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for placing equipment on the market. When taking equipment into use, the manufacturer is obliged to inform the user of national restrictions.

To enable the manufacturers to give such information, national frequency authorities have the obligation to publish information on national frequency usage. On the basis of this, the EC has drawn up a simple classification system for equipment. Radio equipment for which usage is harmonized in the EU belongs to Class 1. Others, not belonging to Class 1, belong to Class 2. For these, the final step in placing equipment on the market is to notify the national frequency authorities of the countries in question about this intention. The notification contains information that is necessary to evaluate whether the equipment really complies with national frequency restrictions.

Apart from stipulations for the conformity assessment of the technical requirements, the Directive defines a marking system, where, in addition to the CE mark, the four digit number(s) of the notified body or bodies should be included. For all Class 2 cases this should be followed by the alert symbol. Additionally, each product should carry a short Declaration of Conformity (in English: Hereby, [Name of manufacturer], declares that this [type of equipment] is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC). This comes in all the official languages of the EU states and includes a contact address where the complete original document is available, e.g. a web address. Restrictions on taking equipment into use must be explained in the user manual and on the packaging. ●

# Typhoon Surveillance in Northwestern Pacific

An international research program investigating typhoons in the Northwestern Pacific utilizes Vaisala RD93 dropsondes to improve data provision and quality.

**D**ropwindsonde Observations for Typhoon Surveillance near the Taiwan Region, i.e. DOTSTAR, is an international research program conducted by meteorologists in Taiwan. It is carried out in cooperation with scientists at the Hurricane Research Division (HRD) and the National Centers for Environmental Prediction (NCEP) of the National Oceanic and Atmospheric Ad-

ministration (NOAA).

The program is based on successful surveillance missions conducted in the Atlantic with NOAA's Gulfstream-IV jet aircraft. Vaisala RD93 GPS dropsondes are released from an Astra jet aircraft flying above 42000 ft (12.8 km) in and around tropical cyclones approaching Taiwan. Information from the surveillance flights is transmitted in nearly real-time to the Central



The Astra SPX jet releasing a dropsonde (circled) during a test flight in March, 2003.

Weather Bureau (CWB) of Taiwan, as well as to the NCEP, Fleet Numerical Meteorology and Oceanography Center (FN-MOC), and Japan Meteorological Agency (JMA). The data are assimilated into the operational global and regional numerical models of these organizations.

### Dropsondes enable significant forecasting improvements

After a year of training and the development and installation of all the required software and hardware in the aircraft, the DOTSTAR typhoon surveillance was launched in 2003 with Typhoons Dujuan and Melor. Nine further missions have been conducted in 2004 around 7 typhoons – Nida, Conson, Mindulle, Megi, Aere, Meari and Nock-Ten. In total, the Astra aircraft has flown 53 h releasing 179 dropsondes. Eight to ten missions are expected to be conducted during the 2005 typhoon season.

The collection of critical meteorological data enabled by DOTSTAR helps to improve the understanding and forecasting of typhoons, evaluate targeted observing strategies, and to validate/calibrate remote sensing data.

In a preliminary analysis of the above 11 missions, the dropsonde data provided an average 20% improvement to the 24-72 h track forecast of the NCEP Global Forecast System (GFS). Further analyses with other models are ongoing. The program marks the beginning of typhoon surveillance in the Northwestern Pacific and is expected to yield impressive advances in typhoon research, observations and forecasting. ●

**More information on DOTSTAR is available at**  
[http://typhoon.as.ntu.edu.tw/DOTSTAR/English/home2\\_english.htm](http://typhoon.as.ntu.edu.tw/DOTSTAR/English/home2_english.htm)



*The interior of the Astra, with the Vaisala AVAPS Dropsonde Receiving System located in the center right, and the dropsonde launcher to the lower left.*

*Typhoon Meari surveillance flight track, numbered locations of dropsonde observations, analyzed dropsonde data at 500 hPa (geopotential height, temperature, dewpoint and wind barbs) from CWB, and Geostationary Meteorological Satellite (GMS) Infrared (IR) imagery at 12:00 Universal Time, 25 September 2004.*

