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# EQUIPMENT CAPABILITY PLANNING

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1. Military Capability denotes an integrated and agile combination of trained personnel, mission capable equipment, infrastructure, information systems, organizational structures & process that can create a military effect in a range of operational contingencies. The ability to achieve a desired effect is defined by combat readiness, sustainable capability & force structure. It is important to note that the capability has to be sustained for the duration of the combat pulse. The vast array of weapons and equipment in the inventory of any force represents a combat capability which has to be kept mission capable 24x7, 360 degrees. Sadly this vital point is missed out by the planners in the never ending quest for new systems while doing lip service to the issue of thru life readiness of in service systems, which is to be ensured by timely medium and base reset, technology insertion and technology refresh initiatives. Consequently force hollowness spirals shooting up non mission capable rates.

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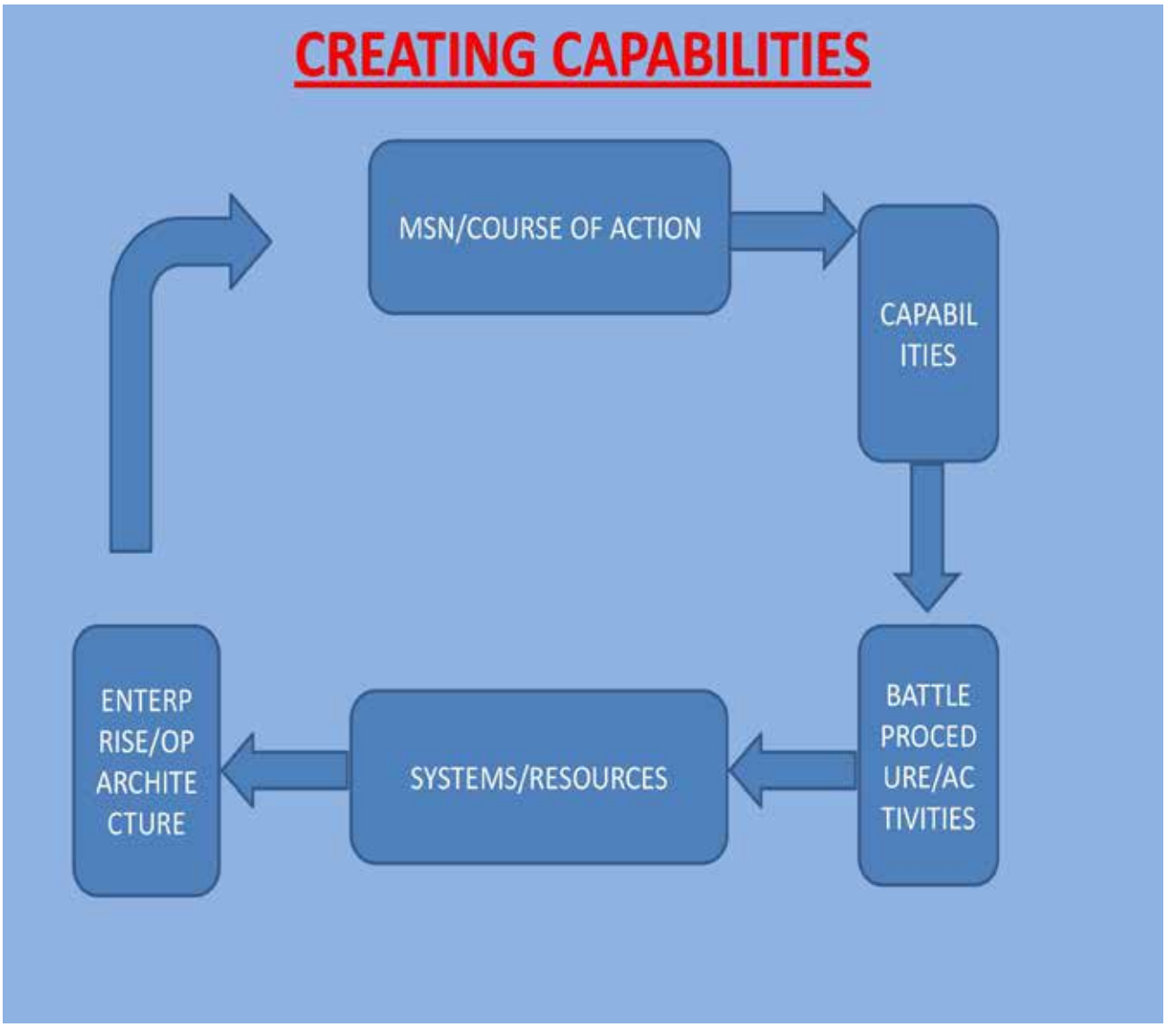
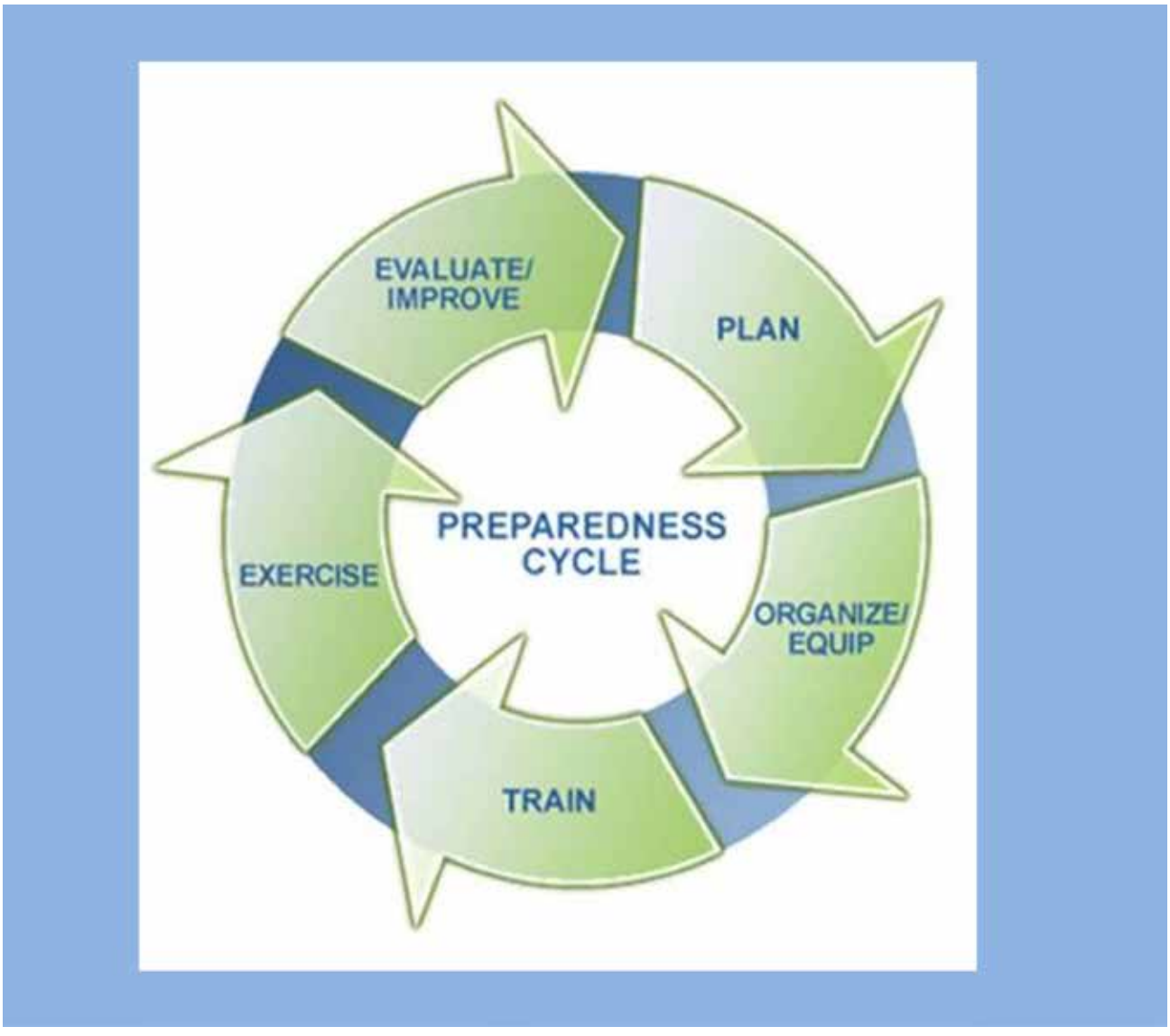
2. Equipment capability development flows out of a capability development plan which is configured taking into account future requirements of war fighting based on threat environment assessment & adversarial capabilities, lessons learnt during exercises where capability gaps get identifies & operational requirement spelt out. As a consequence to this analysis, either a prioritized set of gaps in operational capabilities emerge or it is concluded that no gaps exist. It is important such analysis are regularly undertaken to identify gaps that pose unacceptable risk to achieving the aims of national & military strategies. Needless to mention, suggested gaps must be linked to operational situations on ground and the consequences of failing to meet those objectives clearly spelt out. Once the gaps are identified, solutions and policy approaches to solving or at least mitigating the capability gaps are assessed. Given below is the sequence of actions needed to create operational capabilities and the preparedness cycle to ascertain capability gaps:






