"AESS Growth via GEOSS et al"
Strategy & Tactics: Large-scale Systems incl GEOSS

AESS BoG Meeting
Fort Lauderdale
2008-09-30

Paul E. Gartz

Past President, IEEE AESS, 2004-05

Past President IEEE Systems Council, 2008

Hyatt Resort; Fort Lauderdale

p.gartz@ieee.org;   paul.e.gartz@boeing.com;   +1 206-954-9616;   Seattle, USA

Key AESS Strategies
Since ~1997-98

- **Diversify Board of Governors**

- ***Expand into Large-scale Systems***

  - *SoSs & Systems Engineering*

- **Expand Services Globally..**

- **Expand Educational Services**

- **Expand by Empowering Chapters**

- **Focus on Increasing "Member Services" vs "Membership Drives" w/Same Services**
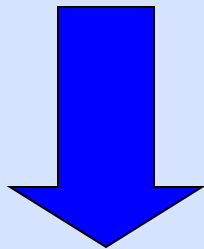
◆IEEE

Why Should AESS Care about SoSs?

- **SoSs will Emerge as Macro-Integrators**

- **Where Money Flows Will Change!!!**

Tactics: Systems Council Societies
Members & w/Interest

Name	First Name	Last Name
IEEE Aerospace and Electronic Systems Society	Robert	Rassa
IEEE Circuits and Systems Society	Maciej	Ogorzalek
IEEE Communications Society	Doug	Zuckerman
IEEE Computational Intelligence Society	David	Fogel
IEEE Computer Society	Rangachar	Kasturi
IEEE Control Systems Society	David	Castanon
IEEE Education Society	Joseph	Hughes
IEEE Engineering in Medicine and Biology Society	Donna	Hudson
IEEE Engineering Management Council	Gus	Gaynor
IEEE Geoscience and Remote Sensing Society	Anthony	Milne
IEEE Instrumentation and Measurement Society	Alessandro	Ferrero
IEEE Intelligent Transportation Systems Society	William	Scherer
IEEE Microwave Theory and Techniques Society	Jozef	Modelski
IEEE Oceanic Engineering Society	James	Barbera
IEEE Power Electronics Society	Hirofumi	Akagi
IEEE Power and Energy Society	Wanda	Reder
IEEE Product Safety Engineering Society	James	Bacher
IEEE Reliability Society	William	Tonti
IEEE Robotics and Automation Society	Bruno	Siciliano
IEEE Signal Processing Society	Jose M	Moura
IEEE Sytems Council	Paul	Gartz
IEEE Systems, Man, and Cybernetics Society	Daniel	Yeung

Large-scale Systems/SoSs = A Top AESS Strategy for 11 Years!

Q: How Does AESS Want to be Involved?

