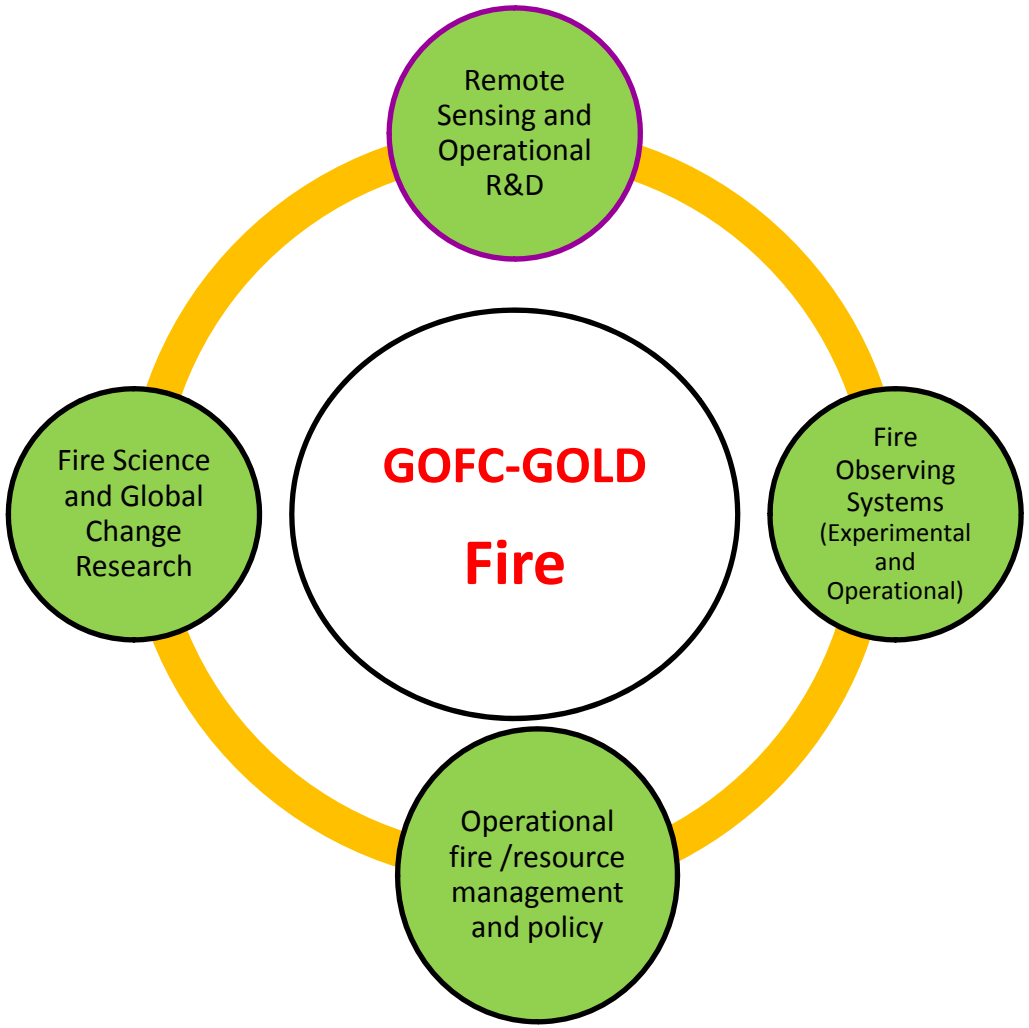
Fire IT Program Status

Chris Justice (Fire IT Co-chair)

Krishna Vadrevu (Fire IT Exec Officer)

John Goldammer (Fire IT Co-chair)

GOFC-GOLD Fire



http://gofc-fire.umd.edu/

GOFC- GOLD IT Fire: Structure

GOFC-GOLD-Fire consists of 5 structural elements:

- *GOFC-GOLD Scientific and Technical Board (STB)*
- *GOFC-GOLD Executive committee (Janetos)*
- Fire Implementation Team (Justice/Goldammer)
- Project Office (Vadrevu, NASA sponsored @UMd)
- Regional Networks (Various,Fire and/or Landcover)