3. If the above best practices are adopted, existing combat capability can be sustained in a ''Ready to Fight ''condition thru life. It is important to see that the approaches identified to address the gaps include the broadest range of options available at the Government & tri service level to meet the requirement. It is possible that the capability gap can be addressed by policy & non material approaches. Alternatively, it could lead to identification of either new uses of already fielded systems or fielding of a new equipment / system with differentiating equipment capabilities. One hopes that in the quest for modernization such an exercise is being under taken.

**The Capability Problem**

4. Broadly speaking, the man & the machine still remain the principal operating systems of the modern battlefield. The classical fire & manoeuvre of yesteryears, the basic tactics of infantry warfare are still essential on a conventional battlefield, but in

the battles being fought today, information & intelligence have emerged as the new equivalents of fire & manoeuvre. It is the era of special operations where analysts draw inferences from a huge amount of data, webs are drawn, identifying the targets and then special operations carried out to neutralize targets. All this needs a great dependence on technology & hence a distinct shift in equipment capability planning for this century is the need. ***Equipment capability is defined as the enduring ability of the weapon system to generate a desired operational outcome or effect & is relative to the threat, physical environment & contribution of the maintainer.***

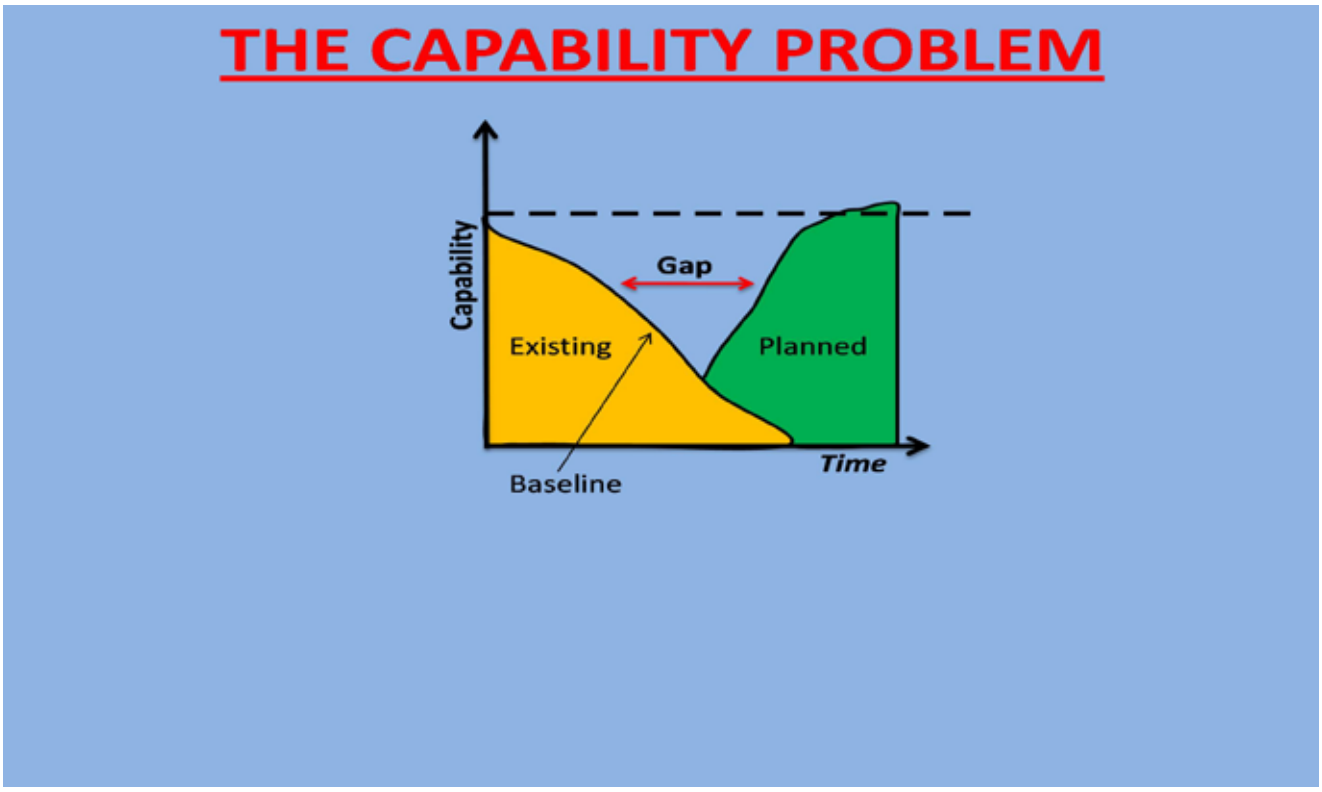
5. It is time available financial resources are set aside for humint, sig int, geo int and mash int tools instead of conventional hardware like tanks, guns, AD systems as these are not going to add substantially to existing combat capabilities. Traditionally, acquisitions in our context have been mainly attribute centric, instead of being capability centric. The focus was on buying a product that had been found acceptable by the military, either to replace an existing in service system or in some cases where the military felt that possession of such a system would give it an operational edge over the adversary. In result, the country ended up with several types of aircraft, tanks, guns, radars, air defence systems, etc in the inventory & platform readiness suffered, as maintenance costs spiralled due to shrinking budgets & vanishing supply chains. It is important to make a strategic shift to capability centric acquisitions & a start can be made with the ongoing hunt for suitable small arms for the Infantry. An acquisition strategy must have the following characteristics, namely, realism, stability, resource balance, flexibility & managed risk. It should result in the acquisition of the following capabilities:-