☐ = **Member, Systems Council**   ☐ = **Potential Member, Systems Council**
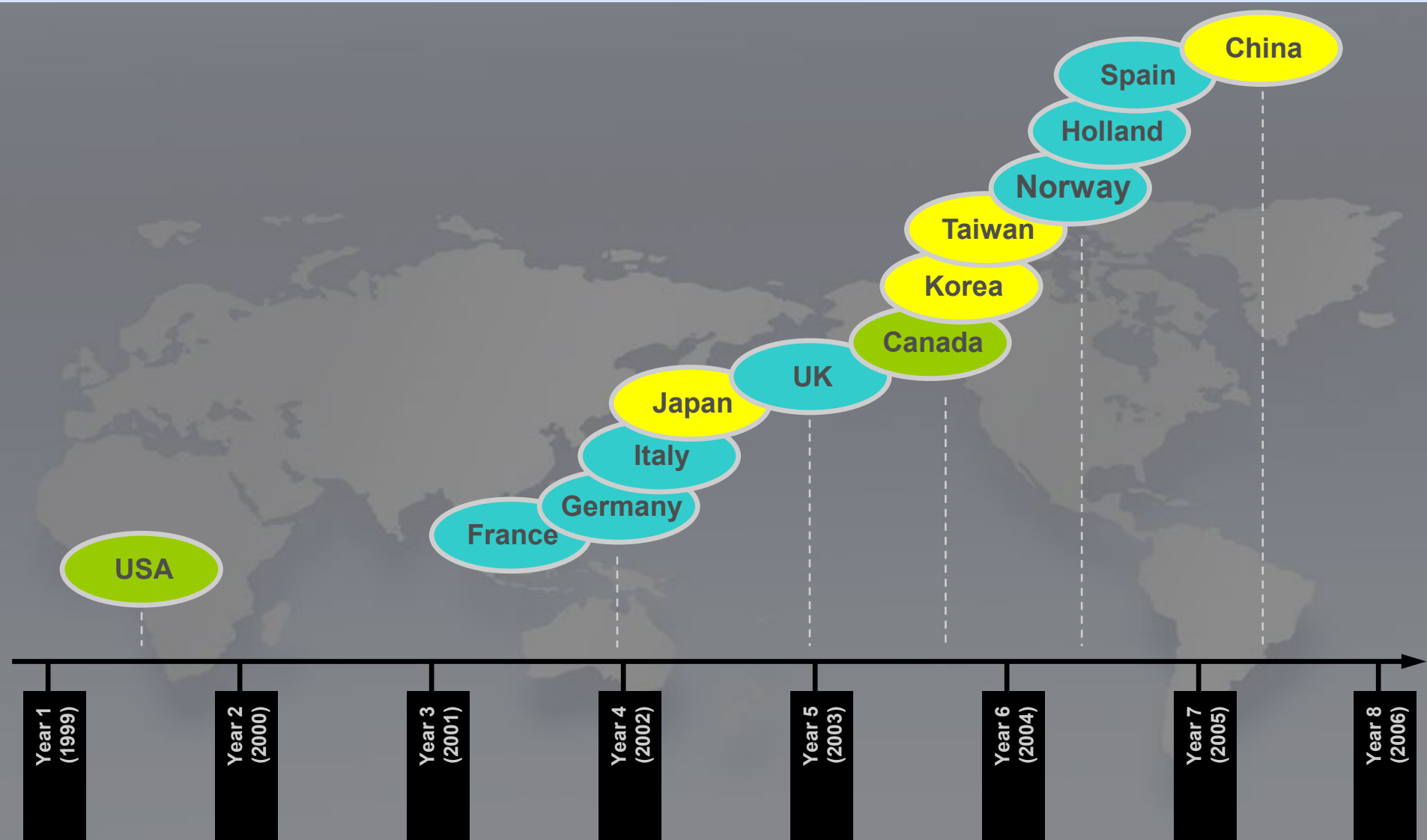
◆IEEE

Systems Council Status/Decisions
Systems Council Presidents' Summit I & II

- **AESS = Key Systems C Founder** (w/SMC)

- **Status: Formed 2005, Starts 2007**

  - Started Systems Council Conference & Journal

- **New Strategic Direction in 2008**

  - Presidents' Summits I & II…Do a New IEEE Council Model

  - "Work Together" Deeply for Win/Win vs Council Alone

Global Healthcare System Interoperability is a GROWTH Market.
(e.g., Elliot Sloane is co-chair Healthcare Enterprise (IHE)

Society Presidents' at Summits Chose…

- ## Start w/2010 HealthCare SoS in N Am.

- ## Joint Conference

  - Also includes GEOSS Health SoS & Privacy SoS Foci
  - 1 Conference Committee Rep from Each Sys C Societies
  - Each Society Runs Track(s) in their FoI
  - EMBS = Key

