

Operational Analysis in Support of HQ MND(SE), Basrah, Iraq, 2003

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Tony Hopkin holds an honours degree in Technology and Management and a Masters degree in Operational Research from the University of Southampton. In 2002 Tony joined the Front Line Department, later the Support to Operations Group, in the Defence Science and Technology Laboratory (Dstl) as an Operational Analyst. During the fire fighters dispute later that year he deployed as part of a small team of analysts to provide support to the Civil Contingencies Secretariat in the Government's Cabinet Office. Since then Tony has provided OA support to the UK's armed forces through staff college exercises and field deployments. Tony is a member of Dstl's Operations Other Than War (OOTW) skill group, which aims to maintain and improve the technical and analytical skills and knowledge in this area.

ABSTRACT

On 8 November 2002 the UN Security Council voted unanimously in favour of resolution 1441 thereby authorising the return of UN weapons inspectors to Iraq and offering Baghdad a last chance to comply with its disarmament obligations, and recalling previous warnings of "serious consequences" in the event of non-compliance. In January 2003 the headquarters of 1 UK Armoured Division deployed as part of a land force package to provide military capabilities for potential operations against Iraq. Amongst its staff were two civilian analysts provided by the HQ Land Command OA cell, later the Land Warfare Centre OA branch, augmented from the UK MoD, Defence Science and Technology Laboratory (Dstl).

On 20 March 2003 coalition forces operations in Iraq began, with the UK military operations being conducted under the name of Operation TELIC. On 2 May 2003 the President of the USA, George W Bush, formally announced the end of major combat operations in Iraq.

UK land forces were deployed to the gulf to fight a war, but they also knew that they would also have to sustain the peace after the fighting was done. As such the Division planned what procedures they were going to use after the defeat of Saddam's regime. The two Dstl analysts were the operational analysis (OA) team charged with assisting the divisional headquarters on monitoring the situation and attempting to provide an analytical assessment of the effectiveness of the stabilisation and recovery of the UK led area of responsibility in the Southeast of Iraq.

The initial OA team, and the subsequent teams that followed, developed *measures of effectiveness (MoE)* using real data collected by the troops on the ground and also later on by

trained Iraqi pollsters. Whilst the extent of data collected was necessarily limited, analysis was undertaken. The work carried out by the OA teams was, and continues to be, held in high regard by the local commanders as well as across the coalition, and host of headquarters and other government organisations back in the UK.

BACKGROUND

On 8 November 2002, recognizing the threat Iraq's non-compliance with council resolutions and proliferation of weapons of mass destruction and long-range missiles poses to international peace and security, the UN Security Council voted unanimously in favour of resolution 1441. In particular, resolution 1441 placed obligations on Iraq to disarm and established inspection mechanisms to verify this. In particular, it authorised the return of UN weapons inspectors to Iraq and offered Baghdad a last chance to comply with its disarmament obligations, recalling previous warnings of "serious consequences" in the event of non-compliance.

During December 2002 operational analysis (OA) scientists from the UK's Ministry of Defence (MoD), Defence Science and Technology Laboratory (Dstl) became involved with the planning necessary for military action in Iraq, should it be required. During this planning the OA staff was considering on only the conflict stage but also how to monitor the situation in the aftermath of a war in Iraq, and how to make an assessment of the effectiveness of the campaign plan for stabilisation and recovery. This was taking place more than 5 months before the eventual war fighting was officially declared over.

In January 2003 the headquarters of 1 UK Armoured Division deployed as part of a land force package to provide military capabilities for potential operations against Iraq. HQ Land Command provided an OA team made up of two civilian analysts augmented from Dstl that deployed with the 1 (UK) Div to provide OA support to the operational planning. Unlike previous UK OA team deployments into theatre supporting a divisional HQ, this time they would be immersed in the operation from the outset.

Pre-conflict, the principal tasks for OA were to provide analytical assessments of potential courses of action (COA) developed by the divisional headquarters and logistic estimates to consider deployment times and sustainability. Along with this work the analysts worked on developing the measures that would be put in place after any potential war to assist the divisional headquarters monitor the situation as the campaign moved from war fighting to recovery and stabilisation of Iraq.

On 20 March 2003 coalition forces operations in Iraq began, with the UK military operations being conducted under the name of Operation TELIC. During the conflict the OA team revisited their earlier COA analysis and handled a surfeit of Ad Hoc questions from the staff officers. The focus on the design and development of the procedures for obtaining the information that would be required to analyse the recovery and stabilisation became heightened as the time grew closer for these to be put into operation.

On 2 May 2003 the President of the USA, George W Bush, formally announced the end of major combat operations in Iraq. As the UK forces moved from the war fighting to the recovery and stabilisation of Iraq, the OA team began implementing the work they had

designed to support the General Officer Commanding (GOC) and his command staff's situational awareness and help measure the effect their troops and initiatives were having on the ground.

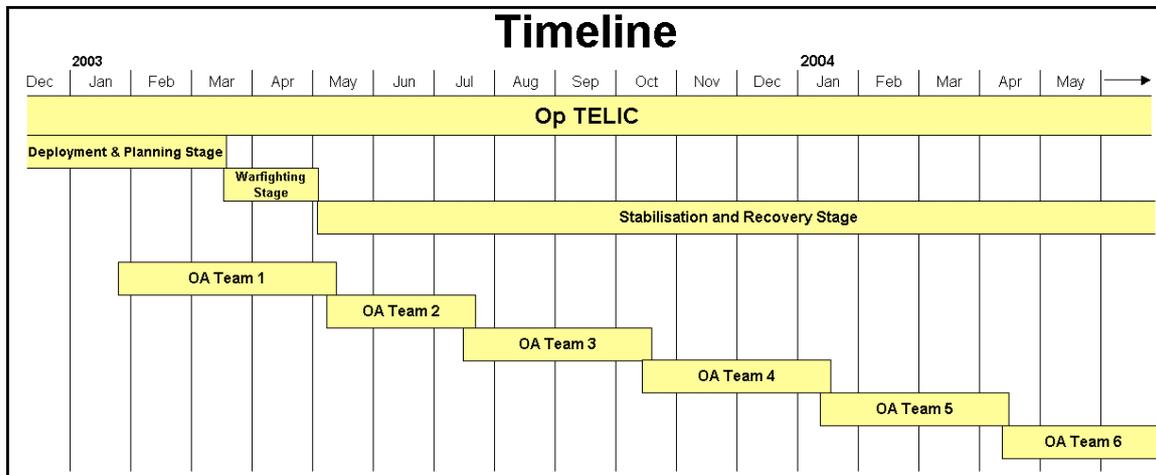


Figure 1: Timeline for the operation.

The UK was given responsibility for the region of Iraq that has become known as Multi-National Division (Southeast), MND(SE). This encompasses the four most southerly governorates in Iraq, Al Basrah, Al Muthanna, Dhi Qar and Maysan.

In July 2003, HQ 1 UK Div was replaced in theatre by HQ 3 UK Div, which formed the core of MND(SE). The first OA team was replaced in theatre by a second team in early May. The OA teams, working on a roulement of approximately 3 months, continued to support the divisional headquarters with MoE and other analytical and Ad Hoc work with the operation now being peace support. At the time of writing this report the 6th OA team is currently in theatre and the 7th are beginning their preparations for deployment.

