

IWGADTS

Interagency Working Group for Airborne Data and Telecommunication Systems

Status Report

to

Interagency Coordinating Committee for Airborne Geosciences and Applications
(ICCAGRA)

September 26th, 2007

NCAR/RAF

Jeffco Airport Facility

Broomfield, CO

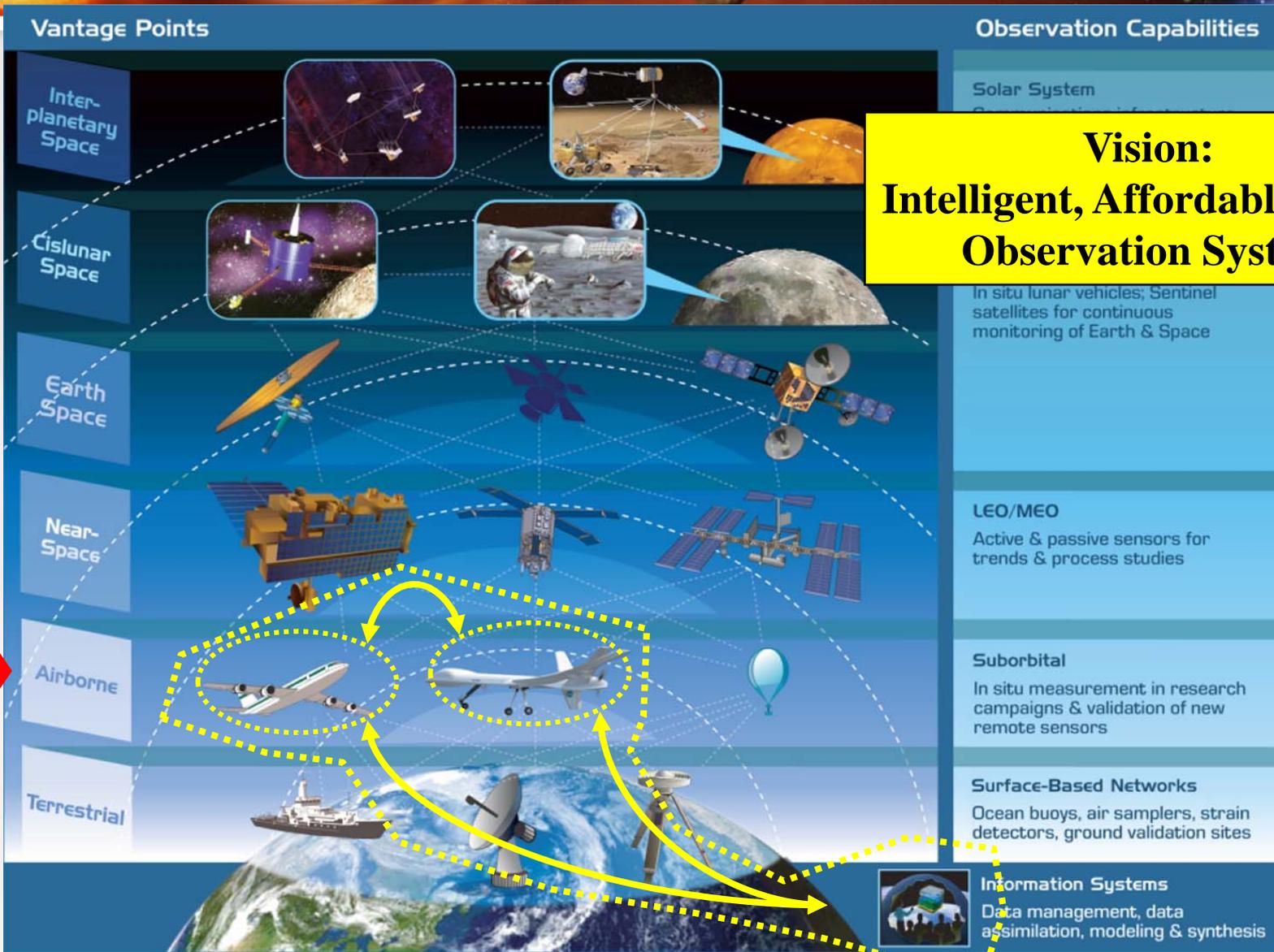
Chris Webster, National Center for Atmospheric Research
Larry Freudinger, NASA Dryden Flight Research Center