  - 1st Meeting of Conference Committee ~Mid November

- ## Systems Council Conference Leadership

  - Conference Chairs = Paul Gartz; Deputy = Elliot Sloane

- ## *Determine AESS Role & Organize??*

IEEE

Backups

IEEE Vision

IEEE = Institute of Electrical and Electronic Engineers

- **"Advance Global Prosperity" by:**
  - Fostering Technological Innovation
  - Promoting IEEE Communities World-Wide
  - Enabling Members' Careers
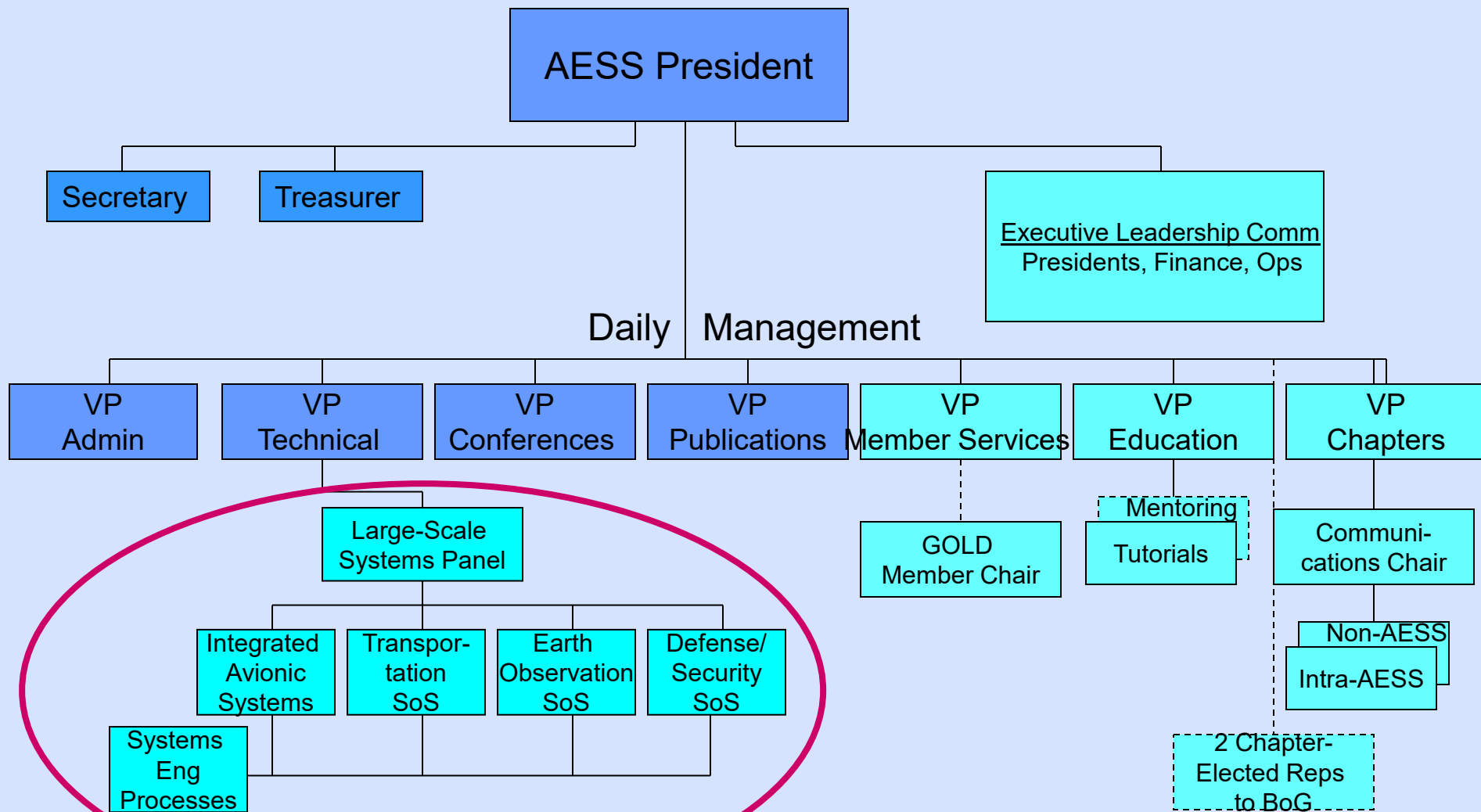- **Many New Initiatives…2007-08**
  - Humanitarian, SoSs, etc.

In EE, Computer and Information Science

◆IEEE

AESS Strategy History Vision

- **1st Proposed Fall BoG, 1996**

- **Response to Declining Membership++**

  - End of Cold War…"Peace Dividend"

  - Changing Industry…Opportunity to Grow/Serve Better

  - Limited Board Diversity and Outreach

- **Chapters, Global = Key**

- **Key Implementations Begin 2004-05**

  - Reorganization

  - Transnational "Events"…2005 to Current

  - AESS Chapters Summit #I; Fall 2005

Changes to IEEE Aerospace Society
To Support Strategy Implementation

AESS President

Secretary

Treasurer

Executive Leadership Comm
Presidents, Finance, Ops

Daily | Management

| VP Admin | VP Technical | VP Conferences | VP Publications | VP Member Services | VP Education | VP Chapters |

