DOCKET NO.: SA-517
EXHIBIT NO. 3FF

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

AOS MSAW BRIEFING
(13 Pages)

MSAW

Minimum Safe Altitude Warning

March 24, 1998

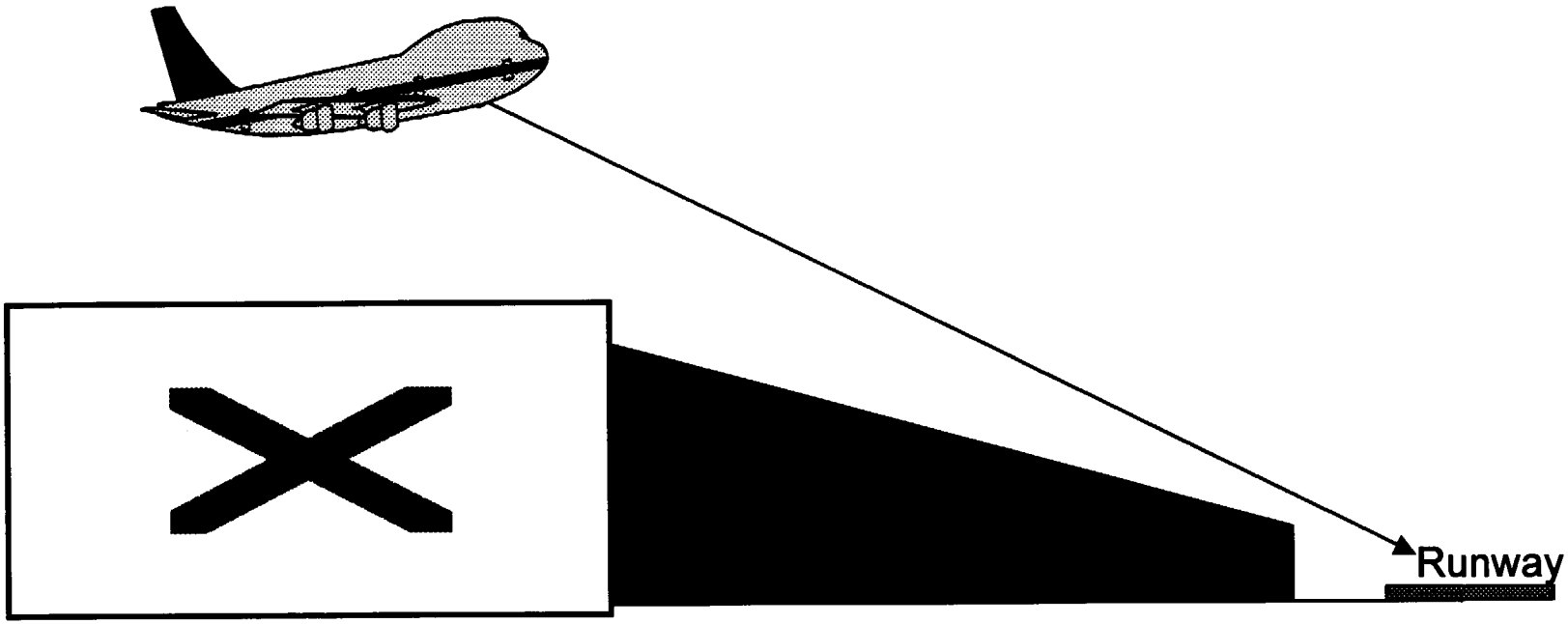
Minimum Safe Altitude Warning

- A function designed solely as a controller aid in detecting potentially unsafe aircraft proximity to terrain/obstructions.
- Generates an alert to the controller when a pilot is below, or is predicted to be below, a specified altitude.
- Must be adapted specifically for each one of the 193 Automated Radar Terminal Systems.