MEASURES OF EFFECTIVENESS

The primary element of the OA work as UK forces embarked on the recovery and stabilisation stage of Op TELIC were Measures of Effectiveness (MoE). The purpose of MoE was to measure the effect of the UK presence upon the local community and resulting trends. Measuring if things are improving, deteriorating or stabilising.

UK Military OA has been involved in several peace support operations most notably in Bosnia, Kosovo, Afghanistan and currently in Iraq. In all these operations they have had projects that follow the meaning of MoE, but have been called different names such as 'Measures of Success' and 'Normality Indicators'. This often was to help distinguish what the project was specifically doing but adds to the confusion on what is actually meant.

The deployed OA team first turned to UK OA previous experience in other operations. Bosnia was the first place that the team were aware 'MoE' had been used in earnest to provide the command staff and COMARRC with robust and impartial data and the current and developing situation in their Area of Operations (AO).

When a new Operation started in Kosovo, the experience gained by the British increased further and they had a greater understanding of the importance of such work. To a lesser extent it was also used in Kabul.

In all these cases MoE were not used as a decision driver, but rather as one of the several major decision advisors. It was clear from all three of these operations, and proven again during Op TELIC, that it is not possible to set up a 'generic' MoE template that will work for any scenario, even crossing the border between Bosnia and Kosovo the process and measures had to be radically altered. The measures and processes need to take into account the highly complex mix of the situation, the resources available and the end state that needs to be achieved.

Op TELIC presented a unique position, certainly for the UK since WWII, where an operational analyst had been present through the planning, the war fighting and into the peace support stages of an operation.

In all cases of peace support one of the main tasks is to return the country back to some resemblance of 'normality'. Such a measure is highly complex and often difficult to prove. MoE can be used as a tool to measure this. Measuring the progress of a situation against a 'baseline' has obvious advantages and provides greater insight to the real situation. However it has several drawbacks, mainly in defining what that baseline is. Can you define normal?

Tomislavgrad was used as a control in Bosnia so western values would not be placed upon the area. It had received little to no damage during the conflict, had a locally acceptable standard of living and is far enough away from the border not to be influenced by events in Croatia. However, is what is considered 'normal' in a country what is wanted?

In Bosnia large scale organised crime (black market, counterfeit goods etc.) was considered the norm. This obviously would not reflect well on IFOR, the International Forces that went into Bosnia, if they were to present this as 'appropriate' behaviour to the western world. This was also true in Iraq, where corruption and bribery of the police was also seen as acceptable.

Is a historical basis good for considering what is 'normal' before an event happened? Before the war Saddam's regime had a grip on the country and controlled it. To consider pre-Saddam the historic case would be decades old and therefore most likely out of date, not reflecting a modern 21st century country. 1960's and 70's British or American values and 'normality' would not be considered appropriate now in these same countries.

Another alternative could be to set-up a 'blue print' of what the UK believe the country should be. However the Arabic, and perhaps the rest of the world, may well take a dim or hostile view to western values being 'forced' upon a 'defenceless' Muslim and Arabic country.

If nothing else the OA team could measure the effect of the coalition presence upon the local community. Identifying trends hence measuring if things are improving, deteriorating or stabilising. To support the divisional headquarters during the peace support stage of Op TELIC the OA team implemented MoE. Of course as this does not have a 'base case' or 'yardstick' it is harder to tell if the situation has stabilised to an acceptable level.

DESIGNING MEASURES OF EFFECTIVENESS

The following lessons were learnt and identified in Bosnian, Kosovo, and Kabul campaigns.

1. If measuring does not begin from day one, there is a real risk of missing the initial trend of before and after the troops move in.
2. The data must be collected objectively, constantly and accurately so when there are different data gatherers, or a hand-over between OA teams, there is consistency between the data-sets such that the results remain robust.
3. It is very easy to gather data, but any data is not always good data, 'garbage in, garbage out'. It is easy to spend all available time gathering data but not analysing it. A large effort may then be required to convert data into a useable format. With only two OA staff in theatre care had to be taken to define what data was collected to avoid these pitfalls.
4. Troops are used to help gather data. It is vital that the troops realise why they are collecting data and showing them the results is probably the best way to achieve this. This will increase the accuracy of the data, by showing the troops the importance of the data collection task, and how it affects them in the long term.
5. It is easy to concentrate on what is going wrong and not look at what is going right. It is just as important to monitor the good things as well as the bad. For example, a decrease in positive measures is just as worrying as the increase in bad.

How did the analysts know what data, or what trends, they should be monitoring? The measures could not be too prescriptive as there was no accurate or detailed picture on what to expect after the war fighting phase.

To ensure that the measures were relevant and useful the team involved all the branches within the divisional headquarters including G2, G3, G5, Provost, Info Ops, PsyOps, Med, and the Chief of Staff (COS).

Once there was an initial idea of the requirement several meetings took place, again involving all the branches, to determine the question list. This served three purposes,

1. Each Branch would know more about the situation in their area of expertise and give better direction (e.g. G5 will know the staple foods of the populace). Also what they consider are the important facts.
2. Each Branch will hold ownership of their area and take an interest in MoE.
3. It helps co-ordinate the work of the Cells, as there are grey areas between branches on who controls what.



Figure 2: Some of the initial measures for collection.

After deciding what needed to be measured there was the question of from where to get the data. There were a number of data sources already available (Figure 3). These have the advantage that they are already being carried out by the staff so OA was not increasing their workload by using this information for MoE. However, they have many and serious drawbacks for MoE. They often have limited scope, concentrating on small areas whereas wide coverage is required. Often the information is too high level, and does not meet the needs of the MoE. The information may be subjective, and contain bias. The concentration may be on the negative and ignore the positive. Also, the formats of the reports can be difficult to ‘translate’ into a form usable for MoE work and the demand is on the small OA team to do the ‘translating.’ This can also lead to serious inaccuracies in the data set.



Figure 3: Sources of data for the MoE.

Designing bespoke data collection, using foot patrols to complete specifically designed reports on the completion of a patrol removed all these difficulties. However they added the disadvantage of noticeably increasing the workload and possible risk to the foot patrols. It was decided that the advantages of tasking foot patrols to complete questionnaires (One report per company per day) outweighed the disadvantages. It was also believed the less data that was asked for the more accurate it will be, and greater frequency it could be obtained.

One of the obvious remarks would be that other military cells and other organisations were gathering this data anyway. What was the benefit of this MoE (Figure 4)? Were we just duplicating effort? The answer to these questions was no, for many reasons.

1. The OA team had held meetings to ensure they did not collect the same data as other teams.
2. The other cells and organisations were collecting data on specific areas. OA were trying to gather an 'all-inclusive' view of what was happening in the AO. Looking at all areas not just known trouble spots.
3. Whilst it could not give detailed information on specific questions it gave highly valuable background awareness on the AO. Often other Branches, the COS and the GOC used the MoE to gain an appreciation of the situation, and then drilled down into greater detail on points with other cells. They understood how the MoE was conducted, its strengths and weaknesses. It was one of their certainties.
4. They could use the MoE as a second opinion to the other information they were receiving. A number of times the picture given by our MoE work conflicted with other intelligence and opinion. This gave the headquarters the ability to find out why this was happening and take action accordingly.
5. The MoE data capture was very broad and was able to monitor large areas of the AO over time. Other sources may only be able to monitor a specific place for a short period. Therefore MoE could monitor real trends and consider whether the situation was improving, deteriorating or stabilising.

