

APPENDIX D

TARGET ANALYSIS PROCESS

This appendix explains CARVER, which is an SOF term. CARVER is used by ARSOF SIOs and operational personnel throughout the ARSOF targeting and mission planning process to assess mission, validity, and

requirements. It is also used in technical appreciation and target analysis. This appendix provides a step-by-step example of how to use CARVER.

CRITICALITY, ACCESSIBILITY, RECUPERABILITY, VULNERABILITY, EFFECT, AND RECOGNIZABILITY FACTORS

The CARVER selection factors assist in selecting the best targets or components to attack. As the factors are considered, they are given a numerical value. This value represents the desirability of attacking the target. The values are then placed in a decision matrix. After CARVER values for each target or component are assigned, the sum of the values indicate the highest value target or component to be attacked within the limits of the statement of requirements and commander's intent.

CRITICALITY

Criticality means target value. This is the primary consideration in targeting. A target is critical when its destruction or damage has a significant impact on military, political, or economic operations.

Targets within a system must be considered in relation to other elements of the target system. The value of a target will change as the situation develops, requiring the use of the time-sensitive methods which respond to changing situations. For example, when one has few locomotives, railroad bridges may be less critical as targets; however, safeguarding bridges may be critical to maneuvering conventional forces which require use of such bridges. Criticality depends on several factors:

- Time: How rapidly will the impact of the target attack affect operations?
- Quality: What percentage of output, production, or service will be curtailed by target damage?
- Surrogates: What will be the effect on the output, production, and service?
- Relativity: How many targets are there? What are their positions? How is their relative value deter-

mined? What will be effected in the system or complex "stream"?

Table D-1 shows how criticality values are assigned on CARVER matrixes.

Table D-1. Assigning criticality values.

<u>CRITERIA</u>	<u>SCALE</u>
Immediate halt in output, production, or service; target cannot function without it	9-10
Halt within 1 day, or 66% curtailment in output, production, or service	7-8
Halt within 1 week, or 33% curtailment in output, production, or service	5-6
Halt within 10 days, or 10% curtailment in output, production, or service	3-4
No significant effect on output, production, or service	1-2

ACCESSIBILITY

A target is accessible when an operational element can reach the target with sufficient personnel and equipment to accomplish its mission. A target can be accessible even if it requires the assistance of knowledgeable insiders. This assessment entails identifying and studying critical paths that the operational element must take to achieve its objectives, and measuring those things that aid or impede access. SOF must not only be able to reach the target but must also remain there for an extended period. The four basic steps identifying accessibility are —

- Infiltration from the staging base to the target area.

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- Movement from the point of entry to the target or objective.
- Movement to the target’s critical element.
- **Exfiltration.**

Factors considered when evaluating accessibility include but are not limited to –

- Active and passive early warning systems.
- Swimmer detection devices.
- Air defense capabilities within the target area.
- Road and rail transportation systems.
- Type of terrain and its use.
- Concealment and cover.
- Population density.
- Other natural or synthetic obstacles and barriers.
- Current and climatic weather conditions.

The analysis along each critical path to the target should measure the time it would take for the action element to bypass, neutralize, or penetrate barriers and obstacles along the way. Accessibility is measured in terms of relative ease or difficulty of movement for the operational element and the likelihood of detection. The use of standoff weapons should always be considered in such evaluations. Table D-2 shows how accessibility values are assigned on CARVER matrixes.

Table D-2. Assigning accessibility values.

<u>CRITERIA</u>	<u>SCALE</u>
Easily accessible, standoff weapons can be employed	9-10
Inside a perimeter fence but outdoors	7-8
Inside a building but on ground floor	5-6
Inside a building but on second floor or in basement; climbing or lowering required	3-4
Not accessible or inaccessible without extreme difficulty	1-2

RECUPERABILITY

A target’s recuperability is measured in time; that is, how long will it take to replace, repair, or bypass the destruction of or damage to the target? Recuperability

varies with the sources and type of targeted components and the availability of spare parts availability. Factors which should be considered when assessing recuperability include, but are not limited to, the availability of –

- Onhand equipment such as railroad cranes, dry docks, and cannibalization.
- Restoration and substitution through redundancies.
- Onhand spares.
- Equivalent OB equipment sets that backup critical equipment or components, and the effects of economic embargoes and labor unrest.

