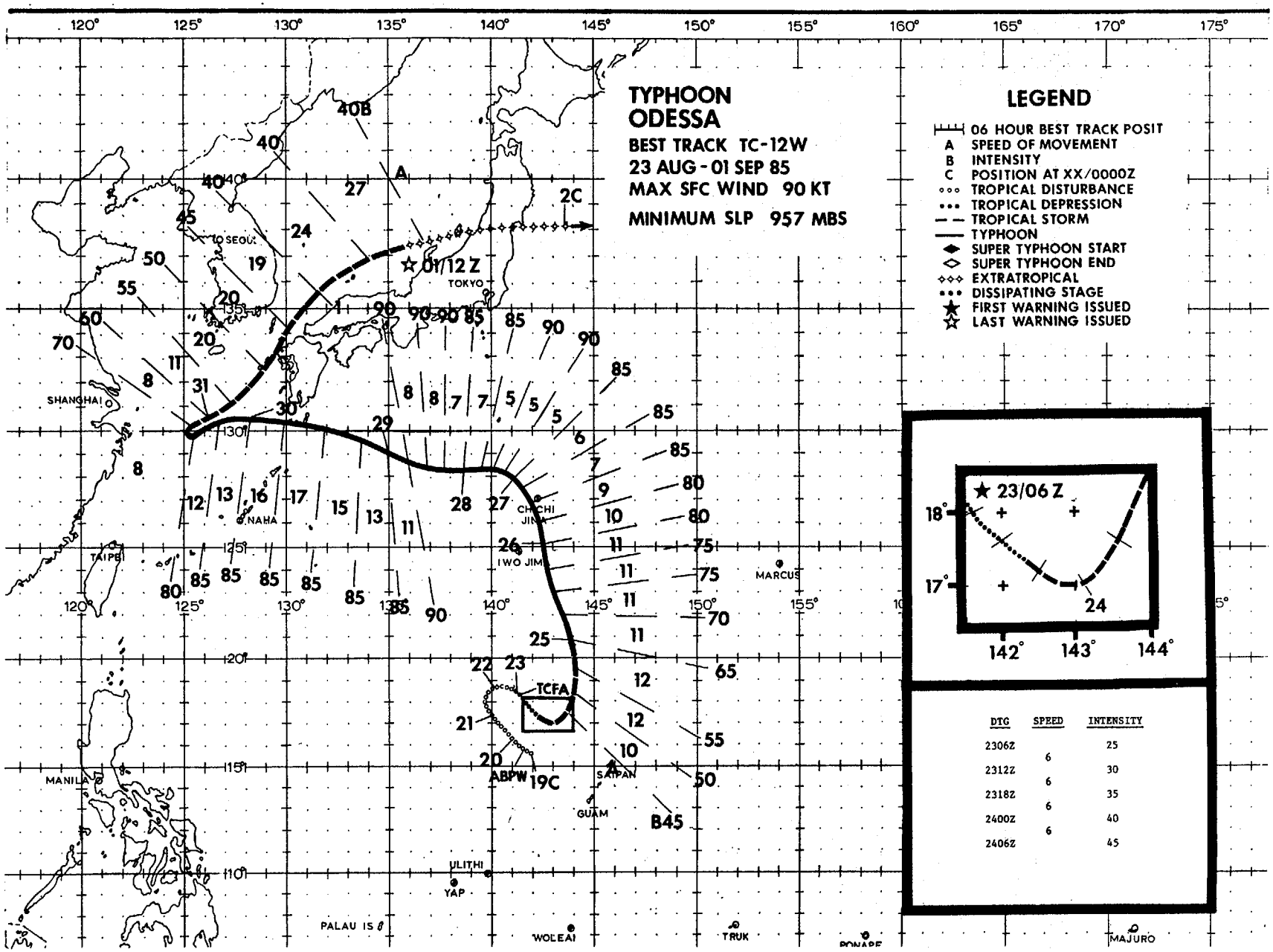
TYPHOON
ODESSA
BEST TRACK TC-12W
23 AUG - 01 SEP 85
MAX SFC WIND 90 KT
MINIMUM SLP 957 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
01/12 Z
TOKYO
SEOUL
SHANGHAI
NAHA
TAIPEI
MANILA
CHICHI JIMA
IWO JIMA
MARCUS
TCFA
ABPW
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
MAJURO
23/06 Z
DTG SPEED INTENSITY
2306Z 25
6
2312Z 30
6
2318Z 35
6
2400Z 40
6
2406Z 45