What did we expect MoE to Achieve?

- Gain Impression of the overall situation
- Counter 'bad press'
- Assist in Briefing VIPs/Politicians
- See indirect effects of Coalition forces
- Indicate potential difficulties before they arise
- Prioritise areas for aid
- Help with force protection - "Hearts and Minds"
- Maintain force 'omnipresence'
- Assist with any information campaign
- Reinforce IO/NGO coordination and cooperation

Figure 4: Benefits of MoE.

MoE can be a vast task and could use large amounts of effort to collect, collate and analyse the data. To avoid this and 'data overload' it is important that the priority areas (e.g. water, public opinion, security, army compliance) are targeted to reduce the burden at all levels. This direction must come from the GOC, firstly to ensure the work informs his decision making, and secondly that all cells receive the proper authority to gather such data.

Foot patrols were tasked to complete their questionnaire reports by an order sent out from the divisional headquarters. Branches were to be regularly contacted to provide results and to ensure the questions still met their requirements. Liaison officers and representatives from the brigades also regularly meet up to see the results of the MoE work to help them feel ‘ownership’ of the work.

IMPLEMENTING MEASURES OF EFFECTIVENESS

In a real campaign there are no ‘stages’. There was no sudden change from war to compliance to stabilisation. It was hard to know when to start the data collection as the stages were all blended together. In one part of the AO soldiers were patrolling streets in berets, in another they were still fighting.

The Division had scarce resources. Whilst Kosovo had five brigades, MND(SE) had only two brigades and a battle group for an area far larger than Kosovo.

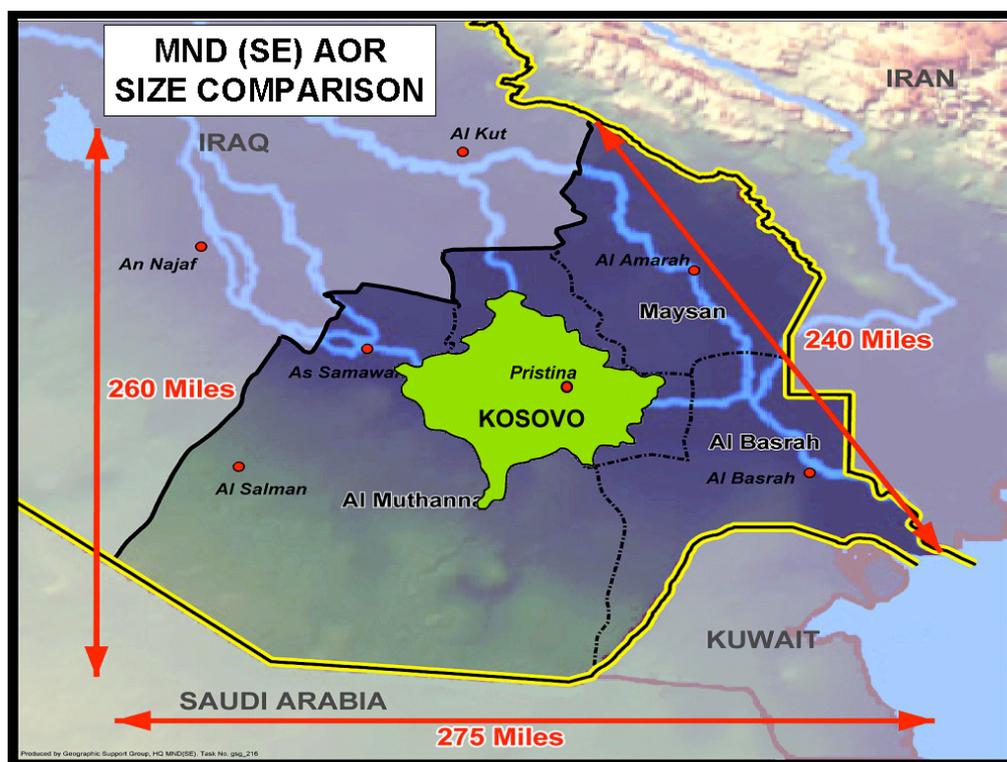


Figure 5: Size comparison of MND(SE) and Kosovo.

Also during the initial planning for the measures of effectiveness and the initial start of it the war had not officially ended and soldiers were still coming under attack. Understandably brigade and battle group commanders did not wish any unnecessary work placed upon their soldiers that could put them at greater risk.

The foot patrols had many other concerns and priorities. Expending time and effort on collecting data was not high on the objective list. After fighting effectively and well in a real war scenario, it was hard to convince them to spend effort in such an unglamorous, time

consuming and boring job. Especially when some were to be sent home in the very near future.

Many of the personnel in theatre did not fully understand why MoE were necessary, and the OA team were going to face a challenge to educate the Division in why such work was occurring and what benefits they were going to receive from it. Once this understanding was received there was confidence that the Division would fully embrace MoE and give it their full backing. However there were only two OA people in theatre and several thousand soldiers and officers who would be involved.

PRACTICALITIES AND USE OF MEASURES OF EFFECTIVENESS

By the time the 3rd OA team arrived in theatre, in July 2003, the MoE were being extensively used throughout the divisional, brigade and battle group headquarters. They were being used to:

1. Inform threat assessments.
2. Monitor trends in the security and humanitarian situation.
3. Measure the effectiveness of coalition activities.
4. Brief visitors and other formations.

The permanent headquarters and other government departments back in the UK were also asking for regular updates of this work. The work was held in high regard by the local commanders as well as across the coalition, and host of headquarters and other government organisations back in the UK. However, the question being asked was how confident could they be in the results being produced from the MoE.

ESTABLISHING THE REQUIRED SAMPLE SIZE

Using an equation based on the *central limit theorem* it is possible to calculate the *margin of error* in a sample to a given *confidence interval*. Using this equation the OA team developed a spreadsheet tool that calculates the required sample size to provide a result to a specific margin of error with a specified percentage of confidence interval. Using a rearrangement of this equation the tool was also able to calculate the margin of error in the result with a percentage of confidence given the number of responses the OA team received from the patrol reports and PsyOps questionnaires which fed into the MoE.

There were several issues to consider when deciding how big the sample size should be for the OA patrol reports and PysOps questionnaire surveys that were undertaken on Op TELIC. The patrol commanders are tasked with completing the patrol report. It was crucial to the success of the MoE that there was 'buy in' from these commanders, and a lot of effort was taken to back-brief the results of this work to the companies. Without this hearts and minds effort the patrol reports will be seen as a task that is a waste of time, not their job, and

an unnecessary obligation that puts them at more risk when carrying out their patrolling duties.

During the briefings to the company commanders there would be discussion of what was happening, why it was happening and the implications for that unit or formation. Collecting the data and briefing the results meant that the deployed OA team travelled throughout the AO. This increased situational awareness and gave OA a better understanding of the local Iraqi perception.

The patrol report is in two parts. The first covers observations made by the patrol including incidents that they have experienced. The second is completed whenever an interpreter is present. It consists of a questionnaire asked of local Iraqis covering their main concerns, how the Coalition is viewed and how they receive information.

Data integrity is essential when analysing the results of these reports. Therefore, the burden placed on the patrols must be minimised as far as possible, whilst ensuring enough data is captured to enable OA to perform their responsibility of providing MoE. The accepted code of practice for survey polls carried out by MORI and other such organisations is to use sample sizes that will return results accurate to $\pm 3\%$ at the 95% confidence interval. For a population the size of MND(SE) this would have required regular returns of 1,067.