Table D-3 shows how recuperability values are assigned on CARVER matrixes.

Table D-3. Assigning recuperability values.

<u>CRITERIA</u>	<u>SCALE</u>
Replacement, repair, or substitution requires 1 month or more	9-10
Replacement, repair, or substitution requires 1 week to 1 month	7-8
Replacement, repair, or substitution requires 72 hours to 1 week	5-6
Replacement, repair, or substitution requires 24 to 72 hours	3-4
Same day replacement, repair, or substitution	1-2

VULNERABILITY

A target is vulnerable if the operational element has the means and expertise to successfully attack the target. When determining the vulnerability of a target, the scale of the critical component needs to be compared with the capability of the attacking element to destroy or damage it. In general, the attacking element may tend to —

- Choose special components.
- Do permanent damage.
- Prevent or inhibit cannibalization.
- Maximize effects through the use of onsite materials.
- Cause the target to self-destruct.

Specifically, vulnerability depends on—

- The nature and construction of the target.
- The amount of damage required.
- The assets available; for example, personnel, expertise, motivation, weapons, explosives, and equipment.

Table D-4 shows how vulnerability values are assigned on CARVER matrixes.

Table D-4. Assigning vulnerability values.

<u>CRITERIA</u>	<u>SCALE</u>
Vulnerable to long-range laser target designation, small arms fire, or charges of 5 pounds or less	9-10
Vulnerable to light antiarmor weapons fire or charges of 5 to 10 pounds	7-8
Vulnerable to medium antiarmor weapons fire, bulk charges of 10 to 30 pounds, or very careful placement of smaller charges	5-6
Vulnerable to heavy antiarmor fire, bulk charges of 30 to 50 pounds, or requires special weapons	3-4
Invulnerable to all but the most extreme targeting measures	1-2

EFFECT

The effect of a target attack is a measure of possible military, political, economic, psychological, and sociological impacts at the target and beyond. This is closely related to the measure of target criticality. The type and magnitude of given effects desired will help planners select targets and target components for attack. Effect in this context addresses all significant effects, whether desired or not, that may result once the selected target component is attacked. Traditionally, this element has addressed the effect on the local population, but now there are broader considerations. Effect is frequently neutral at the tactical (ODA) level.

For example, the primary effect of the destruction of two adjacent long-range radar sites in an early warning system may be to open a hole in the system that is of sufficient size and duration to permit the attacker to launch

a successful air or missile nuclear strike against the defender. Effects can also include –

- The triggering of countermeasures.
- Support or negation of PSYOP themes.
- Unemployment.
- Reprisals against the civilian populace.
- Collateral damage to other targets.

Possible effects can be speculative and should be labelled as such. Effects of the same attack may be quite different at the tactical, operational, and strategic levels. For example, the destruction of a substation may not affect local power supply but cuts off all power to an adjacent region. Table D-5 shows how effect values are assigned on CARVER matrixes.

Table D-5. Assigning effect values.

<u>CRITERIA</u>	<u>SCALE</u>
Overwhelmingly positive effects; no significant negative effects	9-10
Moderately positive effects; few significant negative effects	7-8
No significant effects; neutral	5-6
Moderately negative effects; few significant positive effects	3-4
Overwhelmingly negative effects; no significant positive effects	1-2

RECOGNIZABILITY

A target’s recognizability is the degree to which it can be recognized by an operational element and/or intelligence collection and reconnaissance assets under varying conditions. Weather has an obvious and significant impact on visibility. Rain, snow, and ground fog may obscure observation. Road segments with sparse vegetation and adjacent high ground provide excellent conditions for good observation. Distance, light, and season must also be considered.

Other factors which influence recognizability include the size and complexity of the target, the existence of distinctive target signatures, the presence of masking or camouflage, and the technical sophistication and training

of the attackers. Table D-6 shows how recognizability values are assigned on CARVER matrixes.

Table D-6. Assigning recognizability values.

