

Soldier Systems TRM
Visioning Workshop



THE FUTURE SECURITY ENVIRONMENT
Presentation to Soldier Systems TRM Visioning & Requirements Workshop
16 June 2009

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1

OVERVIEW

Outlook to the future:

- 1. Introduction**
- 2. Ongoing trends**
- 3. Probable Challenges**
- 4. Implications for CF and CA**

2

FUTURE SECURITY ENVIRONMENT

- Environment characterized by continual – often rapid change.
- High volatility and uncertainty.
- Prediction difficult. Confounds military planning.
- Some trends clear.
- Indicate character of future threats and challenges.

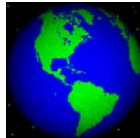
3

FSE KEY TRENDS

Globalization

Rapid Scientific &
Technological Innovation

Power Shifts in the
International System



Demographic Shifts

Resource Scarcities

Disease

State Weakness and Collapse

Rising Significance of
Non-State Actors

Identity & Distributional
Issues

4

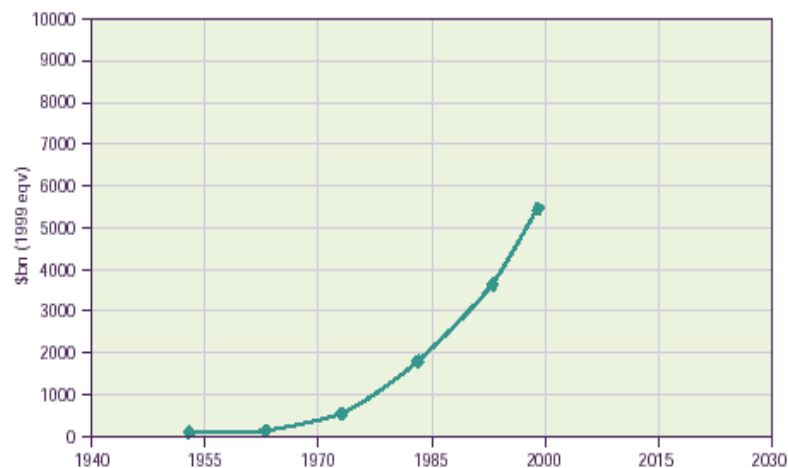
GLOBALIZATION

- Increasing openness and interconnectedness.
- Unifying and fragmenting effects.
- Prosperity and stability.
- Disintegration, resentment, violence.
- Vulnerability to external forces – including threats (e.g. information warfare, WMD, etc.).
- Increased access to information and technologies – widespread empowerment.

5

GLOBALIZATION

An Increasingly Integrated Global Economy



6

RAPID SCIENTIFIC & TECHNOLOGICAL INNOVATION

- Rapid – often exponential – advances in technology (e.g. ICT, robotics, nano and bio-technologies, etc.).

Examples:

- Embedded sensors and computational devices in commercial goods.
- Nanostructured materials with enhanced properties.
- Genetic modification of insects to control pests and disease vectors.
- Biomimetic and function-restoring implants
- Small and efficient portable power systems.

7

RAPID SCIENTIFIC & TECHNOLOGICAL INNOVATION

contd.

- Quantum-based cryptographic systems for secure information transfer.
- Pervasive undetectable cameras and sophisticated sensor networks
- Smart fabrics and textiles
- Pervasive radio frequency identification (RFID) tracking of commercial products and individuals
- Robots that look and move in very human ways, due to advancements in areas such as electroactive polymers and biomedical engineering.

