The Virtual Laboratory for Satellite Training and Data Utilization

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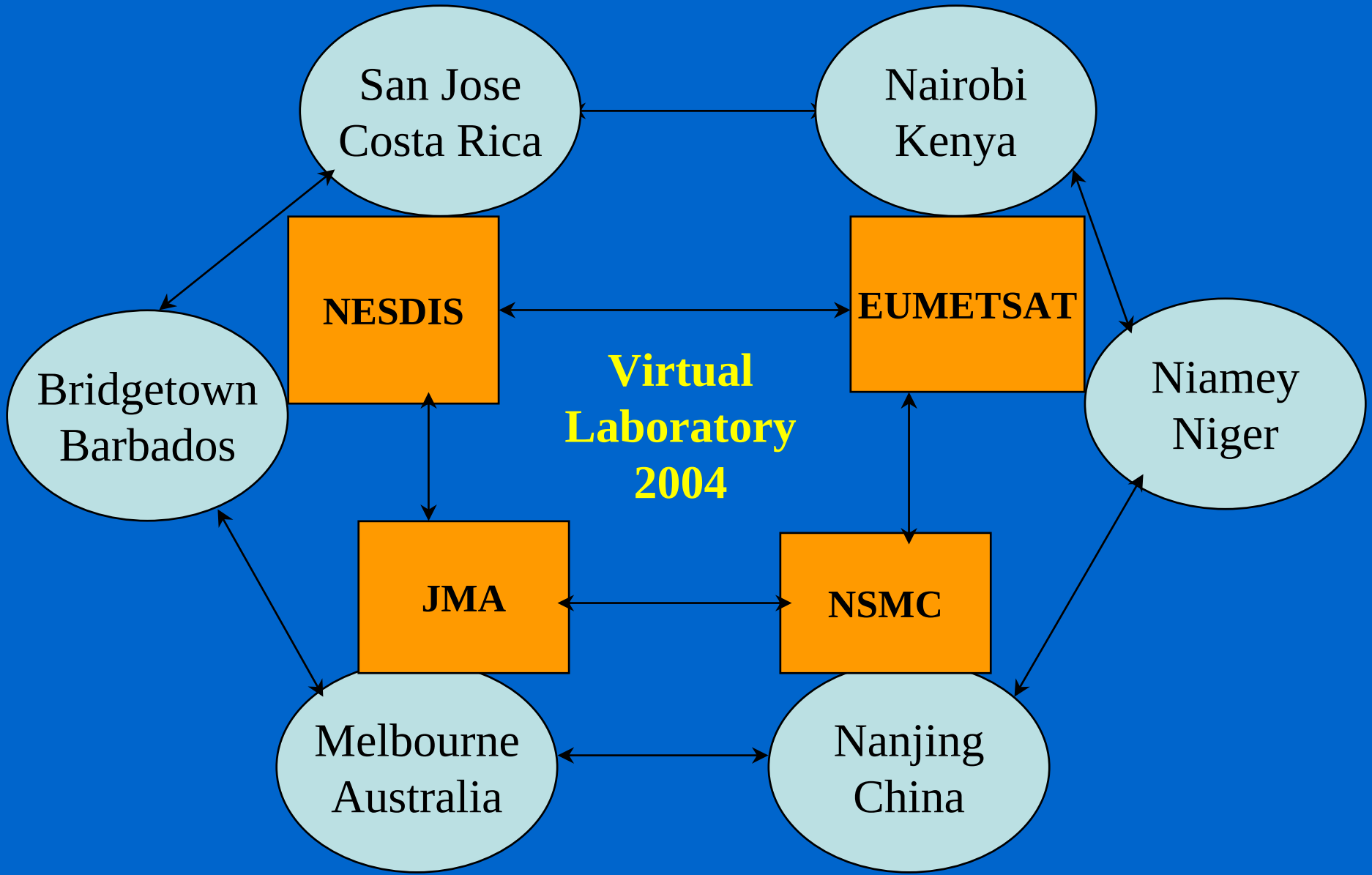
MISSION: IMPROVE THE UTILIZATION OF SATELLITE DATA WORLD WIDE

Virtual Laboratory for Satellite Training and Data Utilization

- A collaborative effort joining the major operational satellite operators across the globe with WMO "centers of excellence" in satellite meteorology
- The "centers of excellence" serve as the satellite-focused training resource for WMO Members across the globe
- The various centers of excellence are sponsored by one of the major operational satellite operators

WMO Centers of Excellence and Satellite Sponsors



Origin

- Work done by the Cooperative Institute for Research in the Atmosphere (CIRA), at Colorado State University in the mid 1990's.

- Training United States National Weather Service (NWS) office staff to fully utilize digital data from NOAA's new generation of GOES satellites
  - Online case study data and selected real time data (using Internet for data distribution)
  - Specialized software and data analysis systems (known as RAMSDIS)

- Expanded to providing both online case study data and near real time data to the WMO Regional Meteorological Training Centers (RMTCs) in Barbados and Costa Rica.