Odessa persisted for almost two weeks and required a total of thirty-eight warnings - in this regard, only Typhoon Jeff with forty-one exceeded Odessa's total during 1985 season. The system became part of a multiple tropical cyclone outbreak along with Typhoon Pat and Tropical Storm Ruby. At one time five tropical cyclones were in warning status. Ultimately, Odessa underwent a complex binary interaction with Typhoon Pat south of Japan before completing extratropical transition over the Sea of Japan.

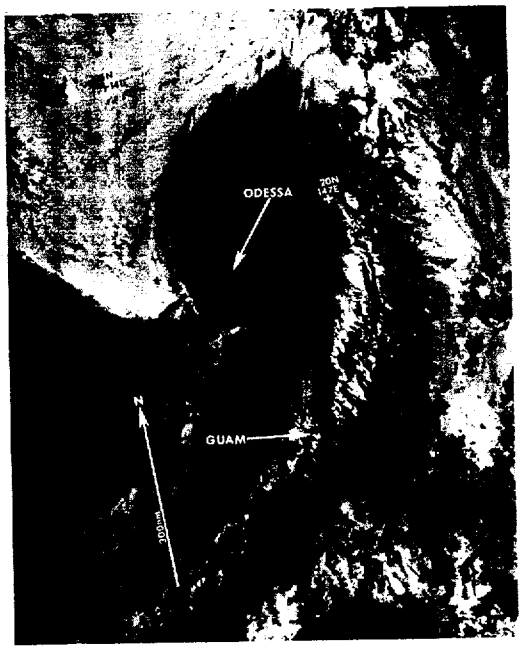


*Figure 3-12-1. Nighttime imagery of Odessa with a single outflow channel that is directed equatorward (241227Z August DMSP infrared imagery).*

By the third week of August, Typhoon Nelson had moved westward across the northern Philippine Sea. At that time, the eastern end of the monsoon trough extended across the Philippine Sea to the vicinity of Guam. The eastern end of the low latitude westerly monsoonal flow, where it interacted with the easterly tradewinds, became the preferred location for maximum cloudiness. Initially, on 19 August, the deep convection in this area appeared random with little, or no, curvature, but its persistence was sufficient reason for its inclusion on the Significant Tropical Weather Advisory (ABPW PGTW). With maximum surface winds in the monsoonal flow of 15 to 20 kt (8 to 10 m/s) and a minimum surface pressure of 1006 mb, the potential for development was rated as poor.

This potential for intensification changed to fair at 220600Z as the convective mass began to increase in size over a low-level circulation which began to separate from the surrounding cloudiness. A TCFA followed at 230230Z based on meteorological satellite imagery which showed a Central Dense Overcast (CDO). Aircraft reconnaissance was scheduled for the next day. The persistent CDO, a favorable outflow channel aloft to the south, and a pre-existing low-level circulation center, prompted the first warning for Tropical Depression 12W a short time later at 230600Z. The Depression was upgraded at 240000Z when aircraft reconnaissance observed sustained surface winds of 30 kt (15 m/s) that were gusting to 55 kt (28 m/s) southeast of the center - the MSLP was estimated to be 1000 mb (Post analyses revealed that Odessa reached tropical storm intensity shortly before 231800Z). The aircraft also discovered that the low-level center had drifted southeastward during the night, when interpretation of infrared satellite imagery was restricted to positioning the poorly defined upper-level circulation center.

Erratic movement became less of a concern as Odessa matured and assumed a north-northwestly track. Aircraft reconnaissance at 242340Z reported typhoon