This was not practical for a number of reasons. The first, and perhaps most important reason was the continual encumbrance this would place on the patrols to collect this data. Secondly, even if the patrols could sustain this level of report returns the OA team would simply not have had the time to process them in a timely fashion for the results to be useful to the commanding officers.

However, the absolute accuracy of the results was not critical, rather the reports were trying to capture the general attitude of the Iraqi public. Therefore it was acceptable to use a confidence interval of 90%. Another important point of note is that the military customer was also happy to accept results based on this level of confidence.

Using the equation for sample size this brought the value down from 1,067 to 752. This, it was felt, was still too high a figure to realistically achieve on a regular basis. Combining the reduction in confidence with a widening for the margin of error to $\pm 5\%$ kept the integrity of the results to a level that the analysts could defend to statisticians outside the OA team, and more importantly were still acceptable to the military customer.

For a population the size of MND(SE), 4.7 million, the sample size required to provide results accurate to $\pm 5\%$ at a 90% confidence interval is 271. In fact this sample size holds true for the worlds population! This gave rise to a quick and easy rule of thumb for the sample size required for these operational surveys.

Analysts should seek to obtain sample sizes of 300.

This gives a 10% allowance for failures of returns in order to meet the 271 that are required to give a 5% margin of error with 90% confidence. OA set a practical limit of one patrol report per company per day. During OA Team 3's time in theatre there were 25 Companies in MND(SE). If this rule were strictly adhered to this would provide 350 reports

per fortnightly period. Provided 20 of the 25 company's completed their quota of reports then OA could guarantee the agreed level of result.

Despite this target appearing to be quite reasonable it was never quite met. However, using the rearrangement of sample size equation the OA team was able to inform the commanders of the accuracy of the work. The table below shows the sample sizes achieved and the precision this gave to the results.

Data Source	No. Returns	Margin of Error (±)	Confidence Level
Patrol Observation Report	172*	6%	90%
Patrol Interview Report	62*	10%	90%
PsyOps TAA Questionnaire	213	6%	90%

Figure 6: Accuracy of achieved sample sizes. * Indicates average fortnightly returns.

With margins of error of $\pm 6\%$ at 90% confidence interval, the patrol observation reports and PsyOps target audience analysis questionnaires were still considered reliable enough to give the commanding officers confidence in the results. The military customer was even happy, at 10% margin of error, that the patrol interview reports gave them enough of a coherent picture that it added value to their decision making and helped to strengthen their argument.

PRACTICAL LIMITATIONS IN DATA COLLECTION

Whilst mathematically OA could prove that the results had a degree of accuracy, reliable conclusions must be drawn from the research representative of the target group. It would be extremely dangerous for the analyst to believe that provided that they take the enough responses the information collected must be truly representative. On Op TELIC, the OA team instruction to the brigades and battle groups was to carry out these reports on different days of the week, on different patrol routes, and at different times of the day. This was to introduce an element of randomness to the survey and avoid systematic bias.

The questionnaire section of the OA patrol report, although asked by an interpreter, was conducted in front of coalition forces. This can increase co-operation from the local Iraqis, leading to bias in the results. Furthermore, soldiers who are not trained analysts complete the patrol reports. There are far more sophisticated, tried and tested collection methods than those used by the OA team in theatre. However, these had to be offset against the time effort and resource available. Also there was a very real risk to the troops on the ground. Commanders would not sanction data collection that would increase the risk to their forces.

On previous operations MoE questionnaires were distributed using 'drop boxes' and a trial box was set up, however it was immediately stolen. During this period of data collection there were also security and safety issues surrounding the use of drop boxes. Clearly OA would have liked a higher number of returns for analysis but the limited number of available

interpreters and the need to minimise the burden on the soldiers left OA with an acceptable but not ideal level of returns.

Further to this MND(SE) was multi-national. This brought its own challenges. At least the UK forces had seen MoE before. For some of the Nations this would be a wholly new concept. The OA team spent a lot of time and effort travelling to these Nations headquarters to educate them in why such work was occurring and what benefits they were going to receive from it. These Nations quickly accepted and endorsed the requirement to collect MoE, and on the whole were refreshingly positive about them, an out-come that was not achieved with the non-UK forces in ISAF.

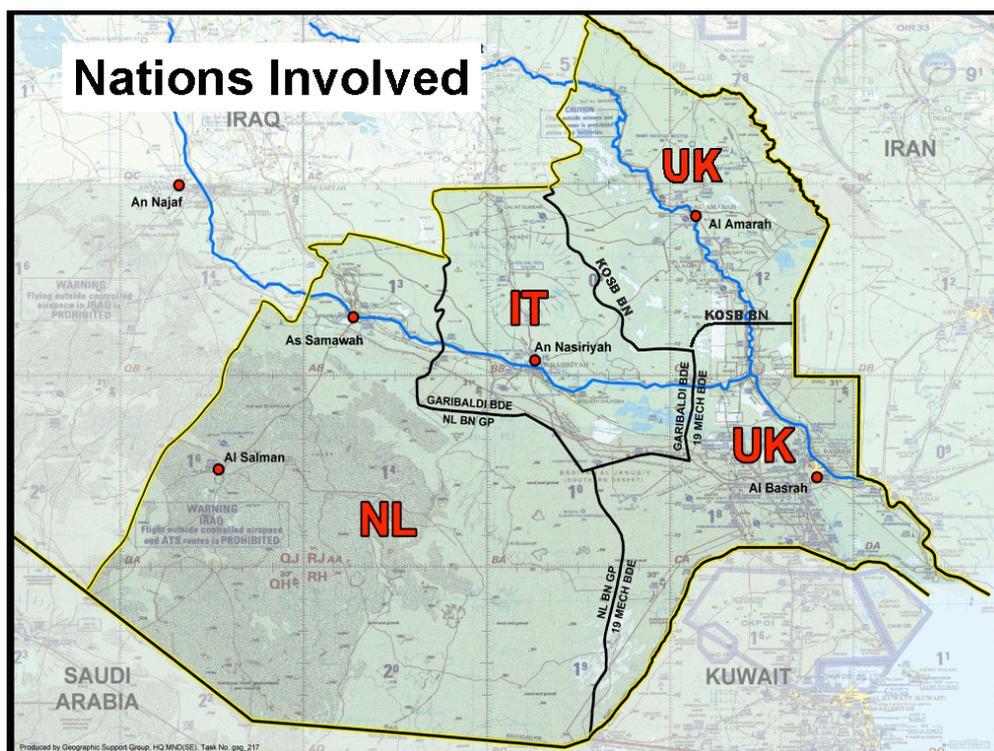


Figure 7: Major contributing nations in MND(SE).

Accepting that the process was a little way from perfect, in terms of providing a product that analyses the overall trends and makes people aware of what is going on in theatre, MoE can be considered fit for purpose. OA were able to deliver a product based on real operational data up to date within a day or two. That was a crucial feature of the MoE for the decision-makers needing to have a grasp of the current situation.

EXAMPLE MoE RESULTS

There are a number of practical reasons not all the MoE work can be put into this paper. However, to illustrate the sort of information that the OA team were able to brief to the commanders as a result of the MoE work a selection of charts and tables are included in this section (Figures 8-11). When they were produced they came with the following caveats.

