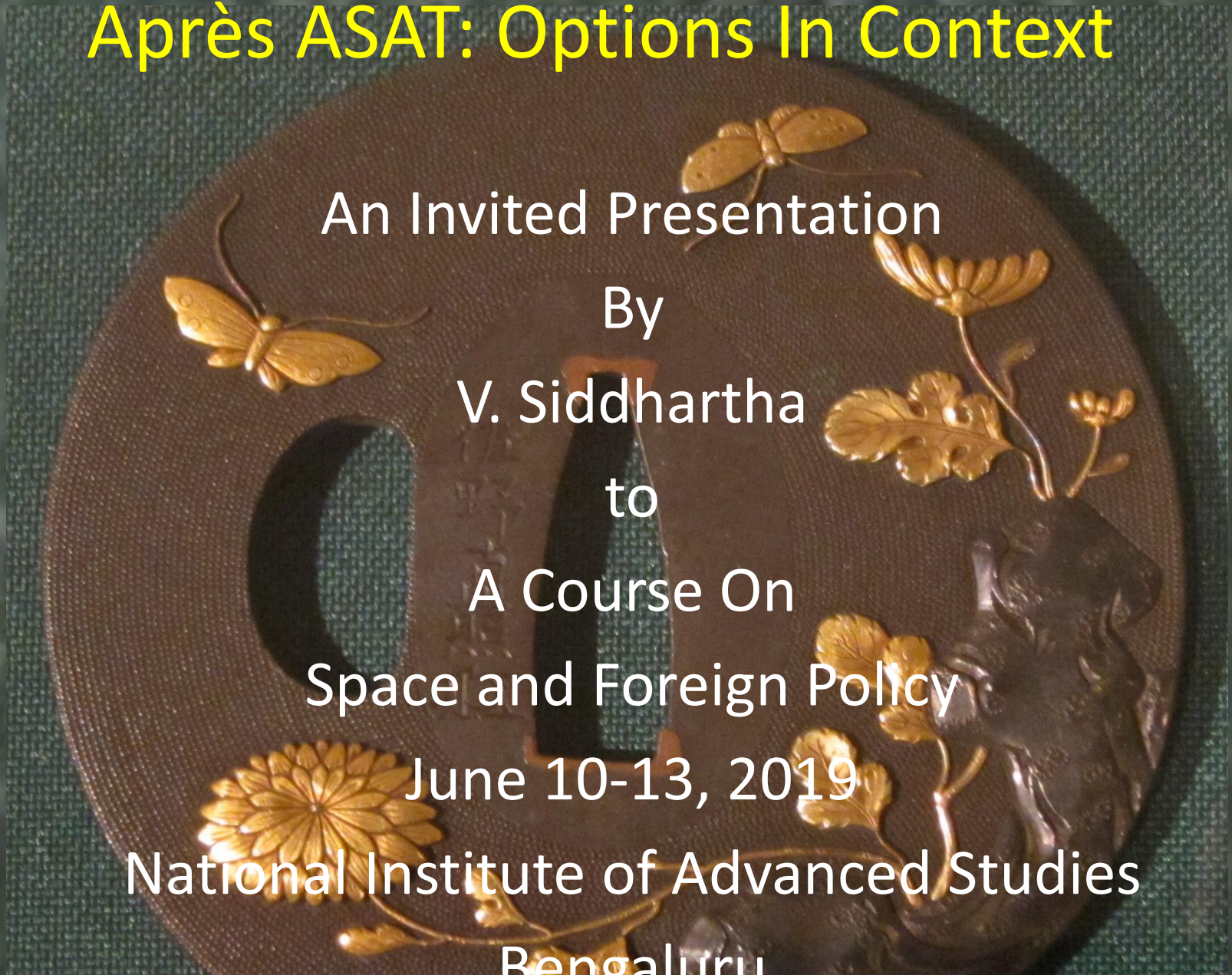
Après ASAT: Options In Context



An Invited Presentation

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to

A Course On

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Purpose of Framework

> "There is a growing trend of international collaboration in research and development… We should take full advantage of this.

For this reason, I have placed science and technology at the forefront of our diplomatic engagement."