Abstract

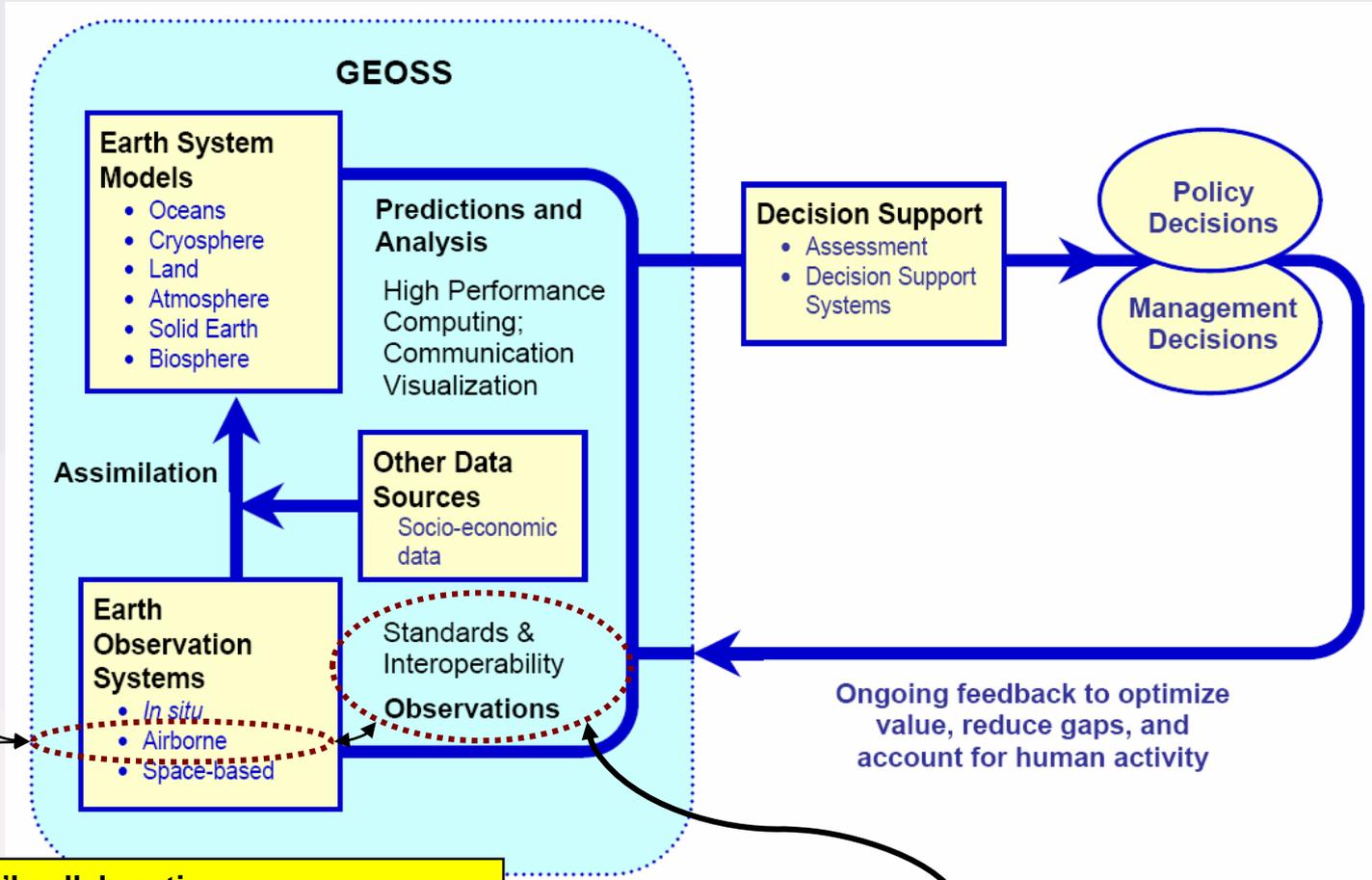
The Interagency Coordinating Committee for Airborne Geosciences Research and Applications (ICCAGRA) was established to improve cooperation, foster awareness, facilitate communication among sponsoring agencies having airborne platforms and instruments for research and applications, and serve as a resource to senior level management on airborne geosciences issues. The Interagency Working Group for Airborne Data and Telecommunications Systems (IWGADTS) is organized as a subgroup to ICCAGRA for the purpose of developing recommendations leading to increased interoperability amongst airborne platforms and instrument payloads, to produce increased synergy with DoD research programs with similar goals, and to enable the suborbital layer of the Global Earth Observing System of Systems.