1. MoE is designed to be one of many sources when assessing the current situation.
2. It is normally briefed by OA in person.
3. There are many reasons for an apparent effect that might not be obvious from the data presented.
4. The brigade and battle group areas are very different and the different brigades and battle groups should not be compared without local knowledge.
5. If the data is to be used for analysis then a member from the OA team should be consulted for further information.

OA PATROL OBSERVATION REPORTS

Figure 8 shows the reaction to the patrols as observed by the soldiers. This reflects a worse case scenario. For example if a patrol lasted 3 hours and they encountered friendly reactions for 2 3/4 hours and hostility for 1/4 or an hour then the patrol was recorded as hostile. The observed increase in August coincides with the documented fuel crisis in Al Basrah. The dotted vertical line indicates when the area covered by the survey was increased to include Al Muthanna and Dhi Qar provinces. Figure 9 shows a general decline in the number of crimes and criminal activities observed throughout MND(SE).

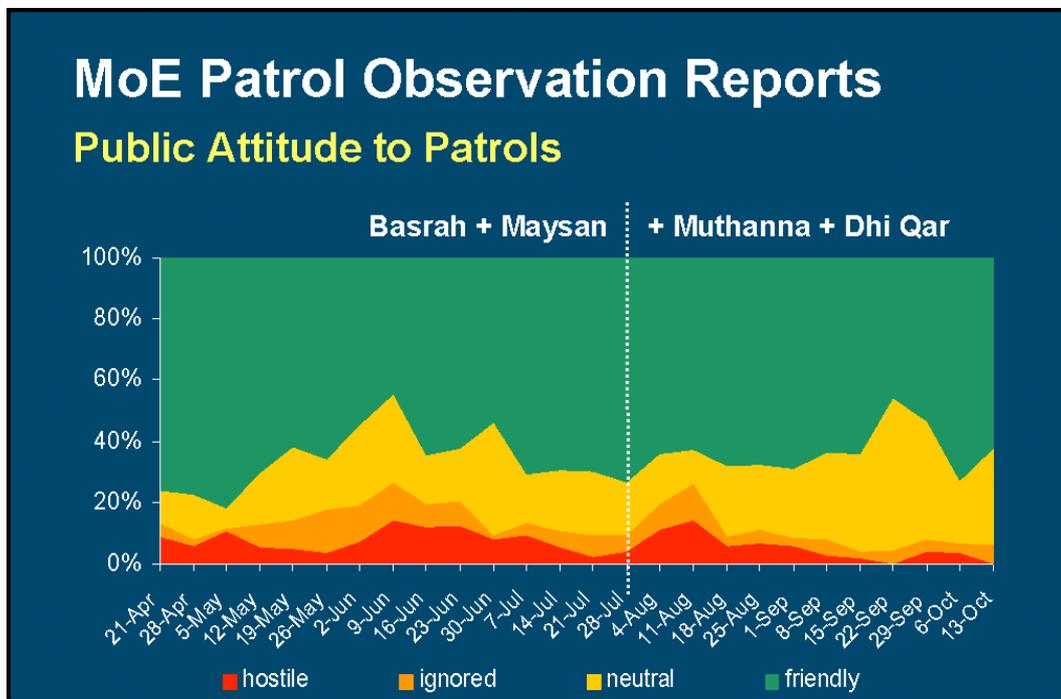


Figure 8: Observed attitude of the Iraqi public to the foot patrols.

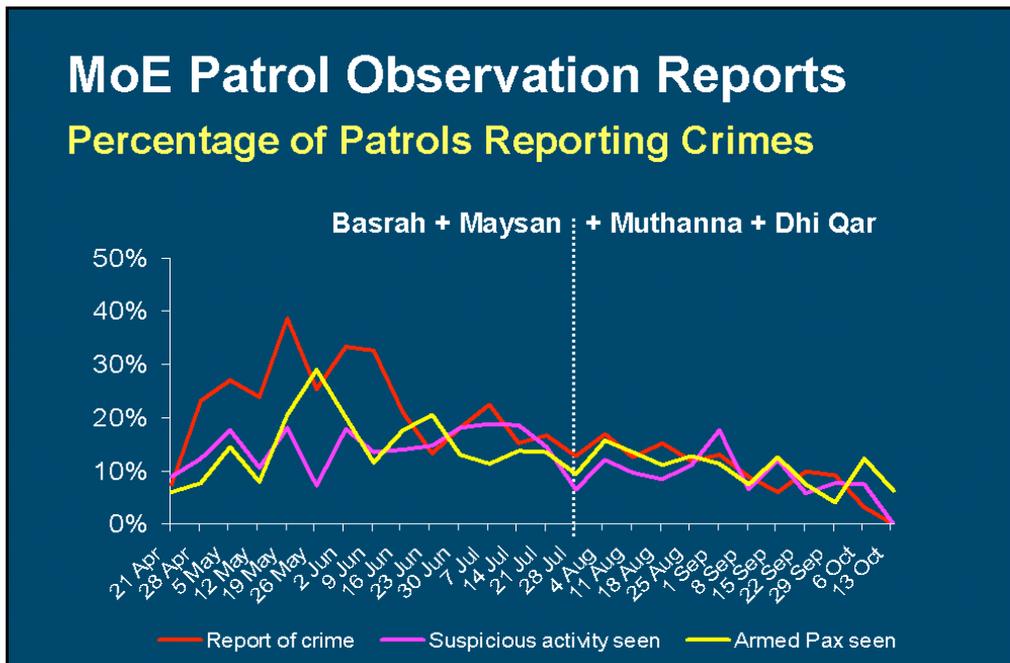


Figure 9: Observed crimes being seen and reported to the foot patrols.

OA PATROL INTERVIEW REPORTS

In Figure 10 there is a clear decrease in the local Iraqis opinion of the coalition forces. This occurs at the time of the fuel crisis that affected Al Basrah. The opinion quickly recovers after the fuel crisis was resolved.

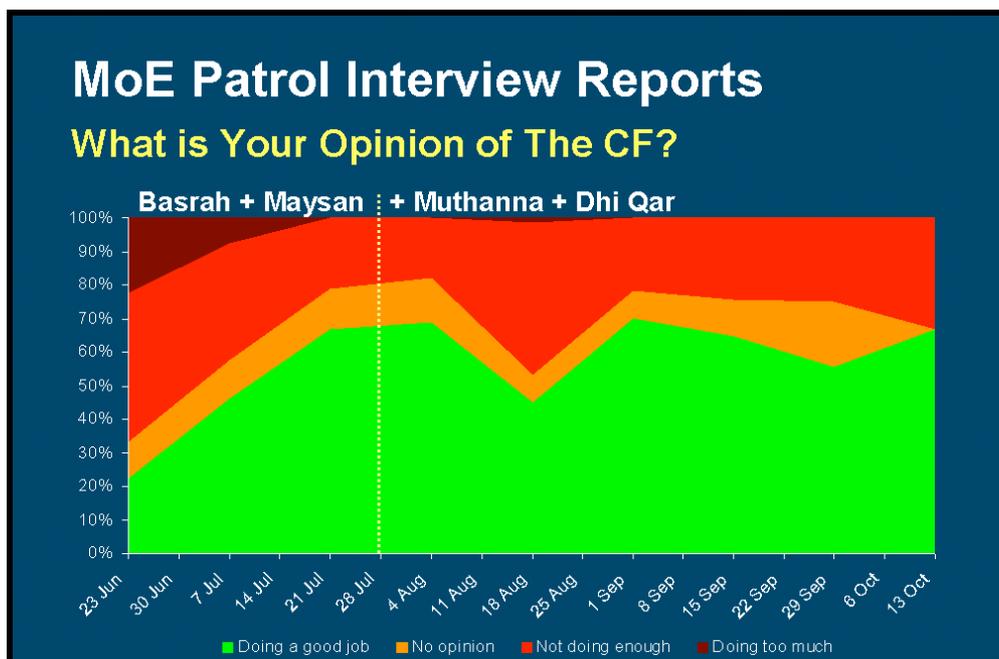


Figure 10: Iraqi locals' opinion of coalition forces (CF).