> Indian PM in his address to the Indian Science Congress, Mumbai, January, 2015

> "..Repositioning [of India] in regional and world affairs"

> Indian PM during his visit to the US, September, 2K

Geo-technological positioning

Such 'positioning' is possible only if a significant part of a country's T&S, and related military capabilities, are grown and shaped to be globally deployable as instruments of her foreign policy, e.g. India:

- One of the non-carbon energy pioneers with co-responsibilities for global climate stewardship
- One of the nuclear weapons 8 (15?), until abolition
- One of the Space Security steward-members of MTCR (Note: China has not been admitted into MTCR)
- One of the P (7-9?) of the UNSC with global co-responsibilities for establishing and maintaining order in contested Global Commons - e.g. the seas/UNCLOS

A morphological distinction

is the leitmotiv of this conceptual framework

> International collaborations in scientific and technological fields,

and

> S&T in Foreign Policy: When the findings of science, or use of technology may have ramifications for international relations beyond the 'S' or 'T' themselves, then the pursuit of the 'S' or the use/control-of-use of the 'T' influence – and are influenced by – Foreign Policy.

S&T in diplomatic engagement -I

- When a *quid pro quo* is negotiated in return for a country's participation *as a State* using her scientific or other advantages, such as: *locational* > UN-sponsored TERLS at the Magnetic Equator; *epidemiological* > WHO-sponsored vaccine trials in tropical Latin America; *technological* > contribution in kind of sub-systems; e.g. for the Square Kilometre Array in South Africa; *reciprocal use of facilities* > GMRT (Pune) and Arecibo (Puerto Rico)
- Non-reciprocal offers of unique facilities, e.g. Infra-red telescope in Ladakh, J&K >Soft power

S&T in diplomatic engagement-II

> Excellent relations with Mauritius enabled placement there in the late 70s of a satellite tracking station essential for our Space programme.

> But an instance of a dual-use S&T engagement with *later* adverse diplomatic consequences was in the nuclear field

++ 1960, CIRUS reactor was built with Canadian assistance while the United States provided the initial supply of heavy water

Science-in-diplomacy

- As human threats to the global commons become ever-more severe, global diplomatic negotiations over treaty-based national actions to mitigate them become increasingly underpinned by a common trans-national appreciation of the underlying science.

  Two hardly-known Indian traces to international science-informed diplomatic negotiations

- Kothari report on the Effects of Nuclear Explosions >> LTBT
- Kulkarni-Ramanathan (late 1940s) work on the vertical transport of Ozone in the atmosphere > Ozone-CFC chemistry >> Montreal Protocol

Diplomacy in Technology Exchanges

.... has traversed from India being a targeted discriminat*ee*: 1974 N-test > NSG; 1987-ASLV > MTCR; 1998 N-tests > 'Entities List'; to being a participant-discriminat*or* > MTCR member in 2016

- Since 1993, regulations periodically notified listing 'dual-use' and military materials and technologies whose export from India is controlled in ways designed to advance India's Foreign Policy goals through trade in such technologies
- Indian Export Control evolution over two decades: 1993 > 2000 CWC Act > 2005 UNSCR 1540 WMD Act > 2013 selective concordance with regime-lists
- By 2014: Wide extant-member support for India's membership of dual-use technology control regimes

Science ‘re-balance’ to Asia?

“A fundamental shift is taking place in the geography of science. Networks of research collaboration are expanding in every region of the globe. The established *science superpowers* of the United States and Europe have dominated the research world since 1945. Yet this *Atlantic axis* is unlikely to be the main focus of research by 2045, or perhaps even by 2020”

Data-supported article in Nature *18 October 2012.*

*[Note use of **these** expressions]*

A Conceptual Confluence

> As countries enlarge their "scientific presence" in more fields of S&T, more entities from more countries with similar "scientific presences" will seek to collaborate with that country's state and non-state institutions. And conversely.

> As a country's dual-use technological capabilities diversify; as the underlying sciences themselves become dual-capable -- e.g. synthetic biology – increasing proportions of the implications of these collaborations will lie at the confluence of

T&S, Foreign Policy and National Security

Thank You