Warship Radar Signatures

(Ship Survivability Part III-A)

The article reflects the views of the authors and not necessarily those of the Royal Netherlands Navy and/or Physics and Electronics Laboratory.
All data in this article are based on "open literature sources".
The English language has been used for this article, since this publication is an edited and extended version of the one presented and published at the SMI Defence Conferences 1999 Third Annual Stealth, Low Observables and Counter Low Observables.

L.F. GALLE, H.J.M. HEEMSKERK & L.J. VAN EWIJK

Leon F. Galle is working at Ship Survivability, at the Department of Naval Architecture & Marine Engineering (MarTech), Directorate of Materiel (DMKM) of the Royal Netherlands Navy (RNLN). He was active for 6 years in the field of Ship Vulnerability at the Prins Maurits Laboratory of the Netherlands Organisation for Applied Scientific Research (TNO-PML). He started Survivability work (Above Water Signatures & Vulnerability) for the Royal Netherlands Navy (RNLN) in 1991. The main author is national representative of NATO subgroup AC/141(NG/6) SG/7 "on Ship Combat Survivability" and manages as Senior Survivability several scientific research projects on ship RCS, IR and Vulnerability for the RNLN at TNO-FEL and TNO-PML.

Hendricus (Eric) J.M. Heemskerk is working on radar signatures and propagation in the Radar Technology Group of TNO Physics and Electronics Laboratory (TNO-FEL). He obtained his MSc in Electronics at the Delft Technical University. He was active in the field of wideband antennas during 7 years at TNO-FEL and became program manager of radar signatures and propagation in 1988. He was national representative in various NATO research study groups and chairman of NATO AC/323 SET-TG05 on "Maritime Target/Background Radar Signatures and Propagation at cm- and mm-Wavelengths" and of the exploratory group NATO AC/323 SET-ET05.

Lucas J. van Ewijk received the MSc degree in Technical Physics from Delft Technical University in 1986. Since 1988 he is employed by the Physics and Electronics Laboratory of the Netherlands Organisation of Applied Scientific Research (TNO-FEL). He has been working in the field of Radar Cross Section computations for an important part of the time and expanded his field of expertise with other kinds of electromagnetic computations. He has been involved in the development of High Frequency RCS computational codes, electromagnetic shadowing and EMI problems. His current interests include NCTR, multiple diffraction, EM screening and millimetre wave imaging. He has been a member of a NATO research study group on Millimetre Wave Imaging and is currently member of a group on Non Co-operative Target Recognition by radar.

Synopsis
Radar Cross Section (RCS) management is of paramount importance for a warship's survivability. In this first part of the paper (Part III-A), the operational benefits of low RCS will be explained. Basic RCS theory, measurement and simulation techniques will be addressed. The RCS of representative geometrical objects will be generated. The relation between RCS and measured radar signature will be elaborated.
In the second part of the paper (Part III-B) possible RCS reduction techniques will be presented and elaborated upon. This to give insight to RCS management. An international survey of low observable/RCS warship design will be highlighted. A general overview will be given of the RCS design process of the new RNLN Air Defence Command Frigate "LCF" and the reduction features installed. The article will close with views on future trends.

> *"Nicht aufzufallen, ist das erste Gesetz des guten Tones"*
> *Langbehn, "Rembrandt als Erzieher" (1889)*

Introduction

The last decades, the threat of Anti Ship Missiles (ASMs) challenging our warships has been dramatically increased.

ASMs have become more and more sophisticated in terms of velocity, agility, sensors and (digital) signal processing (DSP). This is true in the field of Infrared (IR) Electro Optics (EO) guided as well as developments in the ASM Radar Guided (RF)[1]) field. Examples of RF guided ASMs are the Swedish "RBS-15", see Figure 2, the Russian *"Styx"* RF variant and its Chinese (PRC)[2]) derivative *"Silkworm"*.