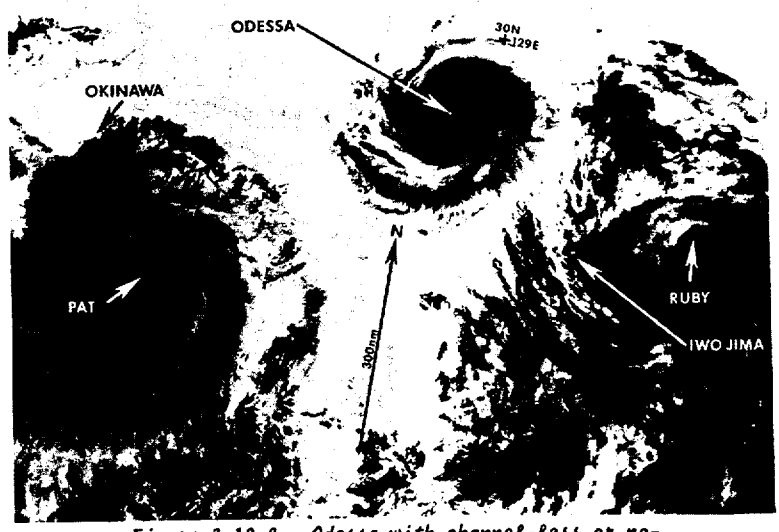


*Figure 3-12-2. Odessa with channel-less or no-channel outflow (281024Z August NOAA infrared imagery).*

intensity winds and a circular eye 15 nm (28 km) in diameter. The warning valid at 250000Z, upgraded Odessa to a Typhoon. Odessa remained a compact typhoon for the following six days. Of interest in this regard was the change in the outflow channel from equatorward, during the maturation process, to the absence of the channel, during the small, but intense, typhoon stage. Compare Figures 3-12-1 and 3-12-2 to appreciate the shift of outflow.

Odessa's north-northwesterly movement slowed as it approached the subtropical ridge axis. The critical forecast - whether to go through the ridge or westward under the ridge - was handled well. The primary aids, the One-way Interactive Tropical Cyclone Model (OTCM) and Nested Tropical Cyclone Model (NTCM), (Figure 3-12-3) were at odds apparently due to their respective sensitivities to the narrow ridge to the north. NTCM provided the better guidance in this case. Odessa tracked, as forecast, and turned westward under the influence of the narrow subtropical ridge over Japan.

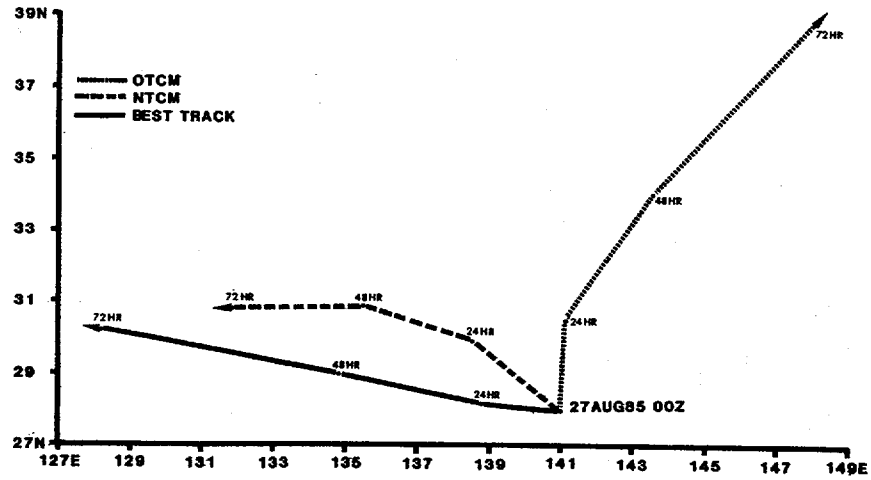


*Figure 3-12-3. Primary aids, NTCM and OTCM, provide conflicting guidance. NTCM correctly senses the track to the West. The best track position is a solid line.*