Figure 11 shows the concerns of the local Iraqi people in the MND(SE) region. The change in priorities is tracked through time, this highlighted any concerns that were becoming a serious issue, and also reaffirmed the belief that the biggest concern of the local Iraqis at the time was the security situation.

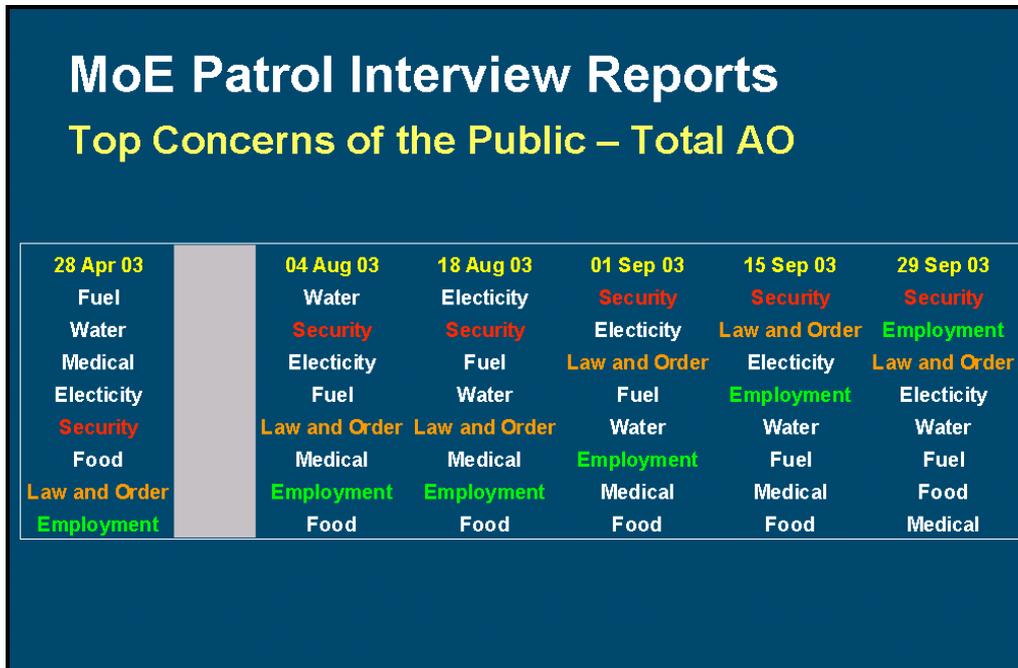


Figure 11: Ranked concerns of the local Iraqi people.

SUMMARY OF WORK

Figure 12 shows the major activities undertaken by OA Team 3 during July to October 2003. The principal piece of work remained the MoE but as the work became more established the scope of the OA work expanded. All previous teams in theatre had consisted of two analysts. Due to the demand for OA products this team was pushed up to a total of four analysts for six weeks, the subsequent teams have remained at three analysts since then.

Operational Analysis Team Tasking List
<ul style="list-style-type: none"> • Measures of Effectiveness (MoE) • Contact Incidents Analysis • Troops to Task Assessment • Target Audience Analysis (co-PysOps work) • Fuel Assessment (Diesel, Benzene, Kerosene, LPG) • Power Assessment (Electricity) • Information Operations Media Monitoring Assessment

Figure 12: Summary of the major OA activities July to October 2003.

Following a decline in crude oil production in late June and in the first half of July the divisional engineering group (DEG) and the multi-national logistic centre (MJLC) requested

that the team became involved in making assessments of the essential services of fuel and electricity within the MND(SE) region of Iraq. The situation was made worse because of sabotage and simple criminal looting of infrastructure, particularly of vulnerable items such as power lines and pipelines, were a regular occurrence. To support the coalitions desire to get a better understanding of the situation and possibly predict, or get an early warning of, any potential shortfalls in the essential services, OA developed some spreadsheet based tools with a couple of days effort, that were further refined over the course of about a week.

MND(SE) FUEL ASSESSMENT

The tool designed to assess the fuel situation documented the daily import, production, distribution, exports and stock levels of the fuel within MND(SE). This gave a clear indication to the planners whether the situation was stable, improving or deteriorating. This documented history of the situation was then used further to forecast how the situation might develop if it continues in the same trend (Figure 13). This was achieved using simple linear regression, which although quick and easily understood has its own limitations. Again OA ensured that these caveats were briefed to the users of this analysis.

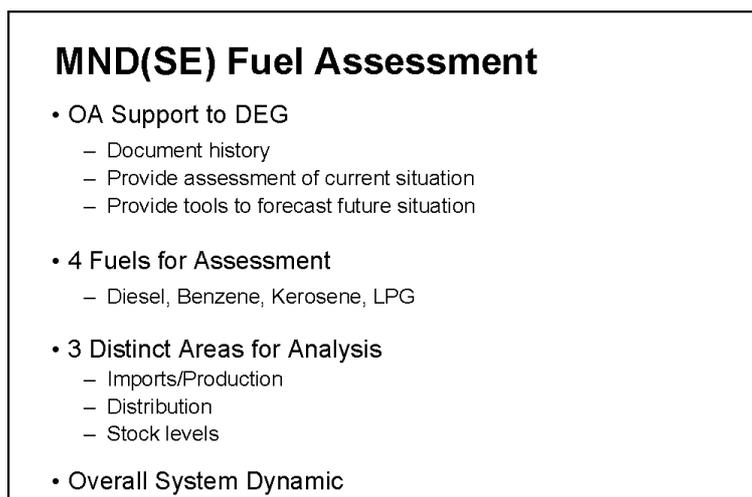


Figure 13: OA support into the fuel situation to the DEG and MJLC.

Figure 14 is a typical output from this tool. It shows the combined effects of import, production, distribution, exports and stock levels on the overall diesel situation in the AO. The trend-line indicates that the situation is slightly deteriorating as the level of diesel in the system is reducing. The forecast uses a simple linear regression to indicate what the future position could look like if the situation continues along the same trend that has been seen during the considered period of the historical data set.

MND(SE) POWER ASSESSMENT

The tool designed to assess the power situation documented information on production, imports, exports and distribution using similar techniques employed in the analysis of the fuel

situation (Figure 15). Consumption was a more obtuse parameter to establish. In the end it was derived using a set of assumptions agreed by OA and the DEG.