GOFC/GOLD-Fire IT Goals

- **Increase user awareness and data use**
- **Establish a geostationary global fire network**
- **O*perational* polar orbiters (coarse and moderate) with adequate fire monitoring capability**
- **Determine product accuracies**
- **Develop a Fire Early Warning System -operational products**
- **Develop fire emissions product suites**
- **Develop Long-Term fire data records**
- **Establish enhanced user products and improved data access**
- **Promote experimental fire observation systems and related research**

GOFC/GOLD Regional Networks

- The Regional Networks have developed to highlight **regional priorities** and requirements for operational fire observations and establish improved communication between regional fire data users and fire researchers.
- Forum for data producers and **regional users** to interact to assess current data availability and existing data collection systems and proven research
- Mechanism for lateral transfer of technology and applications experience
- Mechanism for involving regional scientists and users in new product accuracy assessment (validation)
- Focus of the GOFC Regional Fire Networks is on fire observations and monitoring
- Complement the emerging UN Regional Fire Networks which are focusing on fire management, policy and training
- Forum for satellite data providers, global change and resource managers to improve communication

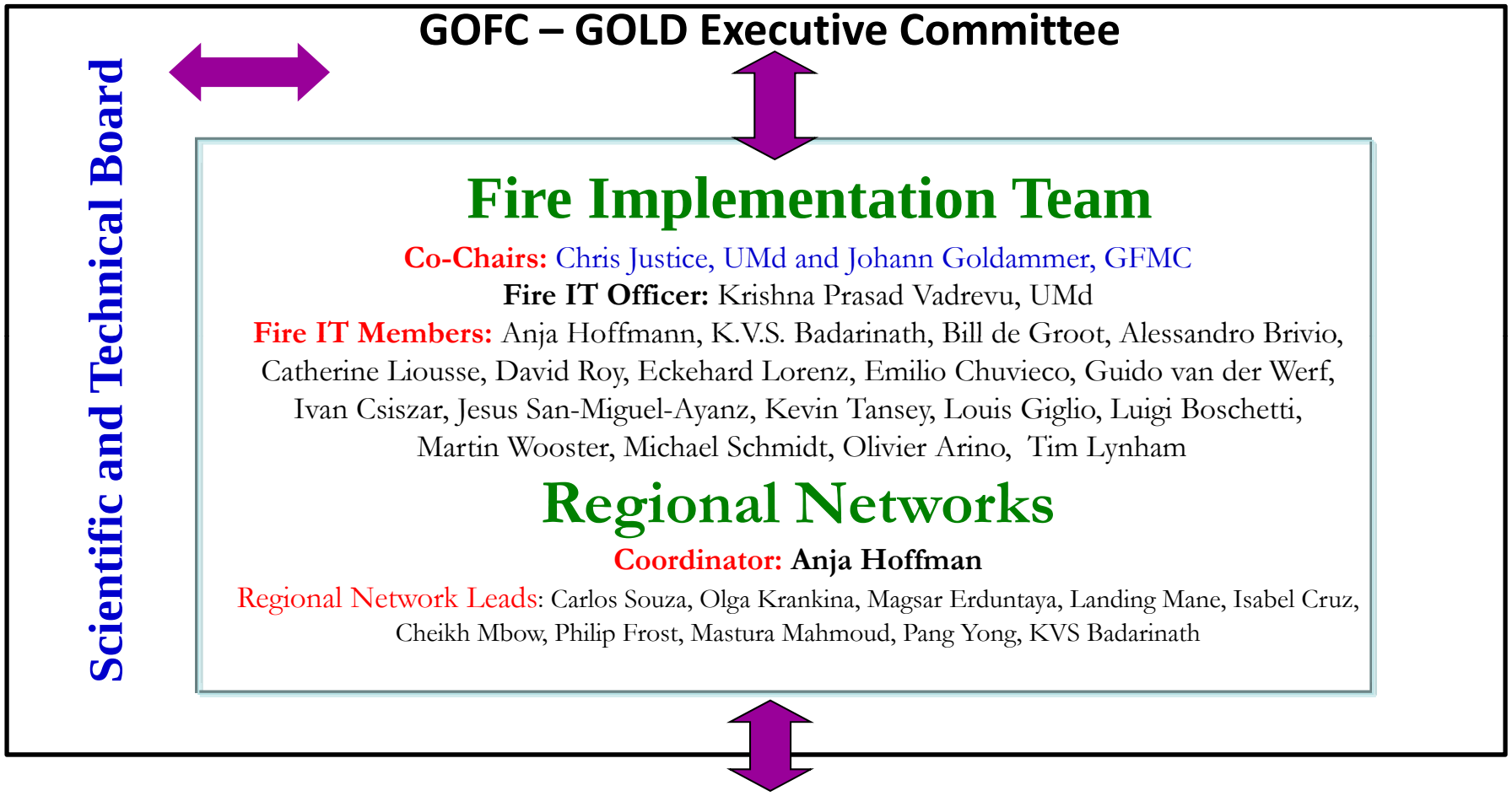
GOFC/GOLD Regional Networks (LC/Fire)