Large-Scale Systems Panel

Integrated Avionic Systems

Transportation SoS

Earth Observation SoS

Defense/Security SoS

Systems Eng Processes

GOLD Member Chair

Mentoring

Tutorials

Communications Chair

Non-AESS

Intra-AESS

2 Chapter-Elected Reps to BoG

IEEE

Market Trends: Increasing Integration

Global/Local Intermodal Traffic
   Management
Defense/Security
Global Earth Observation
  & Prediction
System Control Advisory Sys

SoSs
Systems-of-Systems

Integrated Systems

Radar
Navigation
Guidance and Control
Displays
HMI
Safety/Warning SubSystems
Entertainment SubSystems
Communications Subsystems
Systems Engineering
Space Systems
Sensors
Sensor Processing

Integrated Avionics
Integrated Car Vetronics
Integrated Ship Electronics
Integrated Weather
Integrated Navigation
Integrated Biomedical
C4ISR

Subsystems

◆ IEEE

* FoI = Field of Interest

IEEE Technical Activities Board (TAB)
39 Technical Societies & 4 Councils + New Systems Council

- **IEEE Aerospace and Electronic Systems Society**
- **IEEE Antennas and Propagation Society**
- **IEEE Broadcast Technology Society**
- **IEEE Circuits and Systems Society**
- **IEEE Communications Society**
- **IEEE Components Packaging, and Manufacturing Technology Society**
- **IEEE Computer Society**
- **IEEE Consumer Electronics Society**
- **IEEE Control Systems Society**
- **IEEE Council on Super Conductivity**
- **IEEE Dielectrics and Electrical Insulation Society**
- **IEEE Education Society**
- **IEEE Electromagnetic Compatibility Society**
- **IEEE Electron Devices Society**
- **IEEE Engineering Management Society**
- **IEEE Engineering in Medicine and Biology Society**
- **IEEE Geoscience & Remote Sensing Society**
- **IEEE Industrial Electronics Society**
- **IEEE Industry Applications Society**
- **IEEE Information Theory Society**
- **IEEE Intelligent Transportation Systems Council**

- **IEEE Instrumentation and Measurement Society**
- **IEEE Lasers & Electro-Optics Society**
- **IEEE Magnetics Society**
- **IEEE Microwave Theory and Techniques Society**
- **IEEE Nanotechnology Council**
- **IEEE Neural Networks Society**
- **IEEE Nuclear and Plasma Sciences Society**
- **IEEE Oceanic Engineering Society**
- **IEEE Power Electronics Society**
- **IEEE Power Engineering Society**
- **IEEE Product Safety Engineering Society**
- **IEEE Professional Communication Society**
- **IEEE Reliability Society**
- **IEEE Robotics & Automation Society**
- **IEEE Sensors Council**
- **IEEE Signal Processing Society**
- **IEEE Society on Social Implications of Technology**
- **IEEE Solid-State Circuits Society**
- **IEEE Systems Council**
- **IEEE Systems Man and Cybernetics Society**
- **IEEE Ultrasonic Ferroelectrics and Frequency Control Society**
- **IEEE Vehicular Technology Society**

New Global, IEEE "Systems" Council

Systems Council Scope (FoI)

- **"Systems of Global and National Significance"**
  - Implies Systems-of-Systems, Nations and Transnational
  - "Practitioner Focused"

- **Includes All System Aspects for Holistic Look**
  - "Living Systems" & HMI (Human-Machine Interface)
  - Business, Economics, Politics, Marketing
  - Industry , Academia, Government, Lay Public
  - Management and Technical
  - Bottom Line Performance Line RAA

We are an OU of "Practice"