8

RAPID SCIENTIFIC & TECHNOLOGICAL INNOVATION

Science & Technology

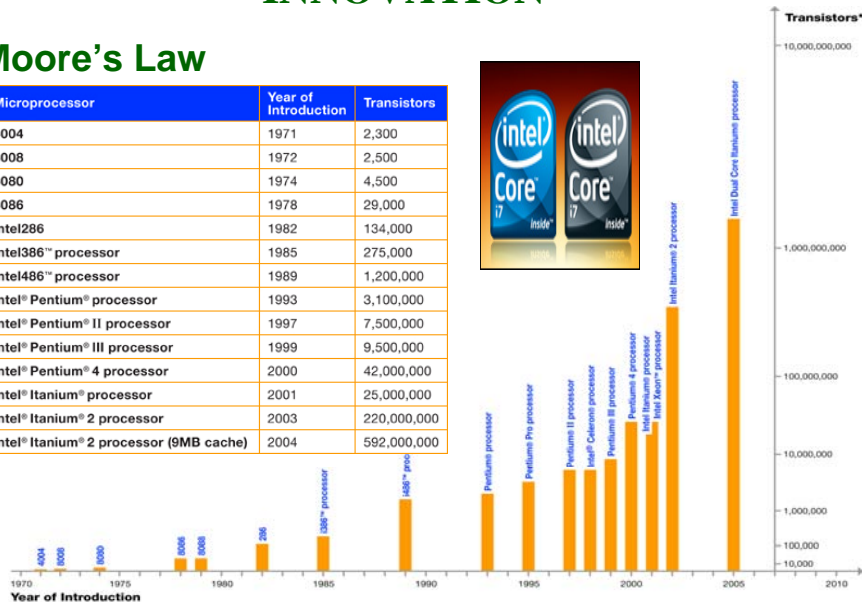
- Expanding Cognitive & Brain Science
- Exponential Technology Growth & Convergence
- Focus on Green & Clean Tech
- Growing Small Tech Investment & Expertise
- Increasing Biotech & Genomics Expertise
- Increasing Robotics, Automation & AI
- Increasingly Pervasive Networks & Networking

"Based on our technical foresights ... we see no indication that the accelerated pace of technology development is abating, and neither is the trend ..." (RAND © 2006)

RAPID SCIENTIFIC & TECHNOLOGICAL INNOVATION

Moore's Law

Microprocessor	Year of Introduction	Transistors
4004	1971	2,300
8008	1972	2,500
8080	1974	4,500
8086	1978	29,000
Intel286	1982	134,000
Intel386™ processor	1985	275,000
Intel486™ processor	1989	1,200,000
Intel® Pentium® processor	1993	3,100,000
Intel® Pentium® II processor	1997	7,500,000
Intel® Pentium® III processor	1999	9,500,000
Intel® Pentium® 4 processor	2000	42,000,000
Intel® Itanium® processor	2001	25,000,000
Intel® Itanium® 2 processor	2003	220,000,000
Intel® Itanium® 2 processor (9MB cache)	2004	592,000,000



RAPID SCIENTIFIC & TECHNOLOGICAL INNOVATION

contd.

- Benefits concentrated in the developed world, but gradually cascade beyond it.
- New areas of military competition (cyber-space, outer space).
- New dangers (spread of deadly military technologies, weapons).

11

POWER SHIFTS IN THE INTERNATIONAL SYSTEM “THE WEST” & “THE REST”

- US predominance.
- Integration of West.
- Regional hegemons.
- “Rogue” states and non-state entities.
- Rivalries increase.
- Western influence problematic.