Regional Network	Coordinator	Country	Organization	Email
AMAZON RN	Souza, Carlos	Brazil	Imazon - Inst. do Homem e Meio Ambiente da Amazônia	souzajr@imazon.org.br
NERIN	Krankina, Olga	USA	Oregon State University	olga.krankina@oregonstate.edu
CARIN - Fire	Erdenetuya, Magsar	Mongolia	Institute of Remote Sensing	m_erdenetuya@yahoo.com
OSFAC	Mane, Landing	DR Congo	OSFAC, Kinshasa, DRC	lmane@osfac.net
Redlatif	Cruz, Isabel	Mexico	CONABIO	isabel.cruz@conabio.gob.m
West Africa RN	Mbow, Cheikh	Sénégal	Université Cheikh Anta Diop	cheikh_penda@yahoo.fr
SAFNet	Frost, Philip	South Africa	CSIR-Meraka Institute	PFrost@csir.co.za
SEARRIN	Mahmud, Mastura	Malaysia	Universiti Kebangsaan Malaysia	mastura@pkrisc.cc.ukm.my
East Asia RN	Pang Yong	China	Chinese Academy of Forestry	caf.pang@gmail.com
S. Asia ?	*Badarinath/ Murthy*	*India / S.Asia*	*National Remote Sensing Center*	*badarikvs@yahoo.com*

Proposal for revitalization of Miombo Network in development in consultation with Land Cover IT

(Natasha Ribeiro, Mozambique)

Organization of GOFC-GOLD Fire



International Strategic Partnerships e.g. START, UN ISDR Wildland Fire Network,, CGMS, CEOS and LPV, ILDRCC, GEOSS EARSEL SIG-Fire

Challenges to the Networks (I)

- Transition from academia to players supporting national policy-supported strategies

- Enhancement of support of national operational decision makers

- Support to international processes addressing unifying global problems, e.g. under UNFCCC / UN-REDD (see presentation by Luigi Boschetti & Anja Hoffman tomorrow)

Challenges to the Networks (II)

- Addressing newly arising requirements in supporting information and decision making:
  - ➢ Wildland fire threats to human security: How could satellite remote sensing contribute to secure human lives & property, especially in the wildland/residential (or urban) intermix?
  - ➢ Special emphasis on fire-generated smoke pollution affecting human health, particularly those fires burning in intermix of natural and technogenic fuels: Synergies with the early warning / fire danger rating and smoke transport modelling community

Problems of the Networks – generally valid for some of both GWFN and GOFC-GOLD

- Cooperative efforts within the regions hampered by lack of intra-regional organizational strengths and funding

- Non-balanced participation between academic or R&D institutions and government agencies or industry

- Lack of demonstration projects involving the whole chain from the skies to the ground (end-user / community level). Good example: Trilateral project between South Africa, Tanzania & Germany ⟹ consult Anja Hoffmann & Philip Frost for more information

Needed action

- Networking should be professionalized

- We must seek aggressively for more political and financial support towards implementing this endeavour

- Negotiations with United Nations System have been initiated, but are advancing slowly

GOFC Fire IT Meeting (March 23-25th 2010)
Short and Long-term goals identified

Summary published in The Earth Observer, September-October, Issue, No. 5. Vol. 22. 2010. GSFC