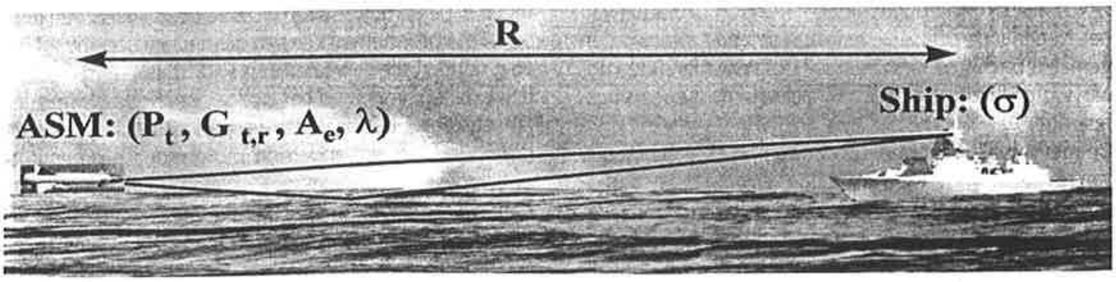


Figure 1. ASM Attack Scenario.

Radar detection is active; Electro Magnetic (EM) energy is transmitted to the target and reflection can be received. Detection by a (pulsed) radar system, will give bearing and range information. This in contrast to Infra Red detection, which is passive, and which gives bearing info only.

Retardation of RF-Detection, Classification & Targeting

It will be hard for a conventionally designed frigate-sized ship, to escape detection for a Radio Frequency (RF) guided "sea skimming" ASM that "pops" over the radar horizon. However, detection, classification and targeting at long range by the "missile carrying" fighter jet can be delayed by means of reduction of the ship's radar cross section, see Figure 4 Block 2.

The "Radar Range Equation" states that the received power (P_r) by the transmitting (jet)radar is proportional to the Radar Cross Section of the target (RCS, σ):

$$P_r = (P_t G_t A \sigma) / ((4\pi)^2 R^4) \qquad \text{eq. (1)}$$

with P_t, G_t and A being the transmitted power, transmitter antenna gain and effective aperture of the receive antenna and R the range.

(Note that, σ is the only parameter, in the radar equation, which can influenced can by the defender/target/ship.)

Long range radar systems need minimum signal levels for detection, classification and targeting: S_{min}. Rearranging eq. (1) yields for the maximum range:

$$R_{dct} = ((P_t G A \sigma) / (4\pi)^2 S_{min})^{1/4}$$

$$= \text{constant} * \sigma^{1/4} \qquad \text{eq. (2)}$$

So reduction of the radar cross section of the warship will decrease the (long range) detection, classification and targeting ranges (R_{dct}) with the 1/4-power. Table 1 taken from [Baganz & Hanses, 4] depicts some numerical examples of changes in detection range by RCS reduction. The reduction in detection range seems not spectacular, but will still be an important operational benefit, which will be explained in the paragraph "Future Trends" (Part III-B).

Ship's ESM benefit

Next to the reduced detection advantage, reduction of the warship's RCS will force the attacker to deploy higher levels of transmitting power which increases the probability of detection by means of the passive Electronic Warfare Support Measures System (ESM) of the defending ship's Electronic Warfare (EW) system and thus increases the reaction time; Figure 4 Block 1.

Improved Soft Kill Effectiveness

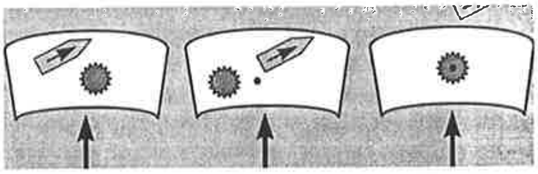
In essence, see Figure 4 Block 3, the active part of the warship's Electronic Warfare (EW) suite; i.e. the Electronic Counter Measures (ECM), will contain two options against RF-guided missiles: an (active) jammer-system either on board or off-board (AOD) and passive RF decoys. Passive RF decoys either float on the water or create a cloud of metallised glass fibres (chaff).

Chaff Support

Chaff can principally be deployed in three roles: (1) before the fighter jet (launching platform) acquires the warship (dilution chaff), (2) before the missile locks on to the target (distraction chaff) or (3) after missile lock-on i.e. to seduce (lock transfer) the missile away from the platform (seduction chaff).

Improved Chaff-S Effectiveness

In the chaff seduction role (Chaff-S), the Radar Cross Section (RCS) or "skin-echo" of the warship is in direct competition with the chaff round. Figure 5 gives the principles of chaff in the seduction role. Figure 6 yields generic results of chaff seduction efficiency as function of the ratio RCS of ship over chaff.



Phase A: Lock-on Chaff Blooming.

Phase B: Ship & Chaff within Rangegate. Centroid Bias moves to Chaff.

Phase C: Lock Transfer Rangegate Separation.