12

DEMOGRAPHIC SHIFTS

- **Developing World:**

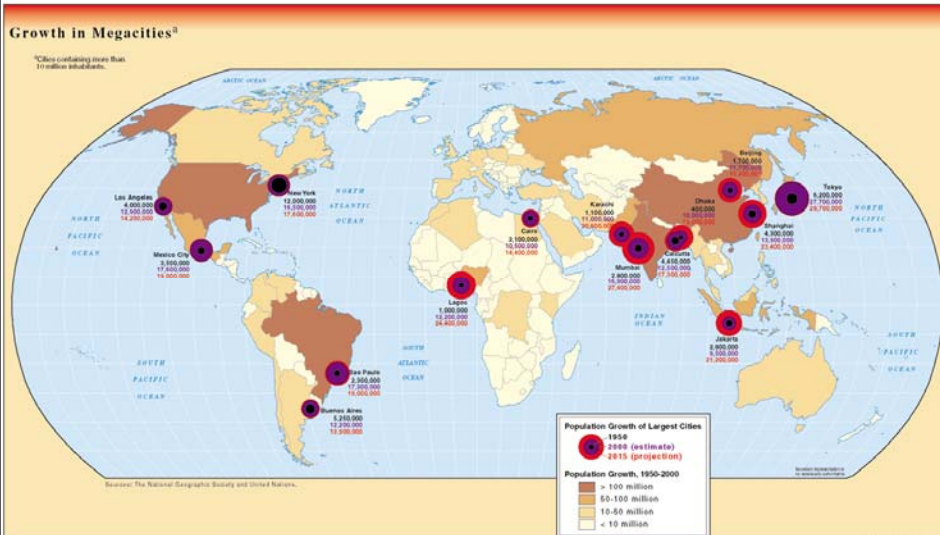
- Young, expanding, urbanizing
- Strain environment, generate state weakness, societal instability
- Civil wars, humanitarian crises, refugee flows, alter regional power balances

- **Developed World:**

- Aging and declining.
- Economic pressures on Western societies.
- Will increasingly affect foreign and defence policies.

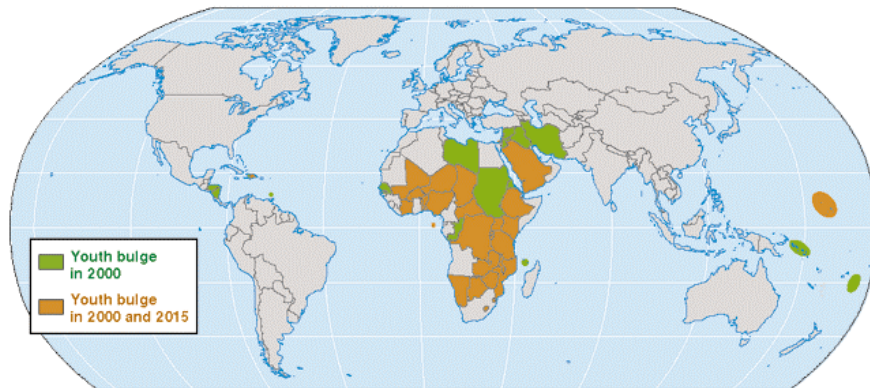
13

URBANIZATION



14

YOUTH BULGE



15

AGING POPULATIONS

Graying Means Paying More for Pensions and Health Care

Public Spending on pensions and health-care benefits
(percentage of GDP)

	1995	2030 (Official projection)
United States	10.5	15.5
United Kingdom	10.5	17.0
France	17.6	25.8
Canada	12.6	22.5
Japan	11.5	23.1
Germany	17.3	28.8
Italy	19.7	33.3

OECD (1996, 1997) and US Census (1997)

