Mammut and Wassermann radar systems

a Survey

Eine Entdeckungsreise
• During a bunker visit promising to prepare a simple Mammut story

• Alain Chazette’s book on German radar and navigation bunkers in Normandy

• Getting from Alain a batch of unknown information

• Phil Judkins A.D.I. (Science) report

• Mike Dean sends a bunch of unique photos from NARA

• Getting kind support by one of the Wijk aan Zee bunker guys
A.D.I. (Science) report No 1
Unknown, apparently Mammut radar display (Sichtgerät)
Layout of a Mammut operational system
Steering column of a Mammut type F
Description of the Mammut beam steering technique

Heureka!

Seemingly, Mammut was like Freya and Seetakt, but bigger!
I Represents the receiving antenna array
II Is the transmitter array
Unknown radar display
AEG HR2/100/1,5 dual trace CRT with special range scale provision
AEG Patent application drawing which got DE891577 of 2/11/1939
Viewing the how AEG facilitated projection from behind
Generally, all GEMA related displays used real dual beam CRTs
Sofitten lamp holder and the projection lens system
Inneres des Gerätes 0
Abb. 60
‘OB’ range CRT, time-base being moved by means of a calibrated delay-line unit. Therefore a projected light cursor was necessary
Principle of most GEMA radar systems, based on Freya and Seetakt technology
Mammut antenna array cabling
The Mammut beam-steering compensator apparatus
Photo taken during Operation Post Mortem, late June- early July ‘45
Dick van den Berg worked on the Mammut beam steering theory
The slotted line section did function like a wave-distribution line.
The Stichleitung had to be inserted and its purpose was to counter or change a complex impedance.
Tuneable Stichleitung also known a stub
HP Network analyser with connected Stichleitung
The compensator unit was placed symmetrically in centre between the left- and right-hand array sides.
The cabling left and right were all of equal length ($\delta < 3\text{cm}$)
Viewing a Mammut antenna array from downwards up. Photo taken in Normandy, after a Mammut type F was blown up.
Shown is the way the Mammut array being fed. Curious is the way three centre groups being fed all in same phase instead of alternating phase.
Sperrtopf, a balun with an impedance ratio 1 : 1
Advantage, defined line phase
A Sperrtopf found next to the Wijk aan Zee Mammut bunker
Vacha 726, 60 Ω low loss cable. Likely the forerunner of the Flexwell cable.
An example of quite shabby Mammut operation room
Photo taken during Operation Post Mortem
Wassermann
a
Survey
Bild 1. Die verschiedenen Antennen von Großraum-Suchanlagen des Typs „Wassermann“ im Vergleich zur Antenne des „Freya“-Gerätes
Wassermann split-beam switch with delay-line (Umwegleitung)
Wassermann vertical beam steering (height finding)
Siemens Wellenschieber (phase-shifter)
Principle layout of a Wassermann system fit with height finding
It is most likely that this display module was part of a P-Gerät
Showing likely below range 0 – 100 km and up 100-200 km
The module with three slanted lines might be a P-Gerät
Photo taken during Operation Post Mortem
High power transmitter with attached T/R unit or Simultan-Gerät
But, I have seen such an outfit before!
Wide-band transmitter module Eibsee (100 kW)
Please focus your attention onto the HP-Gerät, which likely stood for Höhen-Peil (height finder apparatus)
My perception - as to how HP-screen presentations might have looked

Upper-only right-hand side DF

Upper-split-beam DF

Lower screen showing the OB range measuring; please neglect range scale. Pointing down correlating IFF signals
Left the NB dual CRT display (combined with an OB-scope) on the right the radar receiver NE (including IF and video ampl.)
On 15 January 2016, I did find this drawing inside a British wartime report. How to understand it is not yet clear, even not considering a GEMA manual.
Down the full range overview. Up a retarded time-base coinciding with an according video or range signal. Shown up the line range targets and downwards the correlating I.F.F. signal.
Likely the insert to the P-Gerät, for range 0-100 km and 100-200 km
Simulation of a PB-Geräte display?
Unit type O. Left the OB-display and right the Messkette OK
Simulation of an OB display screen
Siemens coaxial delay-line helix. Coaxial?
The core of a Wellenschieber being dismantled
Fig. 6: Skitse av enkelt Rør i Fosemaskina fra "Wassermann"
www.cdvandt.org

Mammut

Wassermann