Figure 5. Lock Transfer Principle for Chaff-S.

It shows that a low RCS of the ship is of paramount importance for successful deployment of seduction chaff.

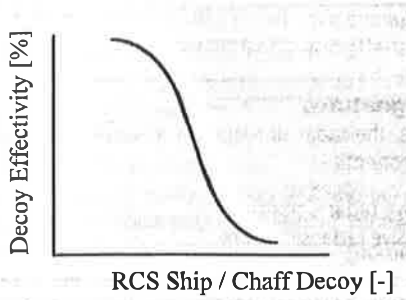


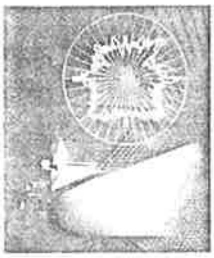
Figure 6. Generic Results of Chaff-S.

Table 1. Decrease of Detection Range by RCS Reduction.

Unreduced RCS Value σ = 10,000 m^2			
Log RCS Reduction [dB]	Linear RCS Value [m^2]	Free Space Conditions [%]	Multipath Conditions [%]
3	5000	16	6 – 8
6	2500	29	11 – 16
9	1250	41	16 – 23
10	1000	44	18 – 25
12	625	50	21 – 30
20	100	68	32 – 44

Table 2. (Right) Equivalent Increase in Jammer Gain by RCS Reduction.

RCS Reduction [dB]	Jammer Signal [dB] Skin Echo Signal	Increase in Equivalent Jammer Gain [dB]
3	S/J = X + 3.00	2.0
5	S/J = X + 5.00	3.2
10	S/J = X + 10.0	10.0
15	S/J = X + 15.0	31.6



The Power Density at the receiving antenna is:

$$(P_tG_t / 4\pi R^2)(\sigma/4\pi R^2) \quad \text{eq. (6)}$$

Introducing an effective Aperture of the receiving antenna A_e, the received power at Rx is:

$$P_r = (P_tG_t / 4\pi R^2)(\sigma/4\pi R^2) A_e \quad \text{eq. (7)}$$

Introducing wavelength λ and Gain of the receiving antenna:

$$G_r = 4\pi A_e/\lambda^2 \quad \text{eq. (8)}$$

Substituting (7) in (8) and rearranging yields:

$$P_r = (P_tG_t/4\pi R^2)(\sigma/4\pi R^2)(G_r\lambda^2 / 4\pi) \quad \text{eq. (9):}$$

Simplifying (9) with $G_t = G_r = G$ yields:

$$P_r = (P_tG^2\lambda^2\sigma) / ((4\pi)^3R^4) \ (W) \quad \text{eq. (10):}$$

This "Radar Range Equation", in its simplest form, indicates that the received power (P_r) by the transmitting radar is proportional to the Radar Cross Section (σ).

Theoretical Definition

Next to this physical definition, the theoretical definition of RCS is (fully illuminated):

$$\sigma = \lim_{R \to \infty} 4\pi R^2 (E_r^2/E_i^2)(m^2) \quad \text{eq. (11)}$$

E_r = electric field magnitude at the receiver
E_i = electric field magnitude incident at the target

The dimension of RCS, in the linear space, is m^2 but because of its highly dynamic behaviour, RCS is also often expressed in "log-space" relative to one square meter (dBm^2) by:

$$\sigma(dBm^2) = 10\{\log(\sigma(m^2))\} \quad \text{eq. (12)}$$

Some numerical examples are depicted in Table 3.

RCS is dependent on target characteristics (shape, material), the radar characteristics (frequency, polarisation, full illumination) and the geometry (relative position/orientation of the target to the radar).

Factors Affecting The Radar Signature

During field trials the measured or apparent radar cross section is obtained. In most cases this is not the theoretical free space RCS, since it includes environmental effects like propagation through the atmosphere, ducting and multi-path effects and also effects by not fully illuminating the target i.e. with too small pulse- and beamwidths. Table 4 gives an overview of the parameters which influence the Radar Signature. In order to avoid misunderstandings the measured or apparent RCS is called here radar signature. Several aspects will be briefly elaborated.

Table 3. RCS in Linear & Log Space.

Linear Space (m^2)	Log Space (dBm^2)
100,000	50
10,000	40
1,000	30
100	20
10	10
1	0

- **Radar Type**

The RCS differs for a monostatic and bistatic case. In the monostatic case transmitter and receiver are co-located, in the bistatic case the transmitter and receiver antenna are separated by a considerable distance. For most regular threat (fighter jets, ASMs) conditions the monostatic case is relevant.