16

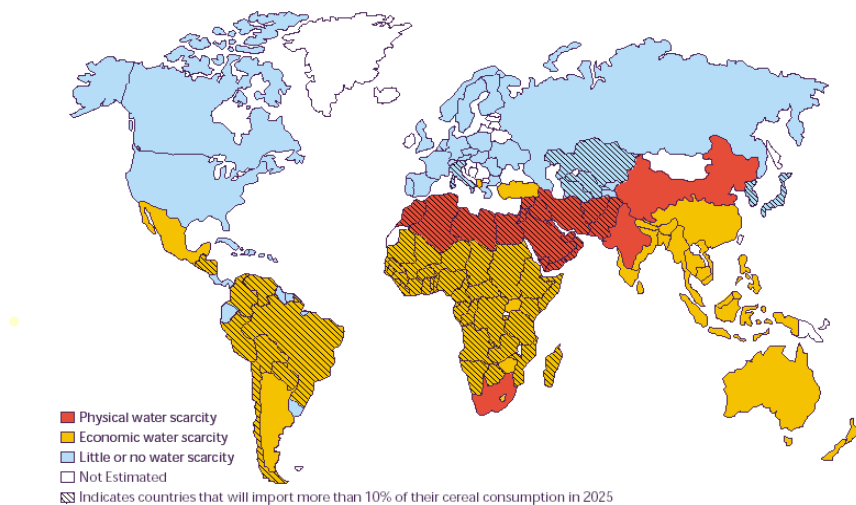
RESOURCE SCARCITIES

- Scarcity of renewable and non-renewable resources in the developing world.
- Growing societal instability and pressure on governments (poverty, infectious diseases, etc.).
- Source of intra and inter-state tensions (civil wars, regional water wars, tensions over energy resources, humanitarian disasters).

17

RESOURCE SCARCITIES

Projected Water Scarcity to 2025

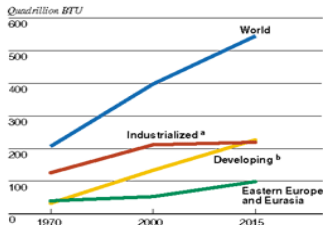


18

RESOURCE SCARCITIES

World Energy Consumption: 1970-2015

World Energy Consumption



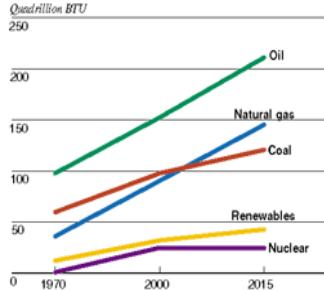
* Includes: United States, Canada, Mexico, Japan, United Kingdom, France, Germany, Italy, Netherlands, other Europe, and Australia.

† Includes: Developing Asia (China, India, South Korea, other Asia), Turkey, Africa, Brazil.

Source on inter and intra-state tensions (regional instability, civil wars over resources etc)

- Growing societal instability and pressure on governments (poverty, infectious diseases, etc.).

World Energy Consumption by Fuel Type



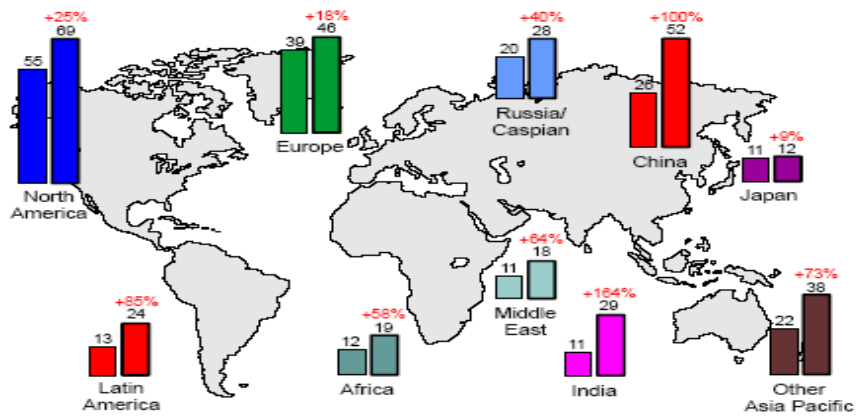
Source: International Energy Outlook, 1998; US Department of Energy.

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RESOURCE SCARCITIES

Future Oil Demand (By Region)

2004
 2030
 % Change
 (millions of oil-equivalent barrels per day)