MSAW - HISTORY

- NTSB Safety Recommendation A-73-46 resulting from accident December 1972
  - 1977 - ARTSIII MSAW Implemented
  - 1990 - ARTSIIA MSAW Implemented

Types of MSAW Processing



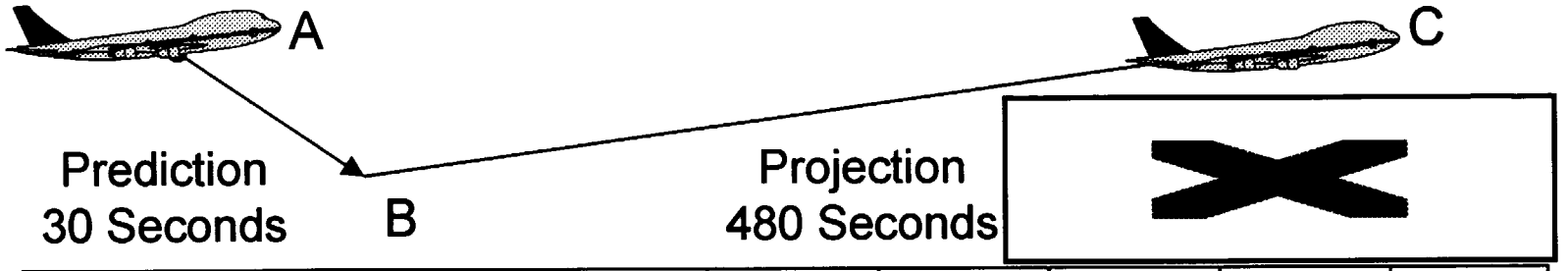
General Terrain Monitoring

Approach Path Monitoring

General Terrain Monitoring

- Current Alarm
  - Presently less than 500 feet above terrain map.
- Prediction Alarm
  - Pilot will be less than 500 feet above terrain map within 30 seconds.
- Projection Alarm
  - Pilot will be unable to clear all obstacles within eight minutes flying time on present course at a five degree climb angle.