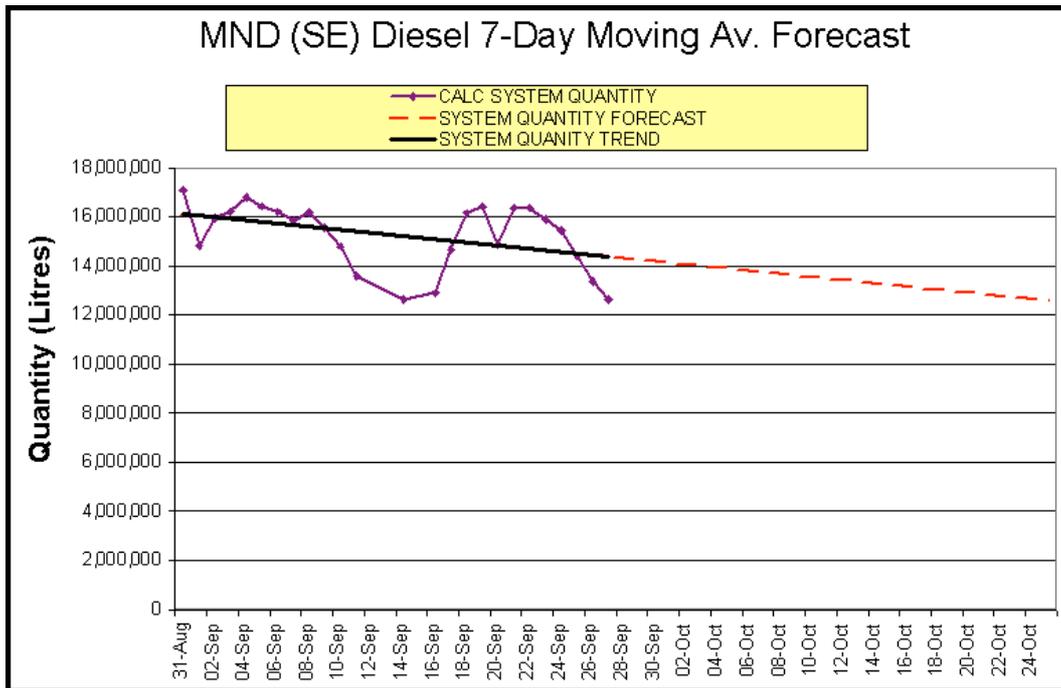


Figure 14: Overall system dynamic for diesel in MND(SE) during September 2003.

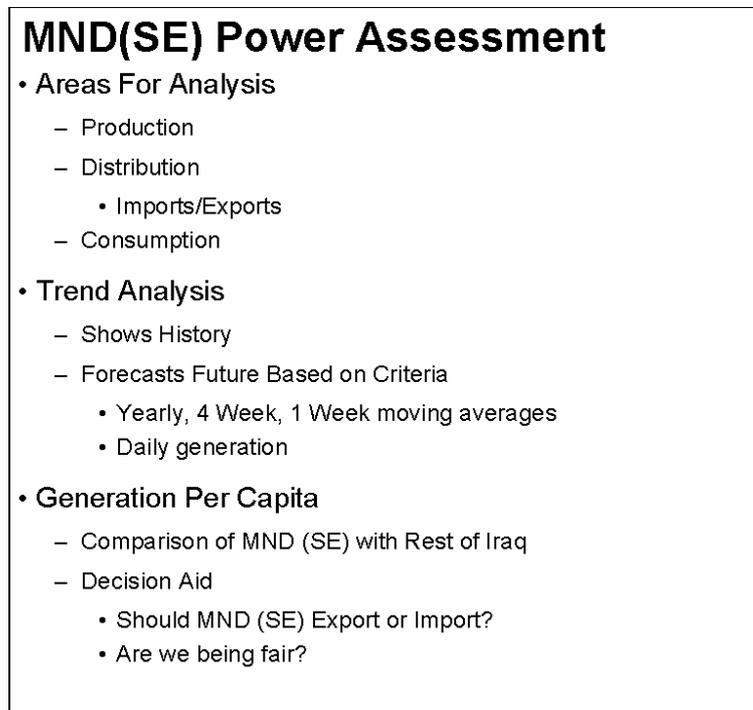


Figure 15: OA support into the power situation to the DEG and MJLC.

There was debate between HQs at Basrah and Baghdad as to the levels of electricity being exported from the MND(SE) region to the busier, more populated area of Baghdad, and other regions outside the UK AO. To support the debate the OA team looked at the

populations in these regions and considered how much electricity was available per capita in each. There were several assumptions and caveats associated with this work, but in principal it offered the UK commanders an understanding of how much better off or uneasy the situation was in their AO compared with the rest of Iraq (Figure 16).

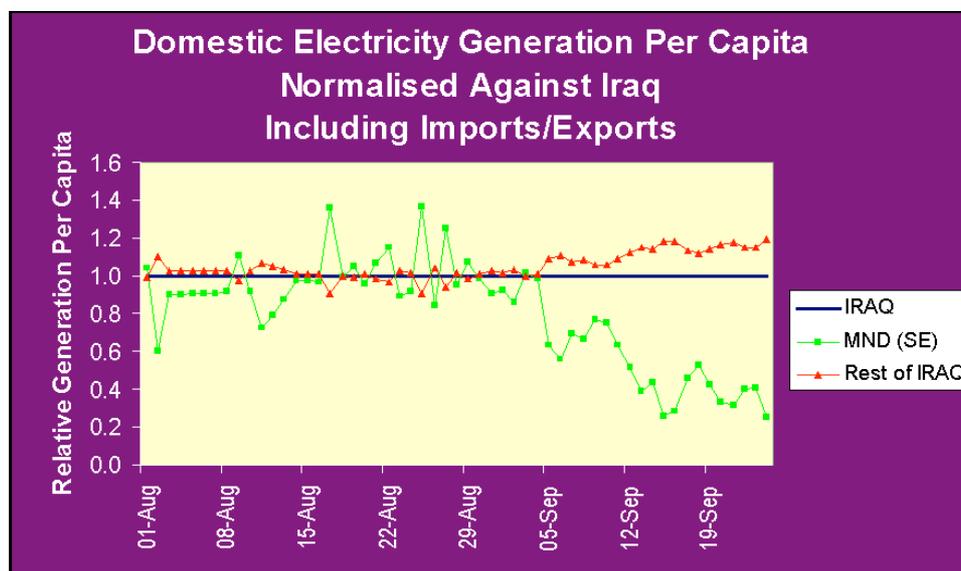


Figure 16: Comparison of electricity per capita in MND(SE) and the rest of Iraq.

When the only available information is some quite limited data that maybe questionable in its accuracy and at times very erratic in its regularity, it is understood that some quite sweeping assumptions have to be employed in order to deliver a piece of work. However, in the front line world of OA it is the 70% solution on time not the 100% solution a day late that adds the value to the commanders' decision making. It is this ability of the analyst to provide this level of support that the commanders require.

The support work for both the power and the fuel situations provided the commanders with a better understanding of the essential services situation. These tools and the analytical assessment they allow are good examples of the OA capability to provide valuable support in this type of situation.

LIVING THE LIFE OF AN ANALYST IN THEATRE

As civilian analysts deployed into the theatre of operations in Basrah, Iraq, there were a number of new challenges to cope with on top of the paucity of data and very tight deadlines. The biggest of these was undoubtedly the weather. During the months of July to October the temperature regularly exceeded 50°C in the shade and in excess of 60°C in the open. Several members of the OA teams that deployed lost a noticeable level of weight during their 3 months in theatre.