(a) An operational capability based on the capability gap analysis.

(b) A resuscitation capability to keep the operational capability mission capable through life.

(c) A technological capability to add to the country's Technology Security.

6. If the above three outcomes are not met, it ends up being a procurement exercise, as has been the situation in the past, with a perennial dependence on imports and a fragile national security shield with critical capability gaps. The Parakaram experience justifies this assumption. Garage availability is high but systems are not battle worthy.




7. Managing capability through life requires a holistic approach, too often a gap opens up the “do nothing” syndrome resulting in huge hidden & increasing costs. In out context, it is a common sight to see such critical equipment capability gaps due Age, Usage and Deployment (AUD) effects as well as absence of an Equipment Readiness work culture i.e. monitoring endurance and initiating resuscitation actions in time. Weapon systems in the inventory are not subjected to formal battle endurance evaluation. ***Most weapons & equipment will not throw up reliability issues unless these are subjected to realistic usage as in actual combat.*** There is no formal methodology to measure residual battle endurance (system effectiveness) of in service weapon systems i.e. ability of a weapon or equipment to do the job for it was intended & the overall degree of its capability to achieve mission success considering the operational environment. It is taken for granted that any piece of equipment lying at Ambala or Meerut will perform all planned duty cycles whether it gets deployed in Rajasthan or in Doklam. Some lessons to this effect were thrown up during Kargil & Parakaram, however, these seem to have been forgotten. During Kargil , failure rates of Bofors was quite high and insitu reset actions by the maintainers help generate the required availability of the system. Today, sustainment of through-life capability has taken a back seat & seldom surfaces in any discourses due to absence of a systems work culture.

8. Equipment Capability is first created by a planned & well defined systems engineering process that strives to achieve system maturity & system readiness during

the system design & development phase. Simply put a system must be fully mature before it is ready for use. System maturity focuses on design maturity of a system. System readiness validates whether the system can fulfill user requirements. Capability readiness determines whether or not the system has the ability and capacity to fulfill the operational capability for a given context in an intended operational environment, say when deployed in the glacier or north Sikkim. It is only then, that an operationally effective capability can be created & sustained supplementing the concept of integrated readiness. In our context, the flawed process of manufacture under TOT has ended up in providing unreliable systems in the hands of troops. It is a common lament in the field army that the fully formed tanks or the ATGM ex country of origin is more reliable than the indigenized versions. This absence of quality aggravates mission capability gaps in the units besides shooting up maintenance costs.

**Characteristics of CR, SR & SM**

| Metric | Scope | Operational Context | System Devp Life Cycle | Verification & Validation | Measure of Effectiveness |
|---|---|---|---|---|---|
| CR | Operational Capability | Driven by mission profile | Capability requirements | Capability validation | Operational effectiveness |
| SR | User familiarity | Driven by GSQR | User requirements | System validation | System effectiveness |
| SM | Technical solution | Driven by SRS | System requirements | System verification | Technical effectiveness |

