



# **Military and Dual-Use Technologies: Current Realities**

A presentation by  
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# Aerospace Power: Trajectories and Transformations

- Politico-military *diktats* are imposing narrowing margins of allowable “effects” and uncertainties in them, thus raising the premium on ‘smartness’ and precision in force application from the air.
- Further, OOTW and future combat ops will inevitably take IAF assets ‘out-of-area’. Such ops will call for staging-environment insensitive (i.e. resilient) embodiments of technology that are portable to, and operable in and out of, an un-benign staging area.
- Consequently, *pace* ACM Tyagi, the IAF is going through a transformative doctrinal transition to a role-agile force, in an uncertain strategic and tactical environment.

# The Centrality of Technology

> Provisioning and using such a role-agile Air Force are technology-intensive activities, in both products and “processes”(ops)

> The deployment of these technology-intensive products and processes -- particularly in the manner of sustenance and amplification of force application from the air -- so as to prevail along the locus of force engagement is also a technology intensive activity.

> Ergo, the centrality of technology as embodied in products, or as used in “processes” -- such as air operations -- is obvious

# Space: An Opportunity Multiplier

- > Executing 'effects confident' precision strike involving target identification, location and neutralisation -- not necessarily only with ordnance -- are capabilities almost wholly dependent on unrestrictable access to Space assets.
- > Several of our extant capabilities in Space -- such as in Remote Sensing -- and new ones planned, are inherently, or designed to be, dual-capable.
- > It is quite feasible to chart an 'affordable effects-cost' trajectory for the IAF that overcomes many of the debilities of legacy -- but only if that transforming trajectory is conceived *ab initio* with imaginative use of Space as an 'opportunity multiplier'.

# The Capacity Constraint

- > The dimensions are very large of the scientific, technological and manufacturing efforts needed to enable such a transformation of the IAF; pursue the trajectories towards its accomplishment, and exploit current and emerging opportunities in Space while doing so.
- > It is a mistaken notion to suppose or believe that the DR&D, the ordnance factories and the defence PSUs have enough capacity (as distinct from capability) between them to cater to the full technological spread of such a transforming IAF.
- > Further, it is not adequately recognised that the entire current aerospace pre-qualified S, T and manufacturing infrastructure of the country in the civil sector (~ IISc+olderIITs+NAL+ISRO+pvt.SIATI) is already capacity-constrained.

# Adding capacity to civilian industry: The catch

- > This capacity constraint cannot be overcome without extensive upgradation, qualification and use of domestic capacity and capability in the extant *non-aerospace*, civil sector, S&T+mfc infrastructure.
- > However, given HR shortages in critical skills, such Indian civilian industry will jeopardise even its domestic -- not to say its global -- cost-competitiveness, if offered only mil-spec dominated systems for production in mil-only dedicated production lines.

# Using non-aerospace civilian capacity

- > Such use of available capacity - even if augmented - will require the utilisation of manufacturing capabilities in non-aerospace qualified Indian civilian industry, which - in turn -- will impose on design and QRs the imperative to eliminate unnecessary mil-spec, and will occasion the extensive use of COTS.
- > Note, however, that the extent of foreign equity permitted by GoI in such civilian industry has no bearing at all on domestic access to dual-usable capital equipment or technology, such access being foreign-state controlled.

# Transitions

- > In view of the foregoing, the *transition* equipping of the Air Force will need to jettison a variety of inherited shibboleths; and study seriously, *inter alia*:
  - # Need for restocking WWR 'dumb' ordnance
  - # Re-engineering extant LRUs to use COTS
  - # Revisit the need for, and audit the engineering of 3f import substitution so as to enable hardware realisation in base workshops and non-aerospace private industry
  - # Conversion of older a/c to Space-navigated UCAVs with PGMs
  
- > Direct funding by the Air Force of D&D and LSP of non-airborne equipment in GOCOs, arranged in a new RDT&E bond structure

# Aerospace RDT&E 2015 bond structure