Areas of IT Emphasis 2010

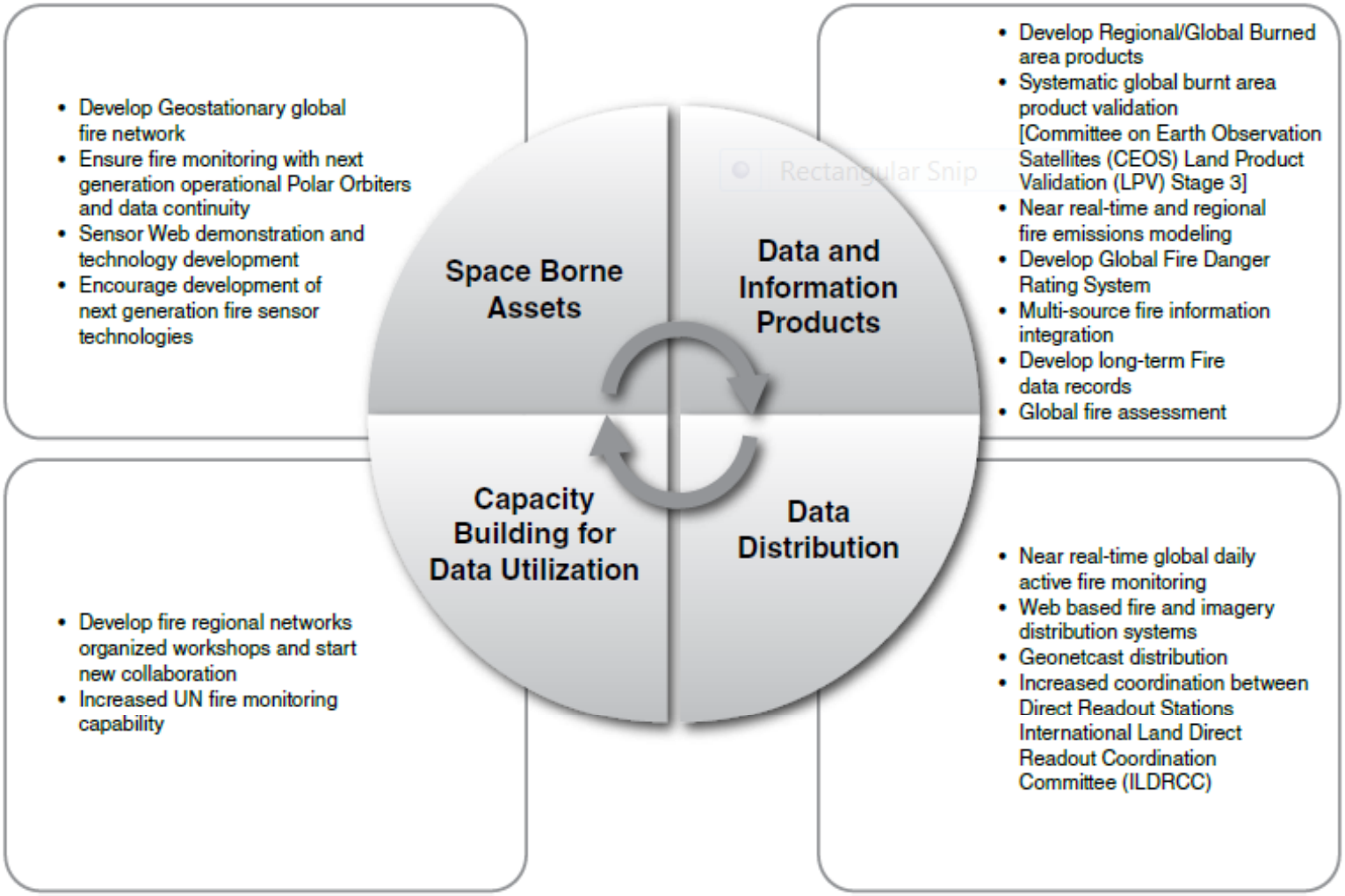


Figure 1. GOFC-Fire IT emphasis areas and sub-tasks

Short-term Goals and Progress

No.	Priority Areas	Short-term goals (2 years)	Progress to date (1 year)
1.	**Global validation protocols and implementation**	Complete the burnt area validation protocol as a part of CEOS calibration/validation sub-group activity. Develop the validation protocol for active fire products.	Ongoing -Revised 4-stage CEOS land product validation strategy has been identified (Boschetti/Tansey leads).
2.	**Global Fire Danger including Early Warning and Risk**	Prepare global fuel type map. Calibrate Fire Weather Index (FWI) over different regions. Organize workshop on fire risk assessment (Coimbra, Nov, 2010).	Work in progress (programmers hired to complete daily global fire danger maps). Coimbra workshop successfully organized successfully. Progress updates on Fire Early Warning System from Bill de Groot.
3.	**Regional network issues, capacity building, accessibility, etc**	Organize training programs for building regional expertise and provide project-based training on data validation and application. Improve data availability and product dissemination. Provide SPOT archive data to African regional networks.	•ESA training program for Land Remote Sensing Scientists (Sep-12-16th, 2011 Poland). •GOFC sponsored Side Event at the 5th International Wildland Fire Conference 'Wildfire 2011' (9 May 2011) wherein more than 30 regional scientists participated.