9. In the ongoing development life cycle of Dhanush gun, it only partial system maturity comprising certain functional requirements like maximum range, minimum range, bias & precision, rate of fire, low angle, high angle & direct fire have been achieved, yet other higher parameters like ballistic vulnerability, soldier survivability, mobility, reliability, maintainability, durability of barrel, breech mechanism, recoil mechanism, carriage & cradle, flammability, mechanical safety have not yet been addressed. At least the mean round between critical failures/ stoppages (MRBF/MRBS) need to be quantified to work out an effective operational sustainment strategy-identification of field and shop replaceable units, the complex chain of technical maintenance tools & manuals that need to be put together to support organizational, intermediate & depot level (O, I, D) maintenance. Only then will the gun system achieve full system maturity & system readiness which then would lead to creation of a sustainable operational capability. Without these, the Desi Bofors would not add any worthwhile operational capability to the Army. It is prudent to exercise caution now, than trying to fix things later. This had been the experience in development life cycle of the 105mm IFG & LFG as even today capability readiness suffers due to sub optimal durability and defect proneness. It is not the question of having a complement of 18 guns in a unit, it has

to be ensured that all these guns come out blazing when required; to ensure this, it is important that once system maturity and readiness have been achieved in the Dhanush gun system, the system is put through several cycles of assessment & measurement of capability readiness by making it deliver several categories of missions envisaged in an operational context to ascertain its effectiveness. There is a need to carry out a hard nosed analysis of the actual import content and initiate efforts to develop indigenous sub system houses for the same to ensure thru life capability readiness. In order to facilitate hand holding during the development process, System Readiness can be divided into Initial System Readiness (threshold) & full system readiness (objective). System should be cleared for induction on achieving ISR on the condition that FSR will be achieved within two years time frame. As on date, in my view Dhanush is a case of System Maturity in progress & System Readiness not achieved. Some hard core systems engineering efforts are needed to make this impressive home spun effort, a world class one.

10. The acquisition of the next generation assault rifles (small arms) for the Infantry should also be against well established quantified parameters and the selection of the final system needs to be based on equipment capability instead of some fancy attributes. Once the key performance parameters (KPPs) of range, accuracy, rate of fire, etc are met, reliability / endurance testing of at least three units of each model should be carried out to ascertain the mean rounds between failures (MRBF) for class I, II & III failures, besides assessing the estimated barrel life and service life. It is only then that a sustainable operational capability would be available to the Infantry man. By solely focusing on attribute centric procurement (looking for state of art features), there is a grave danger of acquiring an assault rifle that could end up being unreliable in our operational context or system readiness becomes unaffordable over the life cycle. Here again system maturity & system readiness have to be assessed in a calibrated manner instead of rushing through the acquisition. As it is a Make & Buy category programme, it can be assumed that System Maturity may have been well engineered, however it should not be taken for granted that System Readiness is guaranteed in our operational context, simply because it is a Colt or FNH or HK product. System readiness should be evaluated at our envisaged operational tempos in our operational environment, aim being to acquire an assault rifle that is right for a given context. Once SM & SR have been assessed, a full scale CR assessment needs to be carried out. Capability Readiness is looking at validation of the system in a given operational environment, in our context several types of operational environment if we intend to use the same weapon in plains, high altitudes, valley & island territories. Only then can we consider getting the desired bang for the buck. Once the MRBF gets quantified, every 3 years there is a need to re-assess residual capability and if found below a threshold value,

the weapon needs to be subjected to a refit for resuscitation of equipment capability. Equipment capability planning for any Army is a very deliberate & complex exercise which cannot be achieved by a work culture of black boxes, that is all pervasive today. Our adversaries are known to be adopting a well crafted procedure for equipment capability development fully understanding the Know Why, Know How & Know What is to be done. It is time the Army also takes this up as a KRA. Towards this end, setting up of Systems Capability Assessment Group (SCAG) in the Army becomes an indispensable reform agenda to usher in the practice of capability centric acquisitions. It should encompass in itself, best practices both wrt equipment capability assessment of in service systems besides development of the same in newly engineered systems. Simply put, SCAG should be able to identify the **first, third and seventh enclosure types** in the Army`s combat systems and initiate technology refresh initiatives to upscale equipment capability, besides providing valuable inputs to the acquisitions branch on capability gaps. It is only then can the Army transition from attribute centric procurement to capability centric acquisition, achieving high standards of operational effectiveness, while concomitantly creating a viable defence industrial ecosystem and plugging gaps in the country's Technology Security.

11. In conclusion, I will end by reproducing below the views of a great combat leader, which possibly is the first recorded effort at Developing System Maturity & System Readiness in a weapon system:

*"We passed the scene of the tank battle during the initial German breakthrough. I counted over a hundred American armoured fighting vehicles along the road, and, as a result, issued an order, subsequently carried out, that every tank should be examined and the direction, caliber and type of hit which put it out made record of, so that we would have data from which to construct a better tank."*

General George S Patton