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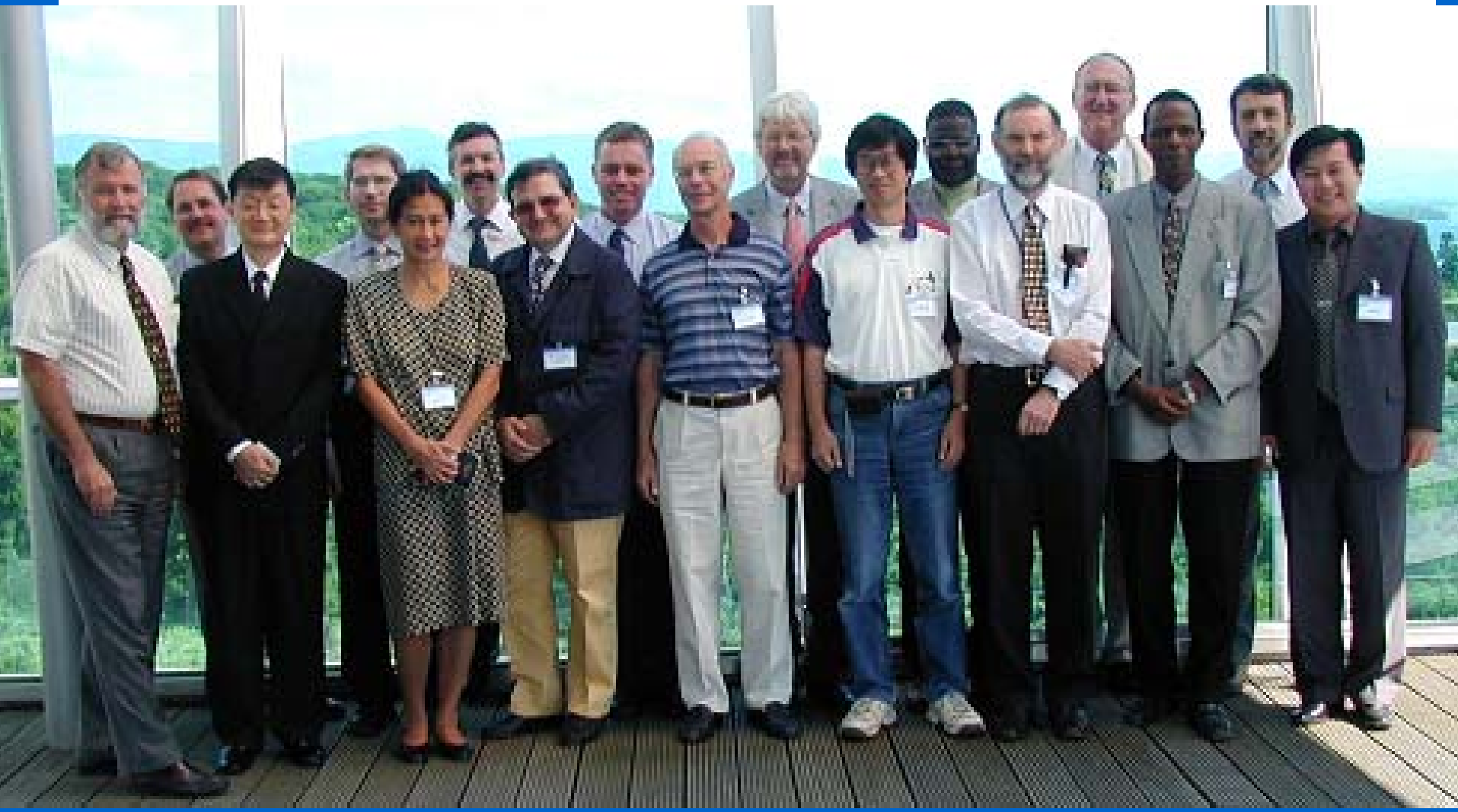
International Background

- **WMO EC-45: supported training strategy linking satellite operators participating in the Global Observing System with specialized satellite applications training centres**
  - **Six centres now sponsored by the satellite operators**
- **WMO CBS president provided the WMO Executive Council Panel on Education and Training (April 2000) information related to the concept of the Virtual Laboratory**
  - **OPAG IOS ET SDUP**
- **WMO EC-LII recognized the potential for expansion of the training component**
  - **Linking the RMTCs**
  - **Involving relevant science groups in a systematic manner**
  - **Incorporate ideas of a Virtual Laboratory**
- **CGMS (October, 2000) Co-sponsorship of focus group to help guide implementation and growth of Virtual Laboratory**