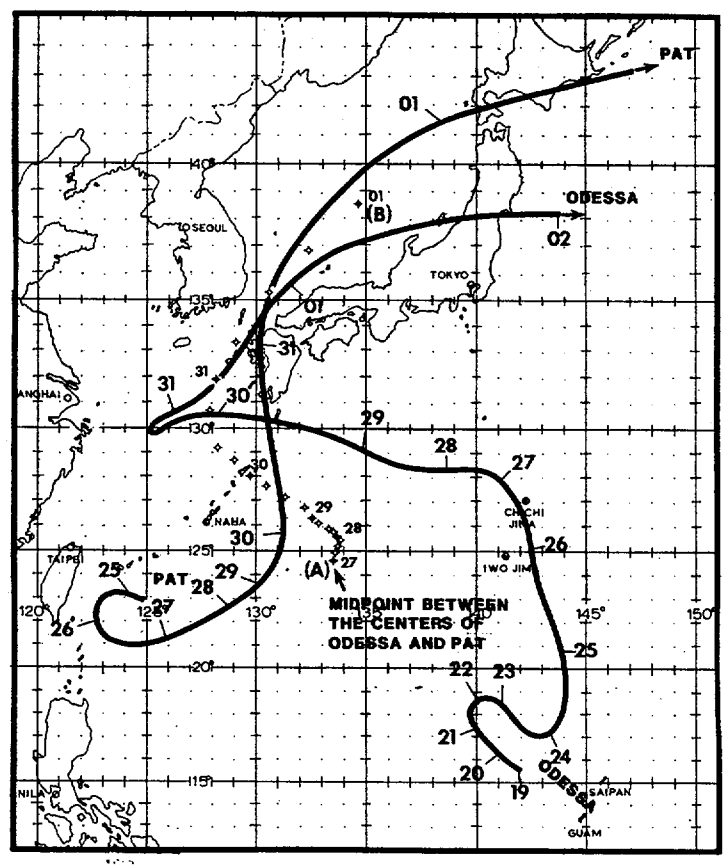


*Figure 3-12-4. Best track positions for Pat and Odessa. The small symbols from (A) to (B) are the midpoints between the respective centers of Pat and Odessa at each six hourly interval.*

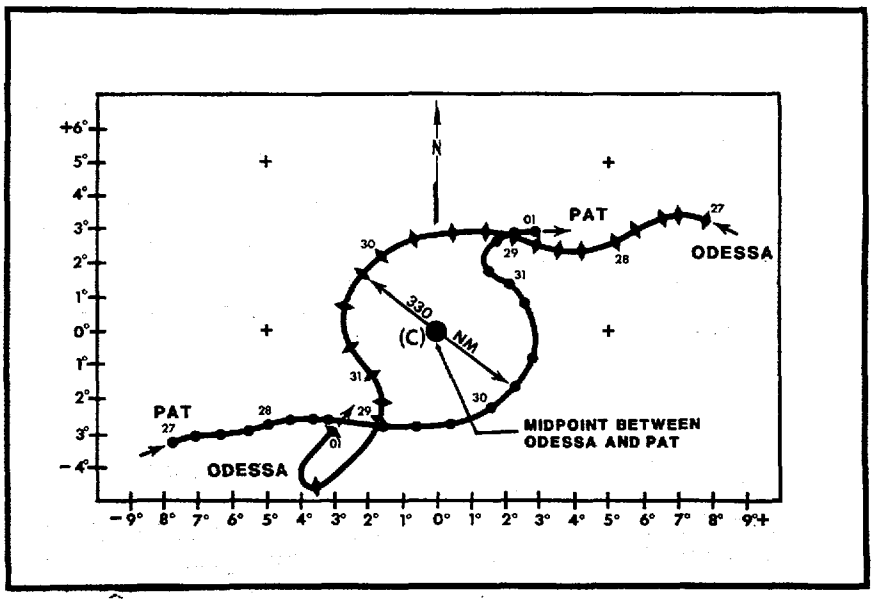


*Figure 3-12-5. The singular point at (C) contains all the midpoints taken from the (A) to (B) in the previous Figure 3-12-4. The positions of both Pat and Odessa relative to the midpoint reflect the inward, spiralling interaction between the two systems with time.*

As the tropical cyclone pressed ahead on its new track, it began to accelerate in response to the approach of Typhoon Pat from the south. The complex interaction between the spatially proximate cyclones, or binarys, is not readily apparent from Figure 3-12-4, which depicts the superimposed tracks. If the midpoint is determined for each six hourly time period, the locus of midpoints from A to B results (see Figure 3-12-4). When this locus becomes a singular point (C) in Figure 3-12-5 and the respective positions of the two typhoons are replotted relative to (C), the subtle attraction and cyclonic rotation into a circle of 330 nm (611 km) becomes apparent. It is interesting to compare the relative sizes of Pat, which is average, and Odessa, which is small and compact (reference the surface isobaric analysis in Figure 3-12-6). Returning to Figure 3-12-5, it is important (next) to note the departure of both typhoons from the 330 nm (611 km) circle at 310000Z. This was the beginning of extratropical transition and separation. Satellite imagery is provided in Figure 3-12-7.