A few retrospectives on cooperation between the Global Wildland Fire Network and the GOFC-GOLD Fire IT (II)

- Joint meeting of both networks at the 5th International Wildland Fire Conference (Wildfire 2011) (South Africa, 2011)

- Thanks to Anja Hoffmann and START funding for the great support in organization and facilitation of the meeting

Short-term Goals and Progress (continued..)

4.	**Long term data record (LTDR) generation**	Complete scoping and assemble 1km AVHRR archive from LAC and HRTP data. Develop procedures for establishing dynamic continuity between sensors.	No progress CEOS T35 Action provides an opportunity
5.	**Global Fire Emissions estimation**	Organize fuel consumption workshop (regional experts + inventory developers). Comparison of inventories using top-down constraints (CO and aerosols).	Fuel consumption workshop successfully organized during the 5th International Wildland Fire Conference 'Wildfire 2011' (9 May 2011). Updates from Guido.
6.	**User Outreach and Feedback**	•Expand the fire component of the GOFC REDD Sourcebook. Promote the involvement of GOFC Regional Networks in the REDD process. Develop user friendly products and documentation	• Fire chapter revised • User outreach on going (e.g. LANCE, FAO GFIMS, MODIS User Guide)

Short-term Goals and Progress (continued..)

7.	**Global Geostationary Network**	•Generate fire products for all GEO network satellites. Enable NRT access. Validate products against e.g. higher spatial resolution data. Generate blended "global" geostationary product, including links to global NRT emissions models.	• NESDIS Operational production for GOES, MTSat, MSG. • Ongoing discussion w. KMA, CMA etc
8.	**Data Requirements for Global ECV's**	•Conduct user consultation exercise (questionnaire and workshop) with modelers and fire technicians on ECV's. Work with GTOS to refine ECV requirements. Propose GOFC GOLD Fire to provide ECV oversight.	•Ongoing. •Updating the ECV T13 document taking feedback from this meeting. •ESA-Fire CCI project + Geoland projects looking into ECV standards; •Latest updates from Kevin Tansey
9.	**New Fire Related Missions and Products**	•Initial evaluation of TET 1 data and products. Publish review of Fire Sensors: instruments, calibration and data related data quality.	• VIIRS, LDCM, Sentinel 2/3, DLR/Mexico

Long-term Goals (3-5 years)
Revisit the goals and brainstorm for implementation in this meeting

No.	Priority Areas	Long-term goals (3-5 years)	Current status/Revisit during this meeting
1.	**Global validation protocols and implementation**	Implement Stage-3 validation for Burned Area through international cooperation.	
2.	**Global Fire Danger including Early Warning and Risk**	Prepare databases of field measurements on live fuel moisture content estimation and other Global EWS inputs.	
3.	**Regional network issues, capacity building, accessibility, etc**	Improve visibility of the regional networks to national end-users and policy decision makers. Prepare training and education materials. Promote training in developing countries on fire data from new missions	
4.	**Long term data record (LTDR) generation**	Generate LTDR's for active fire and burned area products, including validation datasets and produce continuity products from VIIRS and Sentinel 3.	
5.	**Global Fire Emissions estimation**	Develop experimental data sets on fuel moisture, biomass, fire severity, FRP, combustion completeness. Use LTDR's to produce long-term fire emissions estimates. Explore new input products e.g. using radar products and emission factors.	