<u>CRITERIA</u>	<u>SCALE</u>
The target is clearly recognizable under all conditions and from a distance; it requires little or no training for recognition	9-10
The target is easily recognizable at small-arms range and requires a small amount of training for recognition	7-8

CRITERIA

SCALE

The target is difficult to recognize at night or in bad weather, or might be confused with other targets or target components; it requires some training for recognition	5-6
The target is difficult to recognize at night or in bad weather, even within small-arms range; it is easily confused with other targets or components, it requires extensive training for recognition	3-4
The target cannot be recognized under any conditions, except by experts	1-2

CARVER MATRIX

These CARVER factors and their assigned values are used to construct a CARVER matrix. This is a tool for rating the desirability of potential targets and wisely allocating attack resources.

To construct the matrix, list the potential targets in the left column. For strategic level analysis, list the enemy's systems or subsystems (electric power supply, rail system). For tactical level analysis, list the complexes or components of the subsystems or complexes selected for attack by your higher headquarters. (Figure D-1 shows a sample matrix for a bulk electric power supply facility.)

As each potential target is evaluated for each CARVER factor, enter the appropriate value into the matrix. Once all the potential targets have been

evaluated, add the values for each potential target. The sums represent the relative desirability of each potential target; this constitutes a prioritized list of targets. Attack those targets with the highest totals first.

If additional men and/or munitions are available, allocate these resources to the remaining potential targets in descending numerical order. This allocation scheme will maximize the use of limited resources. The SIO can use the CARVER matrix to present operation planners with a variety of attack options. With the matrix he can discuss the strengths and weaknesses of each COA against the target. Having arrived at conclusions through the rigorous evaluation process, the SIO can comfortably defend his choices.

SITE RECONNAISSANCE

During target systems analysis, it is advantageous (in a permissive environment) to have a reconnaissance element perform a site survey. This reconnaissance can take place at the specific target site or at a similar site in a more accessible location.

Preparation for reconnaissance and analysis of an industrial establishment or other technically sophisticated complex is one of the more difficult missions for the ARSOF SIO. Reconnaissance could be done in support of DA missions or to assist a host nation to defend a potential target in a FID environment. Target analysis is a cooperative effort between the operational element and

intelligence personnel. This analysis seeks to answer PIR, IR, and SIR in the categories of CARVER.

Target analysis is the responsibility of the SIO, but a reconnaissance team can often be used to answer SIR that cannot be satisfied by any other means. Preparation for a site reconnaissance requires review and understanding of the following process. Site reconnaissance —

- Can be overt, covert, or clandestine.
- Can be conducted as part of a larger area assessment or a distinct mission activity.

BULK ELECTRIC POWER SUPPLY							
POTENTIAL TARGETS	C	A	R	V	E	R	TOTAL
FUEL TANKS	8	9	3	8	5	6	41
FUEL PUMPS	8	6	2	10	5	3	34
BOILERS	6	2	10	4	5	4	31
TURBINES	8	6	10	7	5	9	45
GENERATORS	4	6	10	7	5	9	41
CONDENSERS	8	8	5	2	5	4	34
FEED PUMPS	3	8	5	8	5	6	33
CIR. WATER PUMPS	3	8	5	8	5	4	33
GENERATOR STEP UP TRANSFORMER	10	10	10	9	5	9	53

Figure D-1. Completed CARVER matrix.

- Can take place across the operational continuum.
- Is often more than a traditional reconnaissance and less than a full-scale analysis. Comprised of four cyclic steps.

**SIO AND RECONNAISSANCE
TEAM REVIEW**

The first step is a joint SIO and reconnaissance team review of the commander’s guidance and stated requirements. This sets out what is to be accomplished regarding the target. In a FID environment, this includes an evaluation of the threat to the target.

**GATHER, ORGANIZE, AND EVALUATE
INFORMATION**

The second step is to gather, organize, and evaluate available information about the target; and to identify gaps in the data. Maps, photographs, flow charts, blueprints, diagrams, and other data are provided by the

SIO and are examined, as appropriate, in light of the mission and the PIR and IR.

An initial CARVER report and targeting folder that highlights gaps in the data may be prepared at this step. The folder is used to develop a detailed collection and reconnaissance and surveillance (R&S) plan.