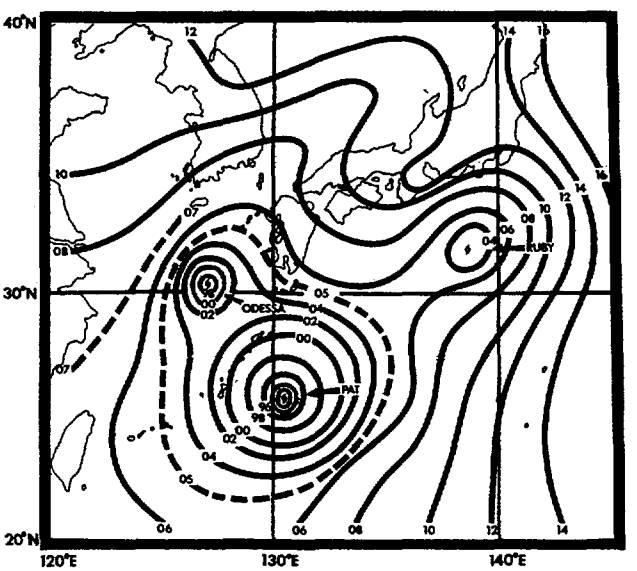


*Figure 3-12-6. Isobaric analysis for 300000Z August indicates the size difference between Pat and the small compact Odessa. The weaker system to the northeast is Tropical Storm Ruby, which remained solitary and apparently didn't enter into the interaction.*

The movement of Odessa under the ridge had served the prognostic reasoning well since the 27th. The forecast remained conservative and held to persistence as Odessa began to display erratic behavior, but the ridge to the north had changed. Both aids, OTCM and NTCM, indicated north to northeasterly movement (see Figure 3-12-8). When Pat started accelerating northeastward across Japan, Odessa executed an abrupt turn to the northeast and followed on its heels. Forecasts for Odessa's forward motion proved too slow as it accelerated into the Sea of Japan and began extratropical transition. Fortunately the system was compact and weakening or damage might have been more widespread. In Kyushu and other southern islands of Japan strong rains and winds from Odessa knocked out power and caused fishing vessels to capsize. Ships remained in port at Sasebo, Japan (WMO 47812)as Odessa passed sixty miles to the north. The final warning was issued at 011200Z September as the extratropical remains of Odessa approached northern Honshu.