No.	Priority Areas	Long-term goals (3-5 years)	Current status/Revisit during this meeting
6.	**User Outreach and Feedback**	•Provide information on fire data and products from new missions. Promote training in developing countries on the use of fire data from new missions. •Explore distance learning outreach modules.	
7.	**Global Geostationary Network**	•Long-term processing of geostationary fire data from archives. Generate Meteosat active fire/FRP product from early mission years (e.g. 2003 onwards). Validate composite product and ultimately blend in polar-orbiting fire products to ensure global coverage.	
8.	**Data Requirements for Global ECV's**	•Develop community consensus ECV Fire products and provide oversight. Revisit VIIRS IORD for Fire.	
9.	**New Fire Related Missions and Products**	•Development of fused products. Characterization of the VIIRS, Sentinel 3 and new geostationary sensors, data and products. Use of satellite-based Lidar for fuel characterization	

Product Status Reporting

- **System promoted by CEOS WGCV LPV for product status**
  - **Beta** – algorithms run, known problems with the data set
  - **Provisional** – product generated but unvalidated, includes product evaluation and "confidence building" by inter-comparison with other unvalidated data sets or visual inspection
  - **Validated** (using independent data sets of known accuracy, results published in peer reviewed literature)
    - **Stage 1 – at a few locations, targets of opportunity**
    - **Stage 2 – over a representative range of observation conditions**
    - **Stage 3 – systematic, statistically robust sample in space and time**
    - **Stage 4 – updating validation on new versions and over time series**

Current Priorities for GOFC/GOLD-Fire

- Implementation of an operational Fire Early Warning System
- Meteorological Agency support for establishing the Global Geostationary Fire Network
- Ensure operational fire monitoring capabilities on JPSS VIIRS and METOP, Sentinel 3 providing data continuity
  - Ensure Direct Readout access to the data
- International Space Agency coordination of global Landsat Class resolution data processing and availability (Sentinel 2, LDCM)
- Development of an international collaborative program on Global Burned Area Product Validation (LPV Stage 3 Validation)
- Support for running the Regional Fire Networks and developing capacity building programs on the use of satellite fire data
- Providing a coordination mechanism for fire observations in support of the International Conventions (i.e. ECVs)
- Defining the role of Fire in UN REDD (i.e. GOFC-GOLD REDD Sourcebook)

Areas of Progress

- Spaceborne Assets
  - **Geostationary Global Fire Network (e.g. NOAA CGMS)**
  - **Fire Monitoring with next generation Operational Polar Orbiters > Data Continuity (e.g. VIIRS, ProbaV, Sentinel 3)**
  - **Moderate Resolution Data Continuity (e.g. Sentinel 2, LDCM etc)**
  - **Next Generation Fire Sensor Technologies (e.g. DLR)**
- Data and Information Products
  - **Regional / Global Burned Area Products**
  - **Systematic Global BA product validation (e.g. MODIS CEOS LPV Stage 3)**
  - **Near real-time and regional fire emissions modeling (e.g. GFED +)**
  - **Global Fire Early Warning System (e.g. CFS / JRC)**
  - Multi-source fire information integration
  - Long Term Fire Data Records (AVHRR 1km > present)
  - Global Fire Assessment **Progress being made**
- Data Distribution
  - **Near Real-Time Global Daily Active Fire Monitoring (NASA LANCE)**
  - Web based Fire and Imagery Distribution Systems
  - GeoNetcast Distribution
  - Increased Coordination between Direct Readout Stations (ILDRCC)
- Capacity Building for Data Utilization
  - **Regional Fire Networks – workshops and initiatives (e.g. SAFNET)**
  - **Increased UN Fire Monitoring Capability (GFIMS)**

One of the key issues: Vegetation fires burning in the interfaces of urban, industrial and contaminated areas

Problem fuels:

- Houses, infrastructures, plastic storehouses
- Agricultural areas with pesticides, fungicides, fertilizers
- Landfills (residual wastes)
- "Other" wastes (e.g. batteries, radioactive materials)

Examples:

- Co-burning of forest fuel and wastes ⟹ significant quantities of dioxins are released
- Co-burning of forest fuel and construction materials: ⟹ pulverized glass, cement, dust, plaster, asbestos, etc.

Remote sensing support?

- Fuel load assessments for both natural and technogenic fuel complexes ?

- Keeping track of land-use change of cultural landscapes resulting in altered fuel complexes ?

- Smoke pollution warning system to be included in national to regional fire monitoring & early warning systems ?