- **Radar Modulation Type**

Radar modulation, either pulse, continuous wave (CW) or frequency modulated (FM) will influence RCS. A steady state RCS will be generated by a CW system, in comparison with a transient response for a short pulse radar system. Variation of frequency (FM) will result in changing RCS during the frequency sweep.

- **Radar Frequency**

The RCS is dependent on radar frequency. In general, for simple objects, the RCS will increase with frequency. However for ship targets, the frequency dependency of RCS is very complex and does not necessarily show the same frequency behaviour as simple objects.

- **Radar Polarisation**

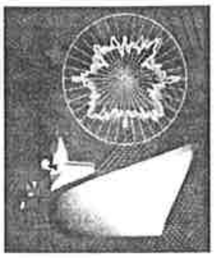
The RCS is dependent on the polarisation of the radar signal, transmit as well as receive. The dependency on polarisation can be fully laid down in a (2×2) "scattering matrix"; including two co-polarisations (for instance HH and VV) and two cross-polarisations (HV and VH), see Table 5.
In case the full matrix (amplitude and phase) is available RCS values for all other polarisations e.g. right- and left-circular forms can be generated.

- **Target Aspects**

The highly dynamic behaviour of the ship's signature during field trials can mostly be attributed to the change in momentary presented aspect angle to the radar system.
Small changes in the target aspect to the radar by the ship's roll, pitch and yaw will cause differences in the range from each contributing scatterer on the ship to the radar resulting in constructive and destructive interference and in a wander of the apparent centre of reflections over the ship. This phenomenon is known as glint. In most cases a ship behaves as a collection of many scatter centres. In that case the received signal exhibits strong fluctuations both in amplitude and in phase. This glint can result in possible aim-point problems for the missile radar. One might be interested to intentionally generate an artificial glint-like signal by passive adaptations to the ship's geometry in order to mislead the missiles tracking system. Knowledge on the missiles tracking system is a prerequisite in that case.

- **Target Illumination**

It will be clear that the radar signature will be affected by the way the target is illuminated by the radar system. Partial illumination can be caused by a too narrow radar beamwidth at short ranges, too short pulse and masking



Theoretically multipath alone can cause a signal enhancement of 12 dB or generate deep nulls. An example of the effect of ducting and multipath is given in Figure 8. This figure shows the measured radar signature of a corner reflector (theoretical RCS is 30 dBm^2 at I-band and 34.5 dBm^2 at J-band) at a height of 3 m above the sea surface as a function of the range to the radar for 7.7 m duct height. The radar is positioned at a height of about 7 m above the sea surface. The figure shows also the frequency dependency of the effects of these phenomena. Actual enhancement will depend on the radar-target geometry, the properties of the target, the sea state and ducting conditions.
With increasing sea state the sea surface becomes rougher and the multipath effects will be reduced. Also the radar signature of a ship will be affected by multipath. However it will be depended if the ship behaves as a collection of non-dominant scattering sources or contains one dominant scatterer. Figure 9 depicts an overview of the relation between free space RCS, the environmental effects and the measured radar signature. Co-operative research is ongoing to model these environmental effects and to apply these models to the measured RCS of the ship to obtain the free space RCS.

RCS of typical geometrical objects

The RCS of targets is strongly dependent on the shape, as has been mentioned earlier. Also, there is no dominant relationship between the physical area of the object and the RCS. To demonstrate these phenomena we performed some RCS calculations with the computer program RAPPORT, which will be elaborated later, of various geometrical shapes. The area of all the objects used, projected on a plane perpendicular to the line of sight at 0° azimuth and 0° elevation angle equals 1 m^2, so when viewed with the human eye, the objects seem equally large. In the following two graphs, Figure 10 & 11, the RCS is given as function of azimuth angle and elevation angle. The angular dependence clearly shows for several of the test objects. The horizontal axis shows aspect angle, either azimuth or elevation, the vertical axis shows the RCS in dBm^2.

- **Flat Plate**

The flat plate has a large RCS when viewed perpendicularly. The RCS falls off with the aspect angle quite fast. The RCS as a function of azimuth and elevation angle depends on the dimensions of the plate in the azimuth and elevation plane. Therefore it not surprising that in Figure 10 the angular dependence of the RCS of the square plate is the same for azimuth and elevation.

