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Hurricane Research Division

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The Orion P3s

In 1973 it was decided that the DC6s were reaching the end of their useful life, and that NOAA, NHRL, and RFF needed to make a major financial commitment to an upgrade of the air fleet. A C130 had been obtained, but more airplatforms were needed. NHRL and RFF went through a period of belt tightening, including reductions in staff and cancelling all STORMFURY flights for three years, in order to finance the purchase of two Lockheed P3 Orions. P3s had been used by the USN as sub hunters and proved to be reliable workhorses. The new aircraft were outfitted with the latest in computers and weather instruments, including three different radar antenna on each aircraft. The quality of the field data was boosted considerably when these planes became available in 1975 and 1976.



In 1975 the USN ended thirty years of hurricane reconnaissance duty and deactivated its Hurricane Hunter squadrons, leaving this function to the USAF and the NOAA aircraft.

When Dr. LaSeur stepped down in 1977, Dr. Stanley Rosenthal took over as NHEML Director. Next year it was made an independent laboratory under ERL, and the year after that NHEML and NHC were moved across Dixie Highway from the University of Miami campus to the Gables One Tower. Dr. Rosenthal had been head of the **Laboratory's** Theoretical Studies Branch, and under his directorship the emphasis of research moved away from weather modification studies and toward computer modeling.



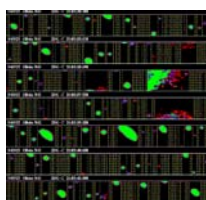
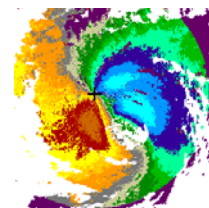
Field studies were greatly improving with the new radar systems on the P3s. Insights into the fine structure of hurricane rain bands were gained, while studies of the inner vortex core revealed the process of eyewall replacement.



In 1980 NHEML was organizationally placed under the Atlantic Oceanographic and Meteorology Laboratories (AOML), a

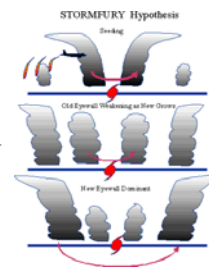
group of Miami-based NOAA laboratories which had been housed on Virginia Key since 1973. Two years later the Experimental Meteorological Laboratory portion of **NHEML** was separated and moved to Boulder, Colorado and the **Lab** was again called **NHRL**. Another year later **NHRL** was moved physically out to AOML on Virginia Key, ending 25 years of co-location with NHC. **NHRL** was then renamed the **Hurricane Research Division (HRD)**, its current sobriquet, when AOML was redesignated a single Laboratory.

The NOAA C130 was decommissioned in 1981, leaving only the two P3s to carry on hurricane research. To compensate for this the instrumentation on the P3s was greatly improved, with Knollenberg cloud physics probes installed, and in 1982 Doppler processing added to the tail radars. Doppler allowed scientists to derive the hurricane's wind fields by either using radar data from both planes, from a plane and a land based Doppler radar, or even from the same airplane radar from two perpendicular legs. Instead of just having wind information from along the aircraft's track, the wind field from the entire inner core could be mapped out. This provided researchers with greater insight into hurricane structure and dynamics.



The Knollenberg probes allowed **HRD** cloud physicists to image individual cloud particles by using an array of laser diodes. As particles pass through the array a laser shadow is cast upon the receiving diodes and the image of the particle is entered into memory. Scientists can see what sort of particles they are flying through in real time, whether rain, graupel, ice, or needles. Also the FSSP probe allows the instantaneous compilation of particle size statistics.

Project STORMFURY came to a formal end in 1982, as no hurricane modification experiments had been flown in over a decade, and as serious doubts about the assumptions of STORMFURY came to be expressed. In part the new cloud physics data showed that the amount of supercooled liquid water available in a hurricane was far less than had been thought, and studies of the natural cycles of storm strength showed that what were thought to be the effect of seeding might have been natural. **HRD** scientists published a paper in 1985 demonstrating many of the flaws in the original STORMFURY premises. Hurricane modification studies and experiments were shelved for the foreseeable future.



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