Expert Team on Satellite System Utilization and Products



Chair: H.P. Roesli

Strategic Goals

- **To provide high quality and up-to-date training resources on current and future meteorological and other environmental satellite systems, data, products and applications**
- **To enable the "centres of excellence" to facilitate and foster research as well as the development of socio-economic applications at a local level by the NMHS through the provision of effective training and links to relevant science groups**

WMO/CGMS Focus Group Outcome

- A management structure
  - Responsibility of the VL focus group
  - Co-chaired by a satellite operator representative and a center of excellence representative
- Immediate and strategic goals
  - Provide access to training and educational materials
  - Provide software and expertise on how to utilize digital satellite data
  - Provide case studies and near-real time data

KEY GUIDELINES

- Satellite training institutions and their sponsoring satellite agencies must utilize modern technology to provide a wide range of training opportunities and materials to WMO Members
- Strong linkage with science groups
- A virtual resource library exists within the Virtual Laboratory
- Two streams of learning skills (basic and specialist)
- Training requirements are developed as a part of the WMO's interaction with its Members
- Satellite operators and RMTCs are linked, with an agreed upon statement of objectives

Selected successes of the VL

- Training tools, data, products, algorithms, tutorials and satellite imagery are freely available to all users
- Connectivity with the three major satellite related science groups established
- Tools include: SATAID, MCIDAS, RAMSDIS OnLine template, VISITView, Hydra
- Four major WMO training events have been conducted:
  - Nanjing 2000
  - APSATS 2002
  - Barbados 2003
  - Costa Rica 2005

Real Time Satellite Data Animations

RAMSDIS ONLINE

Learn more about RAMSDIS *HERE*

NOTE: Netscape 3.0+ or IE 4.0+ is NECESSARY for the javascript animations to work! Get Netscape here! Get IE here!
NOTE: The new IE 5.0 seems to have problems with the code for the loops and hence does not work correctly. We'll be looking into this.

These real time loops consist of 480x640 pixel-sized GIF images, each of which are about 200 KB. Each of the animation loops contain between 8 and 24 images (2-5MB/loop). Trying to view the loops with a slow connection will take some time.

ROLEX - Experimental Products	Tropical Online	Barbados Online	Costa Rica Online	Florida Fire Detection Online
Brazil Fire Detection Online	NEW Mexico Fire Detection Online	Archives and Case Studies	VISIT Homepage	Satellite Interpretation Discussions

Select Satellite & Images to View:

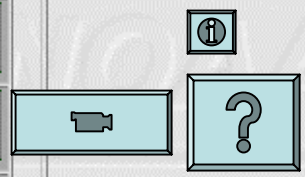
Western USA (GOES-10) | Entire Loop

Product previews & Descriptions:

[GOES-10 (Western USA)] [GOES-8 (Eastern USA)]

Select from the following real-time products:

1 km Visible	MORE INFO	4 km Visible	MORE INFO
4 km Short Wave - IR 2	MORE INFO	4 km Thermal Infrared - IR 4	MORE INFO
4 km Water Vapor - IR 3	MORE INFO	4 km Fog/ Reflectivity Product	MORE INFO
16 km PS Water Vapor - IR 3	MORE INFO	16 km PS Thermal Infrared - IR 4	MORE INFO
1 km Visible Average	MORE INFO	4 km Thermal Infrared Average - IR 4	MORE INFO
1 km Visible Radar	MORE INFO	Sounder Precipitable Water Vapor	MORE INFO
Sounder Lifted Index	MORE INFO	Floater	MORE INFO



Web Access To The Virtual Lab

Go to the WMO Home Page and access the WMO Space Program where access to the Virtual Lab is prominently displayed. For VRL Electronic Notebook contents link to CIRA site.

Nanjing 2000

- Occurred while the VL was in its conceptual stage
- The first time the VL model was utilized in a WMO sponsored training event
- Focused on "training the trainers"
- Lectures were made utilizing Microsoft PowerPoint presentations or stand alone with RAMSDIS
- Some lectures were made from CIRA over the Internet

APSATS 2002

- APSATS 2002 Learning and Action Guide was provided to participants
- Demonstrated the effective use of several of the Virtual Lab tools, primarily VISITVIEW for distance education and SATAID for case studies
- Specialized analysis tools for manipulating hyperspectral data
- Lecturers also demonstrated the usefulness of the RAMSDIS OnLine website during the workshop with morning briefing sessions illustrating the use of remotely sensed data
- Global Map Discussion
- Participation of Research Satellite Operators

Barbados 2003

- The Virtual Laboratory, its training material, resources and personnel were central to the success of the workshop
- SATAID, VISITView, RAMSDIS Online and RAMSDIS fully utilized
- Began with lectures simultaneously in Barbados and Costa Rica in English and Spanish utilizing VISITView
- *Establishment of a Caribbean Focus Group*