- **Cylinder**

The RCS of a vertically oriented cylinder is omni-directional in the azimuth plane, while in the elevation plane it behaves like a plate. In Figure 10 and 11 small undulations are observed in the RCS as a function of the azimuth angle. These are caused by the representation of the cylinder as small facets, necessary for the RAPPORT calculations.

- **Sphere**

The RCS of the sphere is constant for both aspect angle variations, which could be expected because the object is the same whatever angle it is viewed from. The small undulations are, like in the case of the cylinder, caused by the representation of the object as small flat facets.

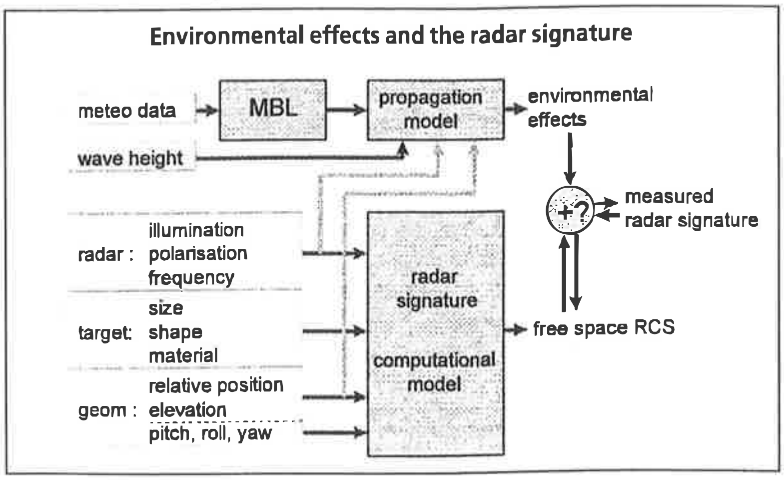
- **Dihedral**

The dihedral is the first object in this list that exhibits multiple reflection effects. This is most clearly seen for the RCS as function of azimuth angle. Over the complete angular region that is investigated here the RCS is very large. Due to double reflection the RCS only decreases slowly as function of the aspect angle. For the elevation angle dependence it is quite different. Here we don't have any double reflection and the dihedral behaves similar to the flat plate.

- **Trihedral**

The trihedral exhibits double and triple reflection, so for both azimuth and elevation angle dependence this object has a large RCS for all angles that are investigated.

Figure 9. Relation between Free Space RCS and the Measured Radar Signature.



Ways to obtain the radar signature

For radar signature measurements two small mobile in house developed radars are operated now by TNO-FEL. The first is a non-coherent high power low resolution radar called NORA operating at a single frequency in the I- and J-band. This radar can be equipped with an interferometer for tracking purposes or lock-break measurements. The second radar is the coherent high resolution radar CORA which uses a stepped frequency waveform and operates at from 8-18 GHz and 92-96 GHz. Also this radar can operate in an interferometer mode. This radar can be employed for signature measurements in a maritime environment, a tower-turntable facility and in an anechoic room. It is planned to extend the frequency range of this radar to 30-40 GHz. Features of both radars are given in Table A1 and A2, see Annex 1. Data can be processed to obtain the conventional polar plots of low resolution radar signature as a function of aspect angle, high range resolution profiles as a function of aspect angle and ISAR images for specific aspect angles. The latter two indicate the location of scattering centres on the target, which information can be used in the RCSR process. Typical examples of results obtained by CORA are depicted in Figure 12, 13 and 14.

RCS scale model measurements

In a ship design stage, it will not be possible to perform life trials. However it will possible and very useful to check a design concept with scale model measurements.