Emerging Systems-of-Systems (SoS) Markets

Selected @ Sys Council Presidents' Summit II to Begin

Some Major Societal Functions

New Markets + Societal Benefits

Assure Human Health — *Health SoS*

Assure Human Privacy (& Security?) — *Privacy SoS*

Top Candidates from Summit I

Observe & Predict Earth — *Earth Decisions SoS (e.g., GEOSS+)*

Transport People and Cargo — *Transportation SoS*

Defend Country…Internal/External — *Defense SoS*

Somewhat Country Unique

Provide Roads, Ports, Power, etc. — *Infrastructure SoS*
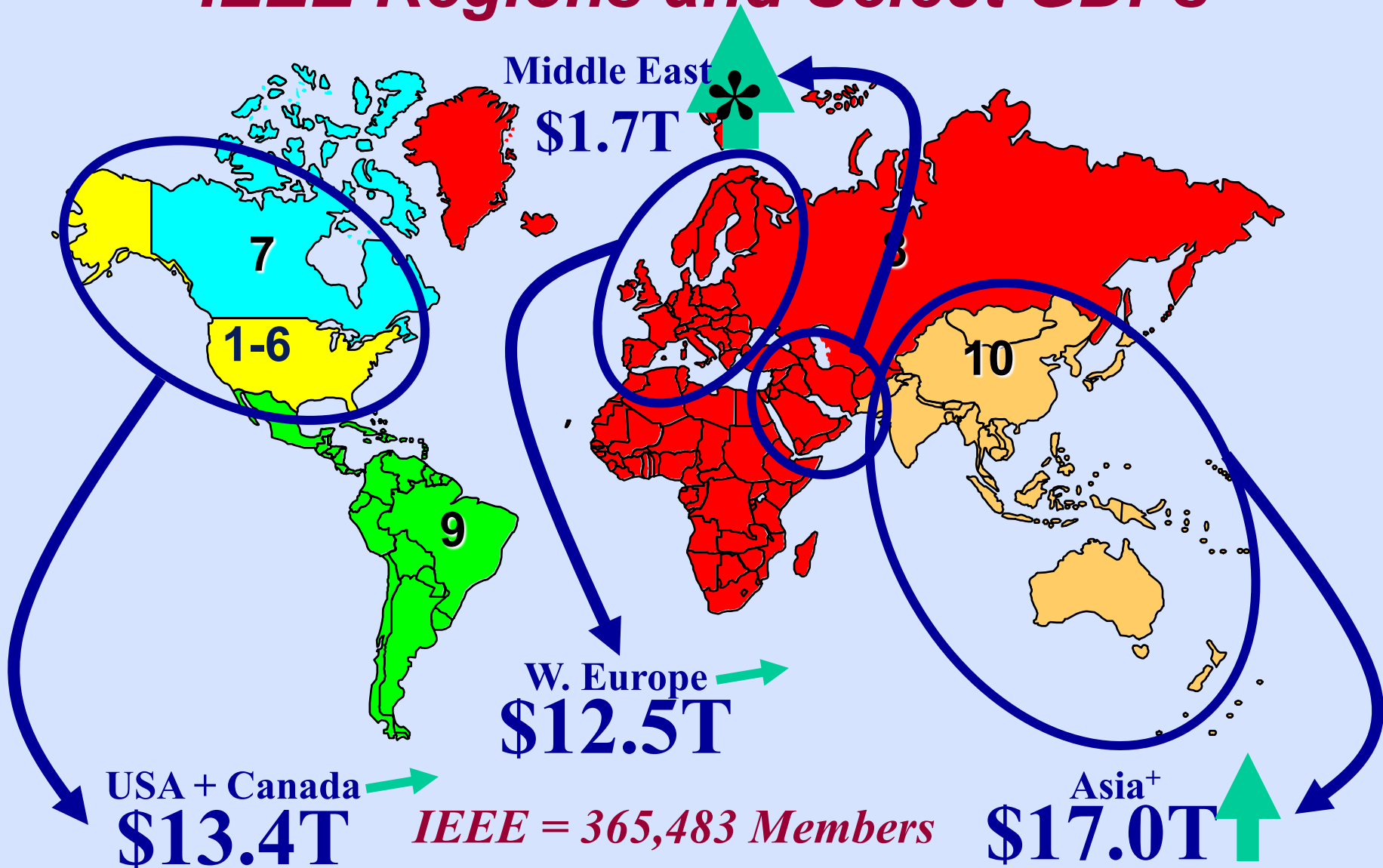
◆IEEE

What's New = Better Interoperability

What is a System-of-Systems?

A System-of-System (SoS) of "national or global significance" is a new way to look at the interdependencies of existing major systems in a larger context and (re-)conceive them to work together for better performance to broader societal goals as a total entity.

IEEE

IEEE Regions and Select GDPs

Middle East
$1.7T

7

1-6

9

8

10

W. Europe
$12.5T

USA + Canada
$13.4T

IEEE = 365,483 Members

Asia⁺
$17.0T

3 Geo-Areas = 75.1% of $59.4T World GDP

IEEE

2005 GDPs

Saudis alone spending $1.1T on Infrastructure 2006-2016