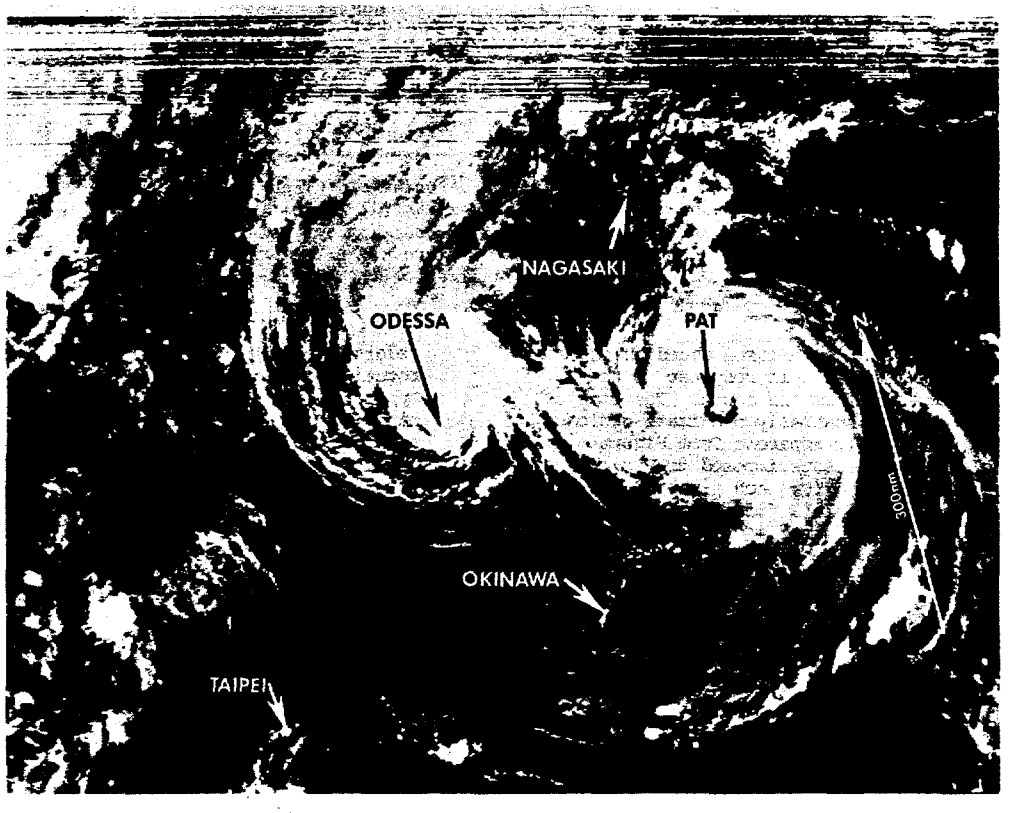


*Figure 3-12-7. In this moonlight photo Pat's ragged eye and large surrounding cloud mass dwarf Odessa, which is also at typhoon intensity (301348Z August DMSP visual imagery).*

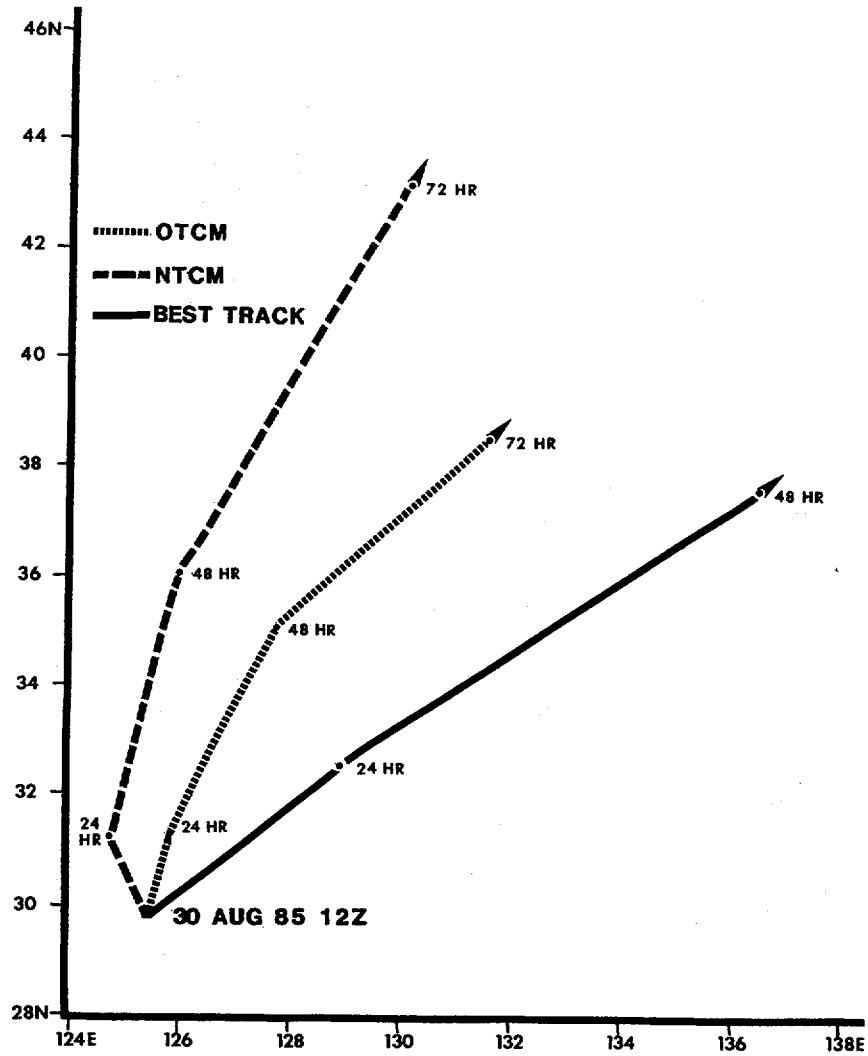


*Figure 3-12-8. Primary aids, NTCM and OTCM, at 3012002 August reflect a north to northeasterly track. The best track positions (solid line) indicate the guidance was basically correct.*