Caribbean Focus Group

- The participants in the Barbados training were so buoyed by the new capabilities that they established a Caribbean Focus Group to perpetuate and build a new and stronger dialogue amongst trainers and forecasters in the region
- Since the Barbados training event the Caribbean Focus Group has met on a monthly basis in a virtual laboratory environment using VISITView

WMO/CGMS Focus Group

- **December 2003: Second Meeting held in Barbados**

- **Critical Outcomes**
  - **Roles and responsibilities of VL partners**
  - **Archiving of training class presentations as a future training resource**
  - **Future training event guidelines**
  - **Major global training event in 2006/7 timeframe**
  - **Plans for an electronic workbook**

Virtual Laboratory Focus Group December 2003 Barbados Meeting

- VL was on track with its implementation plan and in several cases had surpassed expectations
- Guidelines for future training events were developed
- Revolutionize training through the use of electronic notebooks

Above: Newly established Caribbean Focus Group to perpetuate and build a stronger dialogue amongst trainers and forecasters in the region (Barbados 2004)

Costa Rica March 7 – 18, 2005

- Revolutionize VL training by placing all training materials, tools and presentations delivered during a training event onto a VL electronic training workbook
- VL electronic training workbooks configured for use as a primary tool during the training event and return with the participant to his/her country for further education and training activities

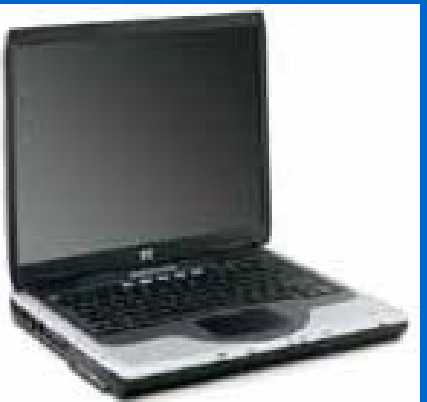
HP Notebook nx9030

Electronic Notebook Technical Specifications

Processor, operating system and memory	
Operating system	Microsoft® Windows® XP Professional Edition
Processor	Intel® Pentium® M; 725 (1.6 GHz, 2-M L2 Cache, 400-MHz FSB
Memory description	512 MB DDR SDRAM (2 DIMM)
Video	
Display	15.0-inch TFT XGA; Up to 32-bit per pixel color depth.
Storage	
Hard drive, internal	40 GB (4200 rpm)
CD-ROM/DVD	24X DVD/CD-RW (fixed)
Audio and ports	
Audio	AC Link audio; integrated speakers; microphone and headphone jacks
I/O (input/output) ports	VGA, RJ-11, RJ-45, IEEE 1394, USB 2.0 (two), S-video, external microphone, headphones/line out, DC power
Communications	Integrated 10/100 NIC; 56K Mini PCI data/fax modem
Wireless	802.11b/g wireless LAN
Power	External 65 watt AC adapter; Six-cell Lithium-Ion battery, 2.2Ah
Keyboard	101 key compatible keyboard
Mouse	Optical with 2 button with scroll roller
Operating systems	
Software	Microsoft Office 2003
Mobility	
Weight	From 7.28 lb.
Dimensions	10.72 x 12.96 x 1.62 in. (LxWxH)

HP Notebook nx9030

Electronic Notebook Material Content



VL Application Tools

RAMSDIS, SATAID, VISITView, HYDRA multispectral tool investigation tool, New EUMETSAT CAL tools, channel simulator from multispectral data and PC analysis capability

Virtual Resource Library tutorials

Course Syllabus, The CIRA 3.9 and GOES tutorials, The new EUMETSAT MSG interpretation guide, Selected topical lectures and exercises, VISIT tutorials

Training Course lecture and resource material

Learning and Action Guide, PowerPoint presentation with notes, Images and animations, Background topic papers

Set of "essential" satellite related URLs

Links to products, Algorithms, Tutorials

Digital data

Selection of canned MCIDAS and HDF data and workshop notes for that data: GOES, MSG, MT-SAT, FY-XX, AVHRR, MODIS

VISITView Communications with distance training capability

Digital Manuals

opportunity

Conclusions

- **The Virtual Laboratory for Education and Training in Satellite Matters (VL) has been established to maximize the exploitation of satellite data across the globe**
- **Under the guidance of the CGMS focus group the VL is meeting, and in some cases surpassing its implementation guidelines**
- **Exceptionally successful workshops have been undertaken, each being an extension in capability based on experience from the last**
- **A challenging agenda for future activity has been developed**

Conclusions: Science Support

- **Increased support from International Science Working Groups is very important**
  - **Review of VL Materials**
  - **Help Assure updated materials for VRL**
  - **An outreach and education focal point for each science group, who among other things serves as liaison between science group and VL focus group**
  - **Subject matter training resource, both materials and persons (i.e. 2006/7 event)**