SURVEY THE TARGET

The third step is a survey of the target by the reconnaissance team. The team —

- Gathers information validating data gathered and conclusions drawn up to this step.
- Satisfies intelligence and information requirements.
- Gives the supported targeting analyst and/or operational element a “feel” for the target.

If the survey is overt and with the cooperation of personnel working at the site, the operational element follows these basic rules:

- Look for those things that would be important if the site had to be attacked in the future. Note layout, construction, location, and composition of key components, security, and communications.
- Dress neatly but not conspicuously.
- Find out what the key components of the site are likely to be by pre-visit research; check this against what you see or are told on the site. Note manufacturers and model numbers of key components. Find out which, if any, of these components are made by cast methods or are otherwise difficult to replace. Determine who the key personnel at the site are and what they do.
- Be conscious of where you are on site at all times in relation to key components; notice what type of machinery or equipment is in your immediate vicinity.
- Discern how the site is similar to other sites in its class. Note any significant differences.
- Take brief but good notes.
- Be polite and attentive when someone from the site is speaking. Direct questions, one at a time, to your host. Do not badger guides with persistent questions about subjects they are unsure about or do not want to discuss.
- Avoid making comments about perceived lax security.
- Do not wander away from the tour group or into restricted areas: such conduct will offend your host.
- Do not smoke where there is even a remote fire hazard or without the permission of your host.
- Ask for informational handouts, such as illustrated public relations literature, that provide technical information about the site. Be especially alert for flowcharts and layout diagrams.

- Do not volunteer any more information about yourself or your purpose than is necessary to accomplish your mission.
- Avoid immature discussions concerning sabotage or destruction of components onsite. Hosts are often concerned about security and, fearing widespread dissemination of their vulnerabilities, may prevent them from offering useful information or hosting return visits in the future.
- Get permission before taking any photographs.

COMPLETE THE RECONNAISSANCE REPORT

The fourth step is to complete the reconnaissance report and transmit it to the SIO. The following are minimum recommended data requirements for a reconnaissance report prepared by a reconnaissance team:

- R&S plan employed.
- Site, system, or complex layout diagram with north arrow and scale.
- During the CARVER assessment, the operational element normally focuses on accessibility, vulnerability, and recognizability.
- Map coverage of 1:250,000, 1:50,000, and 1:25,000 extending out from the target and including significant installations and activities noted by the team that are inside the AO and AI.
- High-angle overhead, oblique overhead, and ground photography of the target with annotations of installations, activities, and differences observed by the operational element.
- Site communications and electronics data can be gathered by an attached SOT-A.
- Locations of the nearest fixed-wing capable airstrip and fixed-wing capable instrumented airstrip; ground distances from each of the above airstrips to the target; and the nearest DZs LZs, and BLSs.
- Summary of local human and material resources available to support special operations.
- List of sources used.

SITE RECONNAISSANCE TRAINING

Since target analysis is the responsibility of the SIO, the SIO trains reconnaissance teams or surrogates in technical appreciation and CARVER analysis. When training, consider the following:

- Know the characteristics and lowest common denominators of the type target being surveyed. This is a strong base for assessing vulnerabilities.
- It is best to get verification from at least two different sources for every critical fact.
- It is important to know the separate capabilities of the attacking and defending forces.
- When doing a map or sketch reconnaissance of the target and its environment, it is helpful to inventory the area in a clockwise fashion, starting at the farthest point considered and moving in circles of decreasing size to the center of the target.
- Although persons working or living near the target can provide important information, one should be wary of the advice of local “experts.” Often they have little or no training or experience in target evaluation, and may know less than they think they do.
- Assessments should focus on the CARVER elements separately, and as they interrelate.
- When conducting assessments, three heads (and three sets of eyes) are better than one or two. A second opinion is helpful, but a third will provide greater insight and prevent potential deadlock.
- It is helpful to do separate analyses of like sites, and then to compare the results.
- Where security considerations permit, CARVER reports should be signed and dated to fix responsibility, facilitate scheduled updating, and identify future reconnaissance team and analyst training requirements.

The farther one is from the risks of an operation, the more feasible the operation appears and the more academic the intelligence requirements seem. It is important to integrate both planning staff and operators in the analysis process.