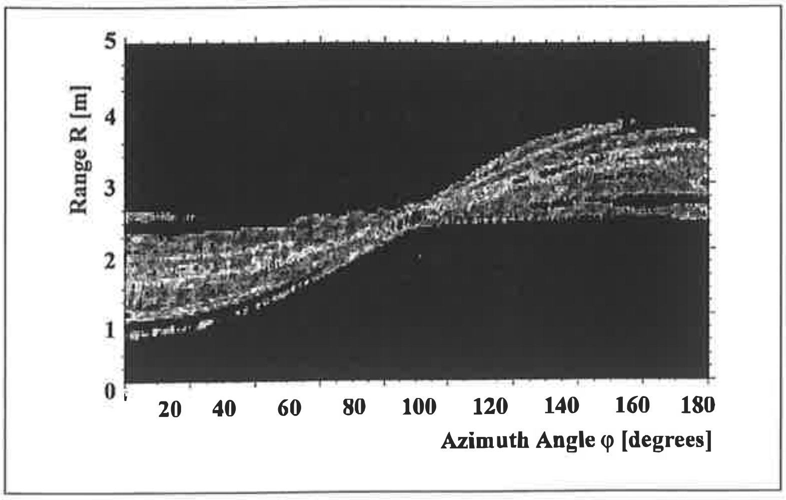


Figure 14. Range profile history plot of a scale model of a ship.

Figure 15. (Right) ISAR image of a ship (ship is illuminated from the "bottom" at about 20° starboard).

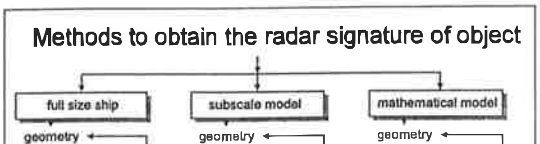
Objects have to be described as a collection of flat polygonal plates, because of the adopted method to solve the PO integral [8]. RAPPORT makes use of an efficient backward ray-tracing algorithm to construct the illuminated part of the object, from which the RCS can be computed for any desired number of reflections and frequencies. The accuracy with which this illuminated area is determined can be controlled by a user defined parameter. This feature makes it possible to model very large complex objects like ships and it greatly facilitates the generation of inverse synthetic aperture radar (ISAR) images of the target.

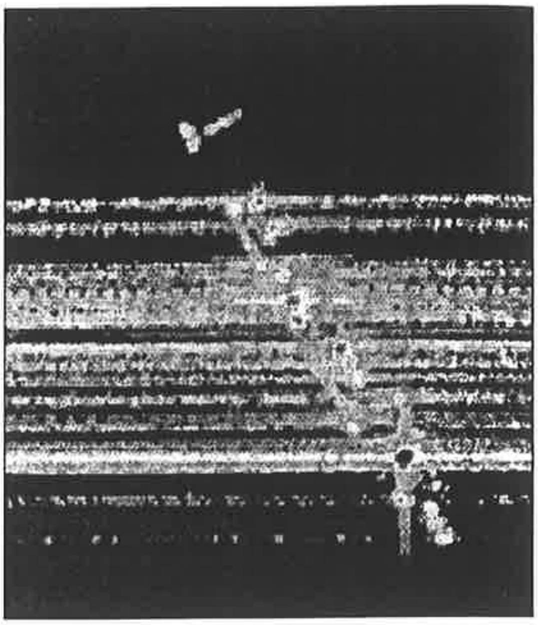
Figure 15 shows a computed history plot of range profiles taken from a 1:75 scale model of a ship. A range profile shows the reflection centres as function of range along the object. It can be used to determine where the major contributions of the RCS originate from. In order to pinpoint dangerous scatter centres, the ones that are visible over a large angle interval, several range plots are made. In the figure, 600 range plots are shown with an angular resolution of 0.3°. The range resolution is 0.04 m. The RCS can be given in a colour code e.g. ranging from blue (low RCS) to red (high RCS).

In the computed ISAR image of a ship in Figure 15 a colour code is used for the RCS, ranging from also e.g. blue (low RCS) to red (high RCS). The contours of the ship can clearly be seen, as are the major reflection centres. These contours can usually not be seen in measured ISAR images because the dynamic range for computations is by far higher than it is for measurements.

In order to overcome the problems with edges that PO based codes encounter, a software tool based on the Method of Equivalent Currents [9] has also been developed at TNO [10]. With this program, called RCS_MEC,

Figure 16. Different methods to obtain the Radar Signature.





the scattering by sharp edges can be computed. To obtain a better representation of the RCS of a target, the scattered fields due to edge diffraction can subsequently be combined with the scattered fields due to reflection, as computed by RAPPORT. [11]

Numerical techniques, that do not use the approximations of the high frequency techniques, are capable of directly solving electromagnetic scattering problems starting either from Maxwell curl equations or from the Chu-Stratton integrals, that can be derived from the Maxwell equations. This can result in highly accurate solutions and are most commonly used as exact solutions for validation purposes of approximated solutions. The use of these techniques for RCS calculations is limited, however, due to the enormous computer resources that are needed for even small objects. At the TNO Physics and Electronics Laboratory a Finite Difference Time Domain (FDTD) code has been developed which solves the Maxwell curl equations directly. Objects of 10 λ cubed can be used for analysis, in real life this means objects of approximately 30 cm cubed. Obviously this method is not applicable for ships, the main objective of the code is to investigate scattering phenomena and to compute small parts of other problems, for instance the computation of the RCS of parts of large antennas.