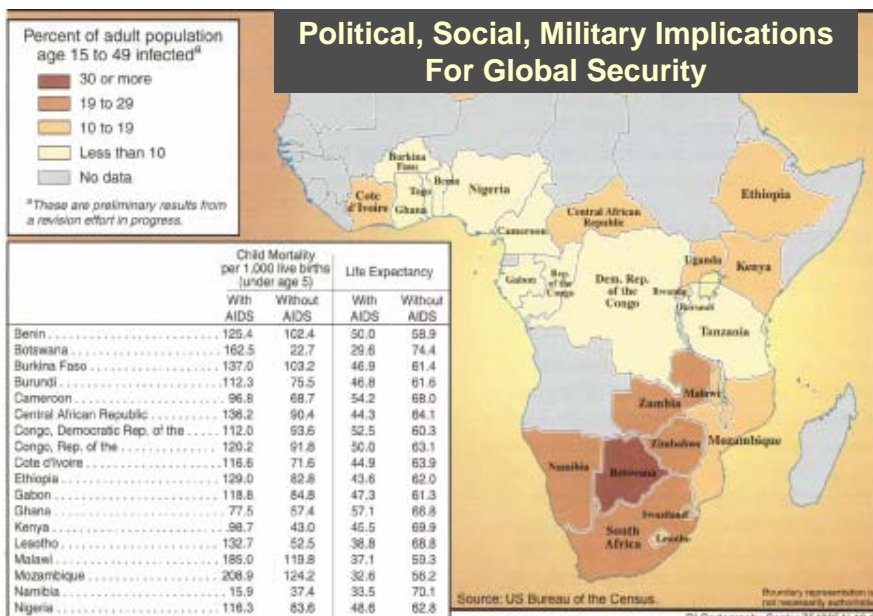


DISEASE

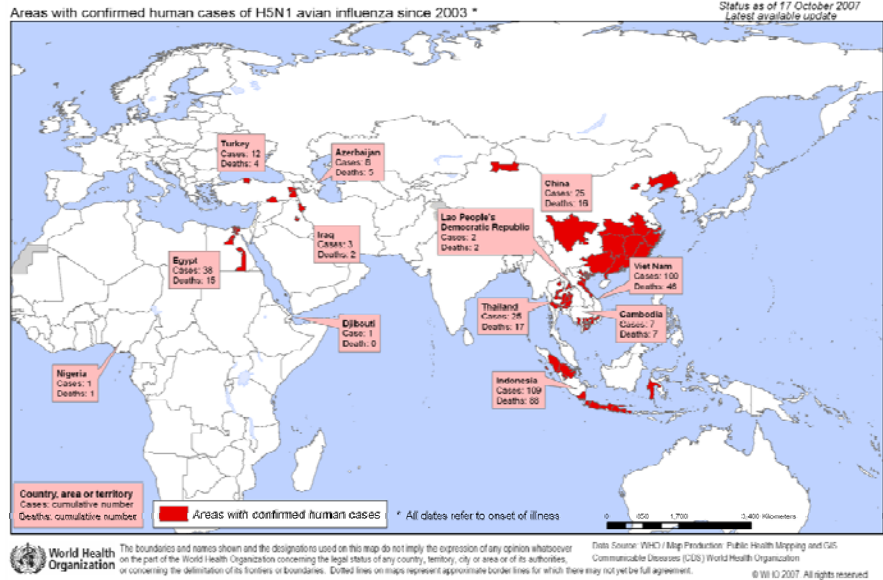
- Impacts increasingly apparent.
- Developing world especially vulnerable (infectious/non-infectious).
- Tuberculosis, malaria, hepatitis and AIDS will continue to increase.
- Generates instability (socially, economically, politically).

21

AIDS: Global Impact



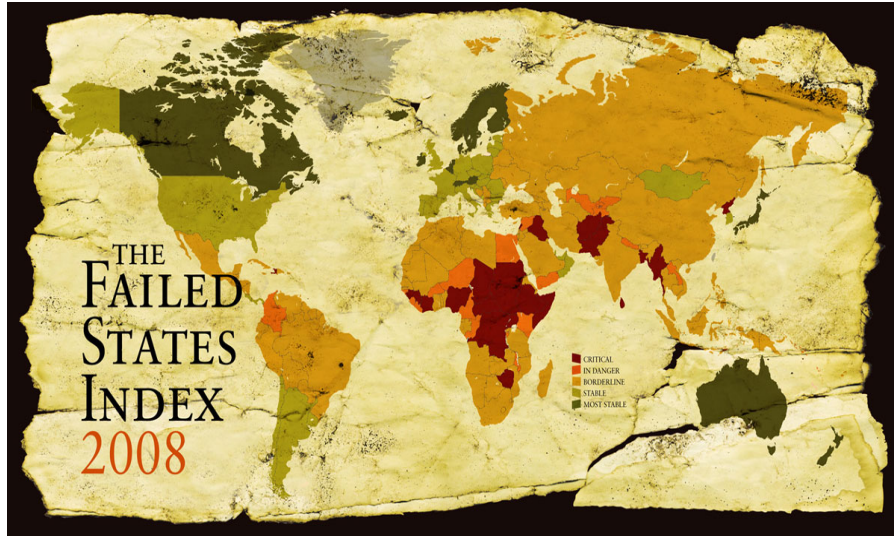
AVIAN PANDEMIC?