General Terrain Warning

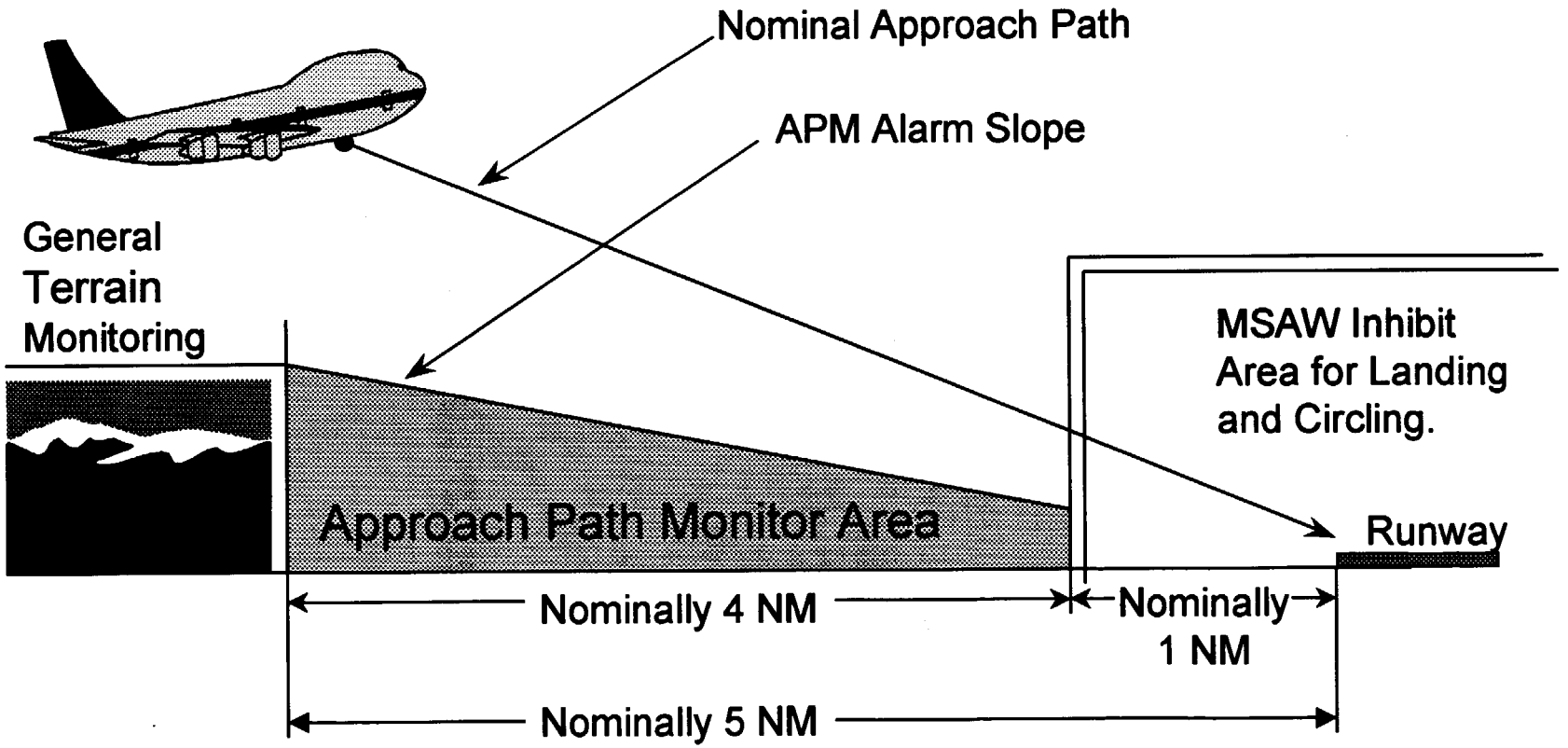


0	0	0	188	333	488	419	712 C	899
0	0	211	512	619	778	912	1212	1422
0	200 B	390	490	712	855	899	899	1366
280 A	318	300	500	680	790	944	1180	1390

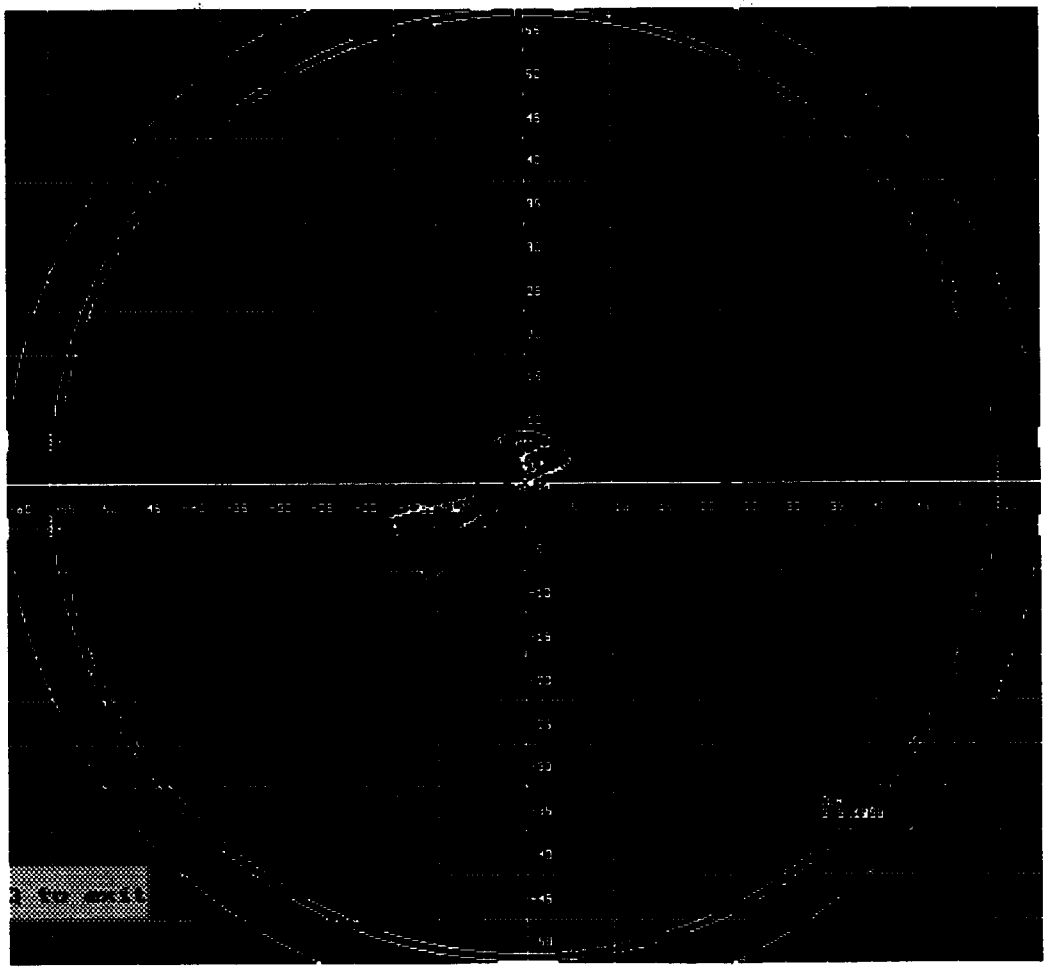
Approach Path Monitor

- Current
  - Pilot is currently below the calculated APM alarm slope altitude.
- Prediction
  - Pilot is predicted to be 100 feet below the calculated APM alarm slope altitude within the next 15 seconds.

