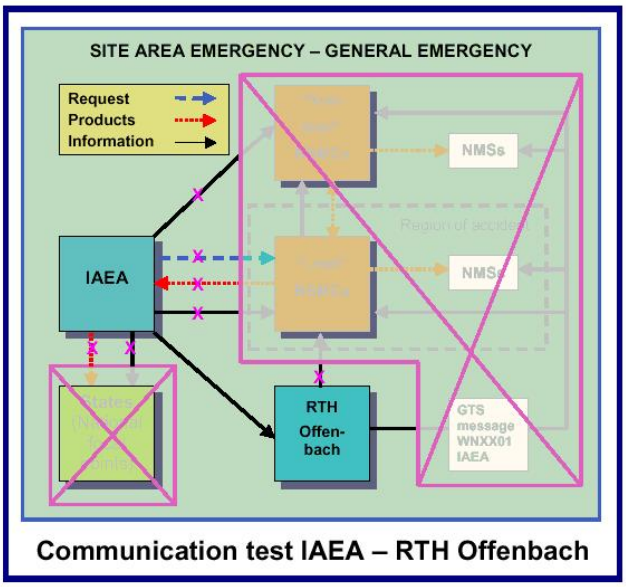


Accident or full scale exercise

(a)



Exercise with RSMC participation



Communication test IAEA – RTH Offenbach

Status of the DWD's operational atmospheric transport and dispersion model (employed for WMO/CTBTO)

The NWP modelling suite of DWD consists of three models, namely the global icosahedral-hexagonal grid point model **GME** (grid spacing 30 km, 60 layers), the non-hydrostatic regional **COSME-EU** (COSMO model Europe, grid spacing 7 km, 665x657 grid points/layer, 40 layers), and finally the convection resolving **COSMO-DE**, covering Germany and its surroundings with a grid spacing of 2.8 km, 421x461 grid points/layer and 50 layers.

Pre-processing of GTS data runs on a quasi real time basis about every 6 minutes on NEC-SX8/SX9. Independent 4 dim. data assimilation suites are performed for all three NWP models, GME, COSMO-EU and COSMO-DE. For GME, analyses are derived for the eight analysis times 00, 03, 06, 09, 12, 15, 18 and 21 UTC based on a three-dimensional variational data assimilation scheme. For COSMO-EU and COSMO-DE, a continuous data assimilation system based on the nudging approach provides analyses at hourly intervals.

As a part of the German radioactive emergency system a Lagrangian Particle Dispersion Model (LPDM) is employed at the DWD. The LPDM calculates trajectories of a multitude of particles emitted from a point source using the grid-scale winds and turbulence parameters of the NWP-model and a time scale based Markov-chain formulation for the dispersion process. Concentrations are determined by counting the number and mass of particles in a freely eligible grid. Dry deposition parameterisation follows a deposition velocity concept and wet deposition is evaluated using isotope-specific scavenging coefficients. Also included is radioactive decay, a vertical mixing scheme for deep convection processes and optionally particle-size depending sedimentation coefficients. Additionally, an assimilation scheme for measured concentration data can be activated. Starting from these observed fields or from selected receptor points the LPDM can be employed also in a backward mode to determine unknown source positions. The LPDM was successfully validated using data of the ANATEX and ETEX tracer experiments. In the ATMES-II report of the 1st ETEX release the model took the first rank of the 49 participating models. During the follow-up project RTMOD an evaluation of an accidental Cs-137 release (Algeciras, May 1998) was performed. The transport and dispersion of the cloud and the calculated dose rates were found to be in good agreement with the measurements. In the ENSEMBLE-ETEX reanalysis (2003) the ranking of the model was again excellent.

The LPDM can be run on basis of the DWD's weather forecast models (GME, COSMO-EU/COSMO-DE). In case of emergency the model output will be transmitted to the national 'Integrated Measurement and Information System' (IMIS) using slightly modified WMO codes. The LPDM is also part of the European real-time decision system RODOS in Germany. In this context data transfer and coupling with the operational RODOS system is tested several times a year. The model consistently assimilates the provided local scale source information, and calculates the transport and dispersion of selected (currently 9) standard nuclides simultaneously. It is also part of the EU-activity "ENSEMBLE" (participants: 17 weather services in Europe and North America), which combines the forecast of different emergency dispersion models to a multi-model ensemble.

Since 2010 the model is based on the new version of the DWD's global NWP model GME30L60 (30km-resolution, 60 layers). Also some adaptations were made for higher time and space resolution handling e.g. for COSMO-DE driven simulations. Especially, the IMIS/RODOS output interface is now coded for complex emission scenarios and to handle the amount of data produced by high resolution NWP models. Concerning the EU-ENSEMBLE activities the model is adapted to the requirements of ENSEMBLE V4.0 (output grid resolution: 0.5° (global) resp. 0.25° (regional)). The model can also be run in a backward mode as a member of the multi-model backtracking ensemble of the CTBTO (Comprehensive Nuclear-Test-Ban Treaty Organization). In this context model and job procedures were successfully tested during official WMO/CTBTO experiments in 2007, 2008 and 2009.

The operational model system is routinely applied in emergency tests at local (IMIS/RODOS) and international level (ENSEMBLE exercises). The model code is optimised for MPP computers (e.g. NEC-SX8/SX9, IBM P5 575) utilising MPI-based parallelisation features. The model is also implemented at MeteoSwiss based on the Swiss COSMO-version running on a CRAY-XT3.

References:

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