STATE WEAKNESS AND COLLAPSE

- Deficit in effective governance.
- Generates instability (anarchy, rebellion, lawlessness).
- Breeding grounds and “safe havens” for criminal groups, terrorist organizations, insurgents, etc.

FAILED AND FAILING STATES



25

RISING SIGNIFICANCE OF NON-STATE ACTORS

- NGOs, multi-national corporations, regional organizations, terrorist groups, organized crime, armed irregulars.
- Increasingly transnational, ever-more powerful.
- Impact as “critics,” “policy advocates,” and security threats.
- Threats pose problems of detection and deterrence.

26

EXTENDED RESEARCH AND SOPHISTICATION OF NON-STATE ACTORS



View from New Jersey 9/11/01 3:00 PM © by Joyce Finlayson



Terrorists bombed the US Embassy in Nairobi, Kenya, in August 1998, leaving hundreds dead and wounded. International terrorists will still be active in 2015 and could become more lethal with the proliferation of more powerful high-tech weapons.

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IDENTITY AND DISTRIBUTIONAL ISSUES

- Will remain major causes of inter and intra-state conflict.
- Ethno-national, religious and cultural.
- Use of unlimited means in pursuit of end sought .

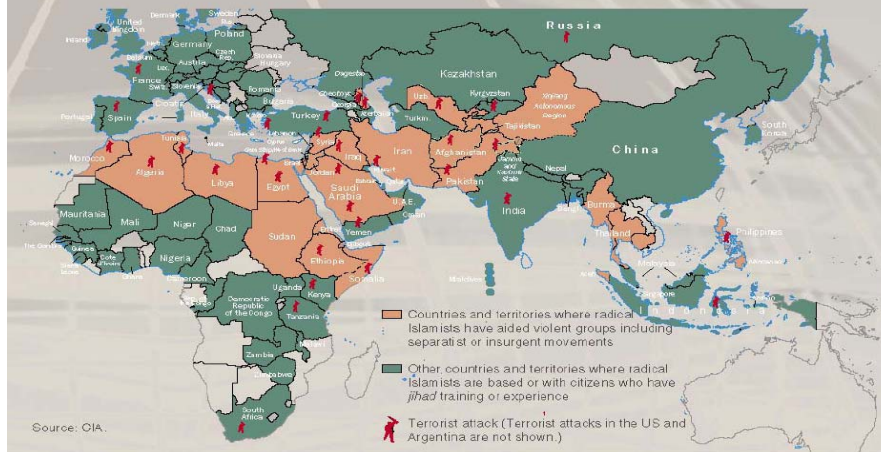


Ethnic, political, and religious conflicts in Sub-Saharan Africa have generated tens of thousands of civilian casualties killed or wounded and created massive refugee flows. In 1998, these children found shelter in a Rwandan refugee camp. Conflicts in Sub-Saharan Africa and the humanitarian crises they generate will continue to require the attention and assistance of the international community in the coming years.