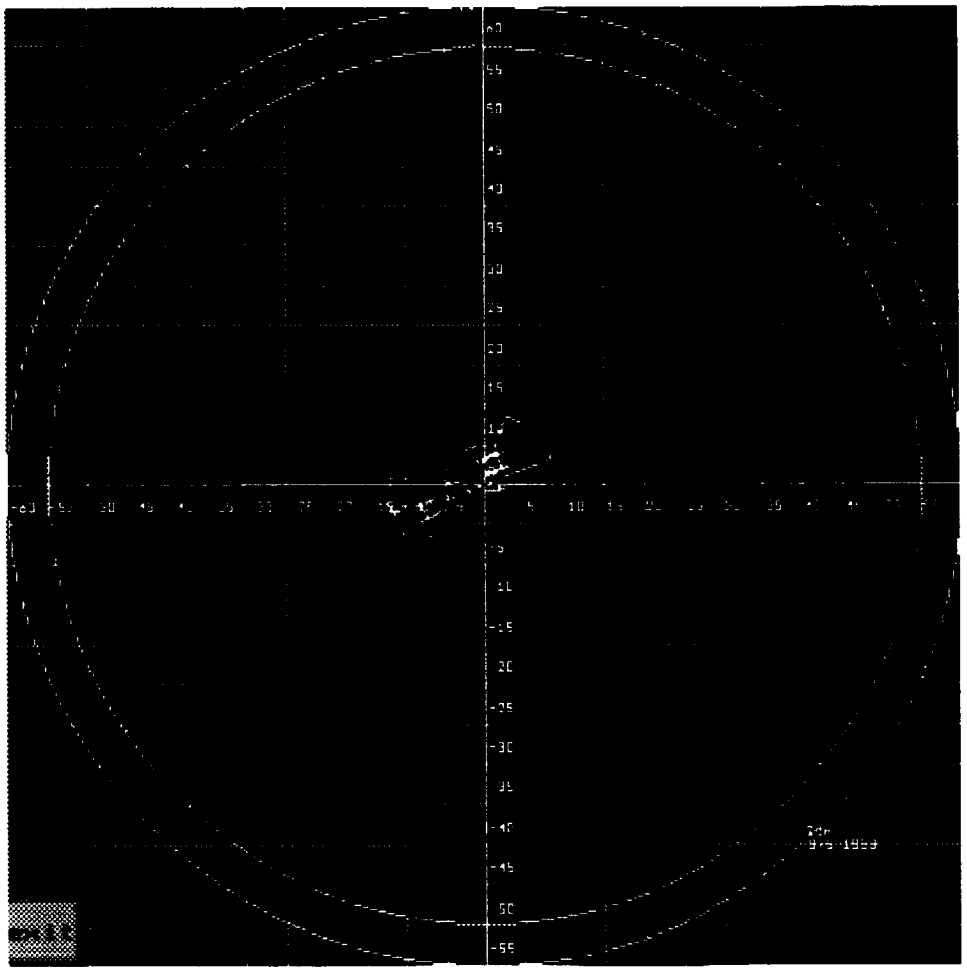
Approach Path Monitor (APM)



MSAW at Guam Before.



Guam After Re-adaptation.



Policy for Software Management

- October 3, 1997 FAA established a method for strict configuration management of MSAW.
  - All modifications are now centrally maintained.
  - Established strict management oversight and control.
  - Developed guidelines and review processes (Quality Assurance)

MSAW Optimization process

- Assembled an interdisciplinary team.
- Set optimal standards and guidelines for each MSAW parameter.
- Developed a process to evaluate and enhance each site.
- Developed new tools.
- Readapted each of the 193 systems.
- Site specific functionality test scenario.

MSAW - optimization (cont.)

- Nationwide findings & fixes
  - Reduced amount of inhibited airspace.
  - Re-designed approach capture boxes.
  - Corrected Digital Terrain Map (DTM) altitudes.
  - Implemented graduated approach path adaptation.