On top of Mauna Kea: In the foreground is the NASA infrared telescope; on the ridge (left to right) the Canada-France-Hawaii telescope, the 2.2m Hawaii telescope, and the latest arrival, UKIRT

Britain joins Hawaii summit

THE United Kingdom Infrared Telescope (UKIRT) at the summit of Mauna Kea on the island of Hawaii was opened by HRH the Duke of Gloucester on 10 October. Funded by the Science Research Council and operated by the Royal Observatory, Edinburgh, this 3.8-m diameter instrument is the largest telescope in the world designed specifically for infrared observations.

The UKIRT, however, is not the only telescope to have been built recently on Mauna Kea. The NASA 3m Infared Telescope Facility, and the 3.6m Canada-France-Hawaii Telescope have also opened within the past three months, joining three smaller University of Hawaii telescopes already on the summit. In terms of collecting area, Mauna Kea now houses the world's largest observatory for optical and infrared astronomy.

Infrared astronomers will be looking with particular interest at the relative performance of the UKIRT and NASA telescopes, since their design philosophies are significantly different. The British instrument goes for maximum collecting area while in the NASA telescope, which cost about twice as much as the UKIRT, image quality and guiding stability are given the highest priority. The Canada-France-Hawaii telescope and the University of Hawaii 2.2-m telescope are also instrumented for infrared observations.

The UKIRT telescope cost £2.7m and was built by the Sheffield company of Dunford Hadfields, Ltd, using a Cer-Vit primary mirror which was ground and polished by Grubb Parsons, Ltd, of Newcastle. An important feature of the design of the telescope is the thinness of its mirror, which weighs only 40% of that of a conventional telescope of the same aperture. As a result, the whole instrument was built at very substantial saving of weight and cost as compared with, for example, the similar sized Anglo-Australian Telescope. The lightweight structure has the disadvantage of lesser rigidity, but careful design and the use of computer controlled pointing has resulted in an instrument whose performance approaches that of the best optical telescopes.

The instrumentation for the telescope, built in Edinburgh, includes photometers and low resolution spectrometers covering the wavelength range 1 — 40μm. The detectors in use are cryogenically cooled solid state devices such as indium antimonide photovoltaic detectors or gallium-doped germanium bolometers. Stray thermal infrared emission from the sky and from the telescope itself is a major problem in infrared astronomy; the optical system has therefore been designed to minimise the size and effective emissivity of the mechanical and optical components that lie in the telescope beam. In order to separate the signal due to a celestial infrared source from the background emission the secondary mirror itself oscillates at up to 40 Hz, providing the detector with near-simultaneous images of two adjacent areas of sky.

Gareth Wynn-Williams

Gareth Wynn-Williams is Associate Professor of Astronomy at the University of Hawaii

Coast guards probe mystery of missing research ship

WITHIN the next few weeks, the US coast guard hope to have developed a plausible explanation for the mysterious disappearance last December of a research vessel charted by the University of Hawaii with seven scientists on board.

No trace of the vessel, the Holoholo, has been found since it set sail from Honolulu harbour on the afternoon of 9 December. The trip was one of a series planned to gather data on the oceanographic conditions off the Hawaii coast in connection with the siting of a proposed ocean thermal energy conversion (OTEC) project supported by the Department of Energy.

Evidence has been found to indicate that the vessel may have put in to shore to make bench-mark readings for some of the scientific equipment. However, the alarm was raised when it failed to make a planned rendezvous with two scientists two days after its departure from Honolulu, following a period of stormy weather.

On board the Holoholo at the time of its disappearance were three scientists from the University of Hawaii — including the principal investigator for the project, assistant professor of engineering Dr Gary C Niemeyer — two scientists from the University of California's Lawrence Livermore Laboratory, which has responsibility for the OTEC research programme, and two scientists from the National Oceanographic and Atmospheric Agency.

Various theories about the disappearance have been voiced during extensive hearings that have already been held in Honolulu by a board of enquiry established jointly by the coast guard and the National Transportation Safety Board. These range form the hypothesis of an explosion on board to the suggestion by some, quoting the Glomar Explorer's links with the CIA, that the vessel might have been captured by a foreign power.

According to a local newspaper, the Honolulu advertiser, the board that the boat sank after being swamped by heavy seas — and that the swamping may have been partly due to structural alterations made to the vessel to accommodate various species of equipment required for the research.

The safety board has already issued a set of recommendations to the University following the Holoholo's disappearance in which it says that some of the alterations, which included the installation of two large winches, a large spool of cable, and an A-frame cargo boom on the after part of the vessel, "may have adversely affected the

0028-0836/79/420515-02$01.00