20

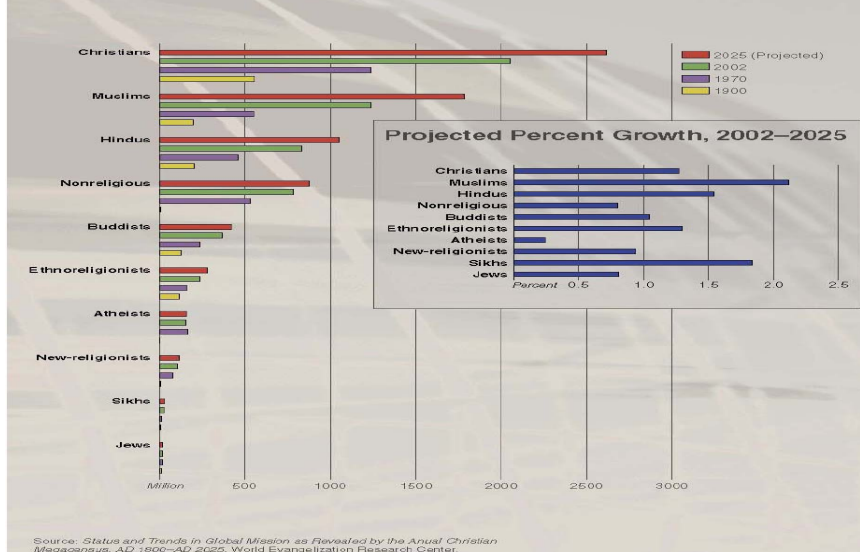
IDENTITY AND DISTRIBUTIONAL ISSUES

Key Areas of Radical Islamic Activities Since 1992



IDENTITY AND DISTRIBUTIONAL ISSUES

Number of Religious Adherents, 1900–2025



PROBABLE CHALLENGES

In sum, trends indicate: **cont'd.**

- World of ever-more rapid change
- Increasing interconnectedness, interdependence (due to Globalization, S&T, global climate change, etc.).
- Power increasingly diffusing.
- More actors, more possibilities for innovation – both positive and negative.
- More novelty “ever greater prominence of “mash-ups”
- Life more complex, difficult to predict.
- Challenges numerous, multifaceted, often connected.

31

PROBABLE CHALLENGES

- Armed conflicts will be *primarily*:
 - identity and/or deprivation-based,
 - intra- rather than inter-state,
 - asymmetric/irregular/protracted rather than symmetric and short.
 - South-North or South-South in origin, and:
 - will occur in complex – chiefly urban, terrain.
- Humanitarian crises and complex emergencies – especially in developing world will continue.

32

PROBABLE CHALLENGES

contd.

- Adversaries – increased capacity to organize, network and mount challenges – moral, political and military (e.g. cell phones, internet, cheap travel, availability of weapons and “weapon-related” technologies. Much commercial, “off the shelf.”).
- Allows for increased understanding, agility and adaptability, reach, lethality and effectiveness (means for exploiting Western strengths and weaknesses – e.g. democratic values, interconnectedness, technological prowess, etc.) .

35

IMPLICATIONS

- Battle-space will be increasingly:
 - complex
 - multi-dimensional,
 - non-linear,
 - uncertain, and
 - lethal.
- Conflict will occur on *variety* of fronts often simultaneously (moral, socio-political, economic, military, abroad and at home).
- Enemies – greater capacity to *rapidly* adapt to Western thinking and strategy.

36

IMPLICATIONS

contd.

- **Governments – strained capacity to cope with challenges (multi-tasking, bureaucratic turf wars, ministerial agendas, etc.).**
- **International organizations will confer legitimacy, but problems operationally (UN continues to face major challenges).**
- **Regional organizations and alliances increase in credibility.**
- **NGOs/IGOs – gain power and credibility.**

37

IMPLICATIONS

contd.

- The Army must become even more:
 - adaptive
 - networked
 - agile
 - combat effective
 - sustainable
 - joint, interagency, multinational and public focused
- The Army must exploit new technologies, particularly enhanced decision-making aids and robotics wherever possible
- The Army must optimize its use and management of energy and seek alternative energy sources.

38