Aware of its limitations, simulation codes have become an indispensable tool for naval engineers. Especially in the design phase (e.g. LCF), where no ship is even available to evaluate. Still the naval engineer must be able to make trade-offs to optimise the ship's RCS cost-effectively.

However, it should be kept in mind, that simulation is only a tool, which can decrease the number of trials. It can not replace the ultimate "Live Trial".

RAPPORT has a coupling with the NAME[4]) (MarTech) Computer Aided Design CAD-Software CATIA.

Figure 16 shows the different elaborated methods to obtain the radar signature of an object.

Ship Survivability Part III-B

In the second part of the paper (Ship Survivability Part III-

Transmitter	I-band
centre frequency	8-18 GHz
peak transmit power	100 mW
antenna 3 dB beam width	3.5°
antenna type	60 cm parabolic
pulse width	3.2 μs
pulse repetition frequency	adjustable typ. 10 kHz
polarisation	horizontal or vertical
number of frequencies	max. 1024
output	
RCS, bearing and heading	registration on optical disk
Output	on-line monitoring

Receiver	
antenna 3 dB beam width	3.5°
antenna type	parabolic
polarisation	horizontal or vertical
receiver type	linear
min. detectable signal	–100 dBm
dynamic range	>60 dB
detector	sample and hold
range gate	manual
target tracking	manual

Table A2. Characteristics of the coherent high resolution radar CORA.

AP-23, No. 3, pp. 252-258, March 1983.

[10] Ewijk, L.J. van: Diffraction computations by means of the Method of Equivalent Currents, TNO report FEL-94-B195, May 1994.

[11] Brand, M.G.E. & Ewijk, L.J. van; The RAPPORT code for RCS prediction, at PIERS conference 1995.

Bibliography

Currie, N.C. et al.: Radar Reflectivity Measurement, Techniques & Applications, *Artech House,* 1989.

Richardson, M.A. et al.: Surveillance & Target Acquisition Systems, *Brassey's Landwarfare,* Volume 4, 1997.

Ruck, G.T. et al.: Radar Cross Section Handbook, Volume 1 & 2, *Plenum Press,* New York/London 1970.

Rains, Dean A.: Methods for Ship Military Effectiveness Analysis, *Naval Engineers Journal,* March 1994.

Polk, J. McCants, T. & Grabarek, R.: Ship Self-Defense Performance Assessment, Methodology, *Naval Engineers Journal,* May 1994.

Goddard, C.H., Kirkpatrick, D.G., Rainey, Dr. P.G. & Ball, J.E.: How Much Stealth? *Naval Engineers Journal,* May 1996.

Boekbesprekingen

Beheersing van geweld
„Het optreden van de Nederlandse landstrijdkrachten in Indonesië 1945-1949"
Auteur: R.P. Budding
Uitgever: De Bataafsche Leeuw, Amsterdam 1996
ISBN: 90.6707.419.5
Prijs: *f* 36,–, hier en daar nog verkrijgbaar

Het boekje van R.P. Budding in 1996 bij de Bataafsche Leeuw verschenen onder de titel **„Beheersing van geweld"** kan gezien worden als tegenhanger van een publicatie uit 1970 genaamd *„Ontsporing van Geweld".*[1]. Het in beide boeken behandelde geweld, werd veroorzaakt door de strijd die in de periode 1945-1950 gevoerd werd in de toen nog Nederlandse kolonie in het Verre Oosten: Nederlands-Indië. De schrijver betoogt uitvoerig dat beheersing van geweld door oorlogvoerende partijen vooral uit welbegrepen eigenbelang, maar ook wel uit menselijkheidsoverwegingen geboden is. De meningen van grote strategen als Von Clausewitz en de historicus Michael Howard worden hiertoe opgevoerd.