The OA team were in the same accommodation as most of the other military officers and other ranks. For the majority of the peace support stage of the operation (up to the time of

writing this paper) this was new style temporary deployable accommodation (TDA) tents (Figures 17-18). These were approximately 1km from the headquarters.

The tents had environmental conditioning units (ECU's). In hot climates these are intended to bring the temperature inside the tent 10°C-20°C below the outside temperature. The idea is to make the living conditions bearable whilst minimising the effect this has to individuals acclimatisation. However, personal experience would say that during the day the temperature inside the tent felt hotter than outside and during the night the temperature in the tent became uncomfortably cold, even though it was still above 30°C outside.



Figure 17: The TDA camp.

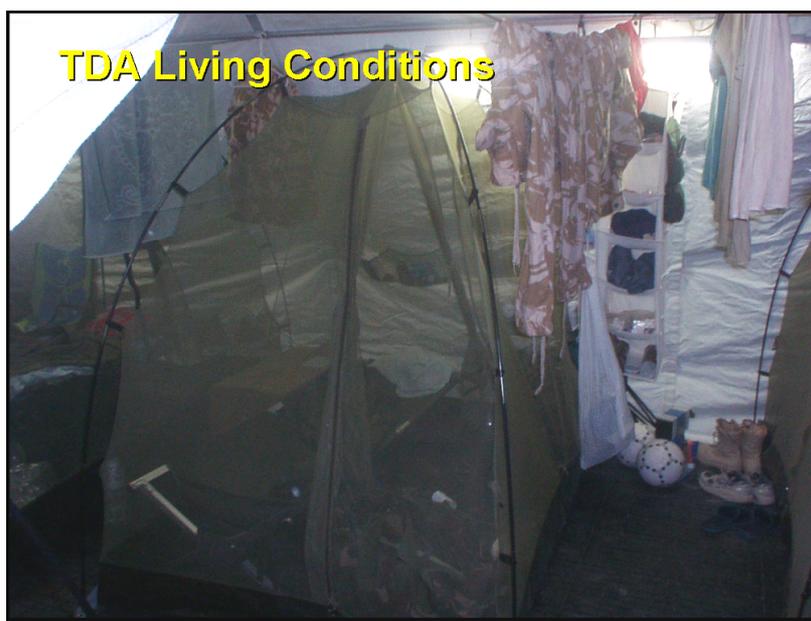


Figure 18: The living conditions in the TDA.

The working conditions, for Team 2 onwards, were much better than have been experienced by OA teams on previous operations (Figure 19). The team was integrated into the Operations Support branch (J3 Op Sp) of the Division. This was in an open office shared by all the branches, and the conditions were pretty good. There was air conditioning (most of the time), good lighting, ample desk space, power sockets and Internet connectivity.

The increased visibility of the Team led to more walk-in visitors with questions. This went to greatly enhance OA's presence within the Headquarters. This operation has shown how important it is for OA to be seen and make themselves seen in order to maximise their usefulness to the Divisional HQ.

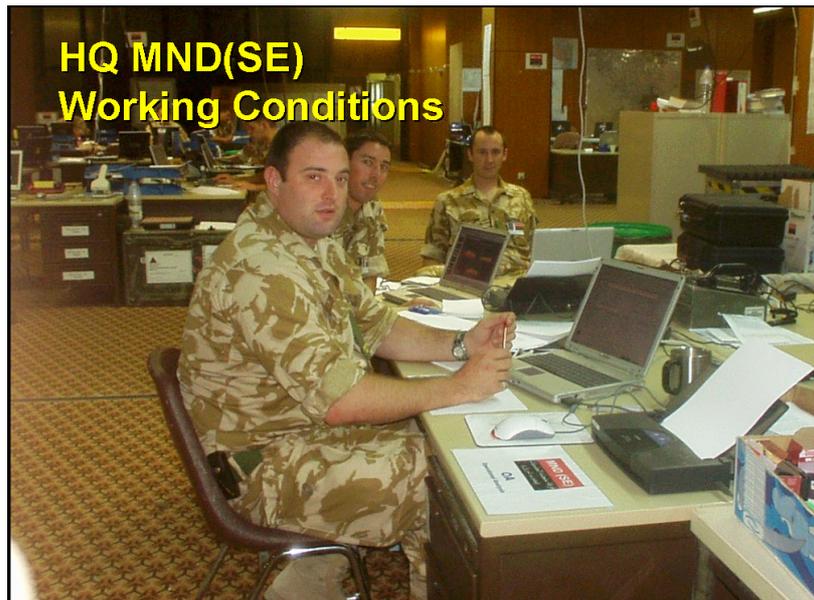


Figure 19: Working conditions at HQ MND(SE).

Another important part of the OA work were the visits to the brigade and battle group headquarters. This gave the teams the opportunity to see Iraq for themselves. There were obvious security risks involved and all necessary precautions were taken by anyone travelling.

CONCLUDING REMARKS

The OA support provided to HQ MND(SE) has been, and continues to be, held in high regard by the local commanders as well as across the coalition, and a host of headquarters and other government organisations back in the UK. The success of OA on Op TELIC has as much to do with the lessons that were identified by the OA teams on previous operations as the work undertaken by the OA teams that deployed this time. On this occasion the peace was being planned at the same time as the war. This led to better-defined MoE from the outset, peace support data that was collected from day one, and 'buy in from the military before OA begin implementing the MoE work.

The analysts understood the importance of delivering a piece of work to meet a deadline. This can go against the instincts of an analyst, who by their very nature will try to fully understand all the facts and figures before examining them to the n^{th} degree. Highly academic

mathematics may be very nice and produce a great solution but if it not understood by the commanders then they are not going to base decisions on it that may ultimately cost lives. Instead the work must be produced with an element of transparency. Speed is vital and the data available is generally poor. The analysts were prepared to offer the 70% solution and save their efforts for the multitude of other tasks waiting for their attention.

The ability and confidence to use reachback to produce pieces of work was another attribute that had been learnt from previous operations. However, the improvement made in visibility of OA in the headquarters led to the teams being able to offer support in areas that would otherwise remained unsupported had the Division relied purely on using reachback for their operational analysis. Although untested we are confident that OA cannot provide adequate support without deployed analysts, reachback alone simply will not work.

The value placed on OA, and the consistent approach that has developed as a result of the experiences of previous deployments, is evident in the Chief J3 Operations Support letter of commendation of the 3rd OA team. In it he says 'they hit the ground running taking over seamlessly from their predecessors and have driven forward significantly OA support to operations to make it one of the cornerstones of the Division's operations.'

ACKNOWLEDGEMENTS

This paper could not have been written without the contribution from Jarrod Cornforth, who was one of the original team of two operational analysts to deploy with 1 UK Armoured Division. I would like to express my appreciation for his time and efforts, for supplying such a vivid account of his time on deployment and his contributions to this paper. I should also like to give credit to John Sharpe, Head OA LWC (formerly Hd OA HQ Land Command), and Dave Evans, the then Project Manager for Op TELIC at HQ Land Command, for their confidence and belief in the abilities of the team of young analysts I was a part of. Finally, I would like to thank Henry Marshall, Paul Barker, Jamie Pinfield, and the other analysts I worked with in Basrah, for their positive contributions and humour which made my time in Iraq a great learning experience.