GOFC Fire community appears a to be in a period of consolidation, continuity and climate

- The idea was for the international 'fire' community (represented by the IT) to help set and promote the program goals for international cooperation on fire observations
- IT Members are expected to contribute to achieving the program goals
  - BUT most contributions are constrained by the context of individual agency funding
  - The initial GOFC intent was to develop proposals for international funding but to-date this hasn't happened – the agencies are still operating independently/parochially
- GOFC Fire in reality provides a forum for periodic updates on new developments towards meeting the program goals (an informed community)

GOFC Fire IT

- The idea was for the international 'fire community' (represented by the IT) to help set and promote the international program goals on fire observations
- Funding agencies are encouraged to support GOFC activities
- The broader community is encouraged to leverage the program goals in pursuit of research activities and project support
- IT Members are expected to contribute to achieving the program goals
  - BUT most contributions are constrained by the context of individual agency funding
  - The initial GOFC intent was to develop proposals for international funding but to-date this hasn't happened – the agencies are still operating independently/parochially
- GOFC Fire in reality provides a forum to provide periodic updates and input on new developments and plans towards meeting the program goals and for informal exchange on best practices (an informed 'international' community)
- GOFC Chair – encourages the IT to identify a 'significant' initiative that demonstrates the utility

The Good or Bad News

- Fires continue to receive national and international attention – (recent extreme events in Russia, Australia, Texas, Alaska, Israel/Lebanon, etc)
- Periodic “after the horse has bolted” responses from funding agencies

- Can CEOS move to a coordinated international response to ECVs?

Format for the Workshop

- 1.5 days
- Designed to encourage free and open discussion and exchange of ideas (IT Members and 'Observers')
- Need to develop some form of consensus from the IT as to priorities
- Identify upcoming opportunities to attain these goals
- Overview presentations (20min) (one presenter) on selected topics followed by questions and discussion (10 mins)
- Suggest everyone to actively discuss the themes during discussions and also round table on next steps and action items
- Krishna will be taking notes of the discussion – will develop a meeting report – with a possible review article on community priorities for fire observations.

Agenda

18th October, 2011 (Tuesday afternoon till evening)

- **1:??** **Welcome remarks by Jesus San-Miguel and GOFC-GOLD Fire IT updates– Chris Justice/Krishna Vadrevu**
  -Round the table introductions and updates from IT Members (new developments and critical issues)

- **2:30** **Global geostationary network and fire products – Ivan Csiszar Martin Wooster (20mins) - Discussion**

  3.00 **Break**

- **3:30** **Fire observations from new instruments - Louis Giglio & Eckhard Lorenz (20 mins) – Discussion**

- **4:00** **Latest updates and research on fire radiative energy products – Martin Wooster & Wilfrid Schroeder (20mins)**
  Discussion

- **4:30** **Open Discussion – Shifting priorities and new opportunities- David Roy & Olivier Arino**

- **5:30** **Adjourn (Group Dinner Self Paid!)**

19th October, 2011 (9-6!!!)

- **9:00 Terrestrial Observation Panel for Climate (TOPC)-Fire ECV update – Kevin Tansey (20mins) -Discussion**
- **9:30 Progress and potential roadmap for the global fire EWS and activities – Bill deGroot & Jesus San Miguel (20 mins)**

  Discussion
- **10:00 UN-REDD Fire-GOFC source book updates–Luigi Boschetti & Anja Hoffman (20 mins) Discussion**

10:30 Break

- **11:00 Update on the global fire emissions inventory and combustion completeness workshop outputs, South Africa – Krishna Vadrevu and Guido van der Werf (20mins)**

  Discussion
- **11:30 Summary of burned area and validation theme summary and next steps – Chris Justice / Emilio Chuvieco (20 mins)**

12:00 Lunch Break

- **1:30 Regional network overview and updates from Wildfire 2011 meeting – Anja Hoffman (10mins) -Updates from regional networks (10mins each)**

  -SAFNET – Phillip Frost; RedLatif – Isabel Cruz, WARN – Cheikh Mbow (Abdoulaye Diouf)

  - SEARIN – Mastura Mahmoud

  Discussion

3:00 - 3:30 Break

- **3:30 Round table on next steps for GOFC-GOLD Fire IT program – Ivan Csiszar & Krishna Vadrevu**
- **5:00 Summary of the meeting and action items – Chris Justice (Fire IT co-chair)**

6.00 Adjourn