five permanent employees. We launch one radiosonde twice a day from Jaegersborg. On weekdays, when more than one person is working at the station, we fill the balloons with hydrogen. For safety reasons, we use helium when we have only one person on duty, during the night shift and weekends, for example."

Lars Andersen and Bendt Nielsen were on duty the day that Vaisala News visited, and Lutz O.R. Niegsch was also at the sounding station. Mr. Andersen is a Software Engineer responsible for the programming software for DMI's upper air stations. As he explained, Vaisala's products have proven to be reliable, and he has been satisfied with them. Good quality makes all the difference when instruments must function well in demanding conditions.

Lutz O.R. Niegsch, Commander and Port Meteorological Officer (PMO), is in charge of ship observations. He served in the Danish Navy before joining DMI four years ago. According to Mr. Niegsch, two MILOS500 weather stations will be installed on ships in Copenhagen in the near future.

To measure upper atmospheric conditions, Vaisala radiosondes are launched twice a day from seven DMI sounding stations. When needed, these stations can measure the radioactive profile of the atmosphere. Upper air measurements are also made at two radiosonde stations on board ASAP ships travelling between Denmark and Greenland.

In cooperation with research institutes in Europe and the United States, DMI also monitors the ozone layer and measures ultraviolet radiation in Greenland and Denmark. ■

Tinka Arctica, one of Denmark's ASAP observation ships.

Cost-Effective ASAP

The Automated Shipboard Aerological Programme (ASAP) is a cost-effective source of upper air weather data over data-sparse ocean areas. Denmark has always been actively involved in the ASAP program. Vaisala's radiosondes and ground equipment are used in the country's ASAP ships.

The cost of ASAP upper air sounding is about 15 per cent of the figure for an upper air sounding from a weather ship, and equal to or less than the cost of a land-based sounding. For this reason, the ASAP system is an economical source of baseline upper air data from the oceans and a vital part of global ocean observing systems.

The containerized ASAP system offers important advantages in today's flexible shipping environment. If there is a sudden change in shipping routes, the unit can simply be transferred to a ship that is more suitable for ASAP operations. It has become apparent, however, that the number of ships capable of carrying such a system is limited.

The countries with currently deployed ASAP systems are Denmark (2 units), France (4), Germany (5), Spain (1), Sweden/Iceland (1), the UK (1) and the USA (1).

The ASAP was instituted in its current form in the mid-1980s. It was organized by the ASAP Coordinating Committee (ACC) established by the WMO Executive Council in 1985. From 1994–1997, Klaus Hedegaard from the Danish Meteorological Institute was the chairman of ACC.

"The quality of ASAP data is generally very high, comparable with the quality of data from ocean weather ships, with average sounding heights exceeding 20,000 gpm. Vaisala's radiosondes and ground equipment have been used in Danish ASAP ships from the beginning," comments Mr. Hedegaard.

The total number of ASAP soundings has risen to about 5,000 annually. This corresponds to approximately seven ocean weather ships when based on comparable observation protocols. From this standpoint, ASAP plays a vital role in the World Weather Watch. ■

The ASAP Coordinating Committee (ACC) in Reykjavik, Iceland, in June 1996. From the left (back row): P.E. Dexter, Switzerland; J. Morenz, USA; S. Burns, Germany; and P.J. Kostamo (invited speaker from Vaisala), Finland. Middle row: H. Hjartarsson, Iceland; M. Rochas, France; A. Garcia-Mendez, UK; and F. Sigurdsson, Iceland. Front row: S.M. Norwell, UK; W.H. Keenan, USA; K. Hedegaard (chairman), Denmark.