Duidelijk blijkt uit het betoog dat de regering alsmede de hoge legerleiding, kortom de betrokken militaire en civiele autoriteiten tijdens onze laatste koloniale oorlog heel bewust in woord en daad alle nodeloos geweld zijn tegengegaan. Natuurlijk zijn er in die periode van soms hevige strijd excessen geweest. Daarvoor heeft men dan ook niet voor niets het instituut van de militaire rechtspraak. Deze excessen zijn onderkend en de schuldigen zijn naar behoren berecht. Onwillekeurig gaat men al lezend denken aan de titel **„Omgaan met geweld".** Tenslotte zal in elk militair conflict het daarom gaan. Ontsporing of juist beheersing, maar een oorlog zonder geweld is ondenkbaar.

J.Ph.A. Crommelin-Prisse

Noot:

1) Het Nederlands/Indonesisch conflict. Ontsporing van geweld, J. A. A. van Doorn en W. J. Hendrix, Rotterdam (1970), derde druk, Amsterdam/Dieren (1985).

Titel: Servië en het Westen
Een historische schets van Joegoslavië en de Balkan
Schrijver: Milo Anstadt
Uitgeverij: Pandora pockets
Aantal pag.: 238 (derde druk 1999 - geactualiseerd)
ISBN: 90 254 9991 0
Prijs: *f* 15,–

„Welke kwalificatie is op de oorlog in Joegoslavië van toepassing? Is het burgeroorlog, een ideologische oorlog, een godsdienstoorlog, een oorlog tussen naties, etnische groepen, stammen, een oorlog tussen benden, mafiosi, bandieten? Of misschien alles tegelijk? Elke oorlog is gruwelijk, onmenselijk, barbaars. De oorlog in Joegoslavië overtreft dat alles nog door zijn ongedisciplineerd, chaotisch karakter."

In Europa verbaast men zich over de wreedheden die er in Joegoslavië zijn begaan, maar vooral over het feit dat van de ene op de andere dag buren elkaar naar het leven stonden met een alles verwoestende vijandschap terwijl ze voor decennia naast elkaar hadden gewoond. Natuurlijk wordt er naar een zondebok gezocht en worden, in veel gevallen, de Serviërs verantwoordelijk gehouden voor het gros van de wreedheden.

Met zijn boek heeft de schrijver geprobeerd het uiteenvallen van Joegoslavië vanuit een andere invalshoek te belichten. Hierdoor wordt een vollediger beeld van de Joegoslavië problematiek verkregen dan dat er doorgaans in de media gepresenteerd wordt. Tevens wordt duidelijk dat het aanwijzen van de Serviërs als de zondebok zeer kort door de bocht is. (*„Alle groeperingen maken zich schuldig aan wreedheden. Ze lijden allemaal, maar ze zijn ook allemaal schuldig."*)

Als basis voor een beter begrip van de gehele problematiek wordt in het boek allereerst de complexiteit van de etnische lappendeken onder de loep genomen. Waarna een uiteenzetting over de geschiedenis - één van overheersing - van de Balkan volgt. Alle ons inmiddels welbekende geboden passeren de revue met al hun bijbehorende problemen die vaak ook nog met elkaar verweven zijn. Natuurlijk komt ook het bewind van Tito aan de beurt en de uiterst subtiele manier waarmee hij nationalistische gevoelens van verschillende bevolkingsgroepen in toom hield.

In het tweede deel van het boek wordt de aanloop, in de jaren negentig, naar de uiteindelijke uitbarstingen van geweld beschreven. Niet alleen de rol van de verschillende Joegoslavische hoofdrolspelers wordt belicht, maar vooral de rol die het Westen daarin heeft gespeeld.

„Met weemoed ziet de bezoeker uit de Lage Landen in de Joegoslavische tragedie een herhaling van het historische uiteenvallen van zijn eigen taal- en cultuurgebied omwille van religieuze onverdraagzaamheid, lokale politieke ambities en buitenlandse manipulaties."

In dit deel van het boek maakt de schrijver gebruik van citaten uit krantenartikelen waarmee hij bewerkstelligt dat de lezer zich beter kan inleven en het 'ver-van-mijn-bedshow' karakter verminderd wordt. Tevens wordt door het gebruik van citaten het boek gemakkelijker leesbaar.

Indien u interesse heeft voor de Joegoslavische problematiek en geïnteresseerd bent in de dieper liggende achtergronden ervan dan kan ik u dit boek zeker aanraden.

M.J.M.S. Hekkens