Background discussion

Future = Layered Sensor Webs



Global Earth Observing System of Systems

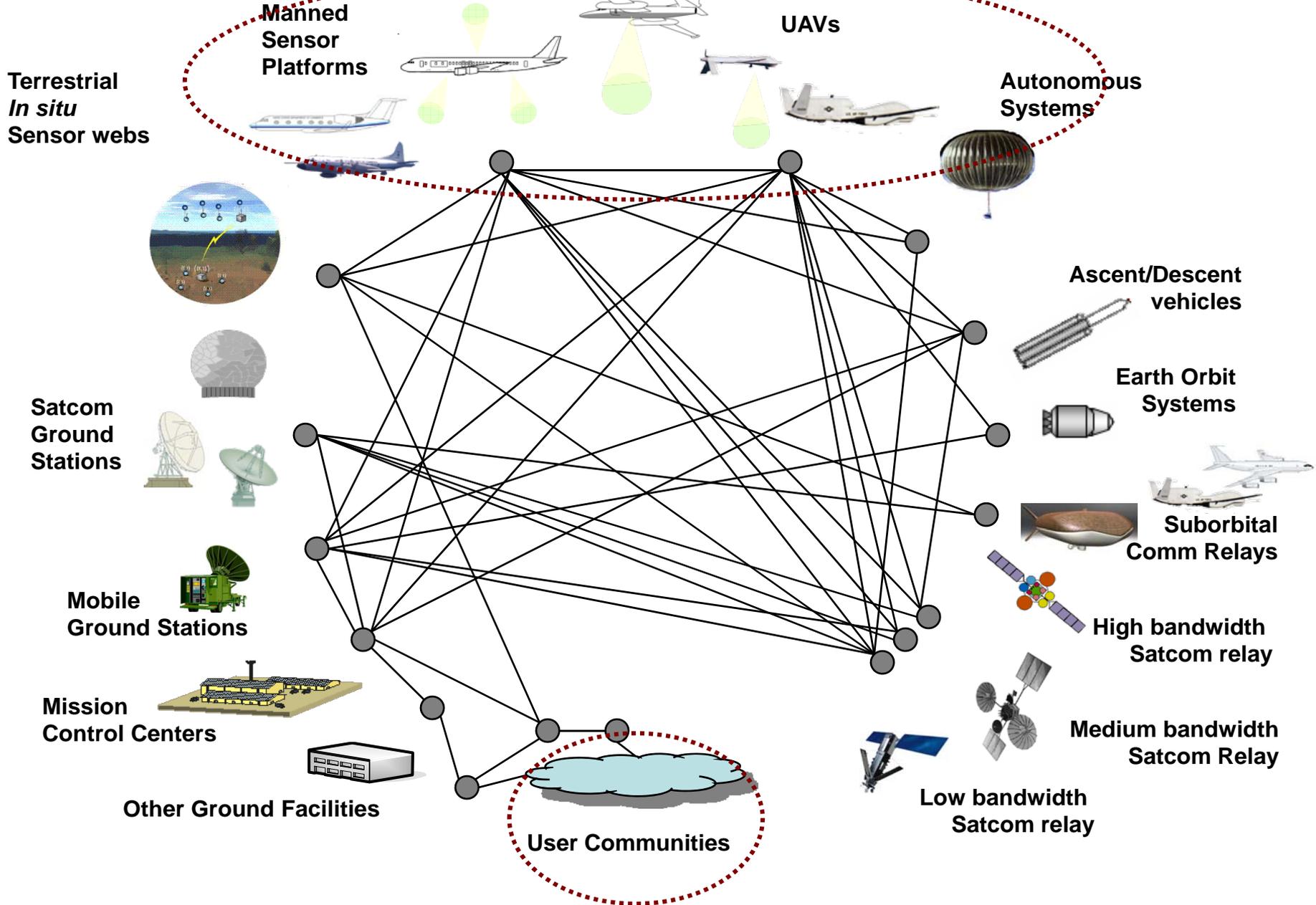


- National/Int'l collaboration
- Time correlated global data collection
- Integrated metadata
- Integrated system analysis
- Reliable long term archival
- Easy access but secure archive
- Near realtime observation

IWGADTS

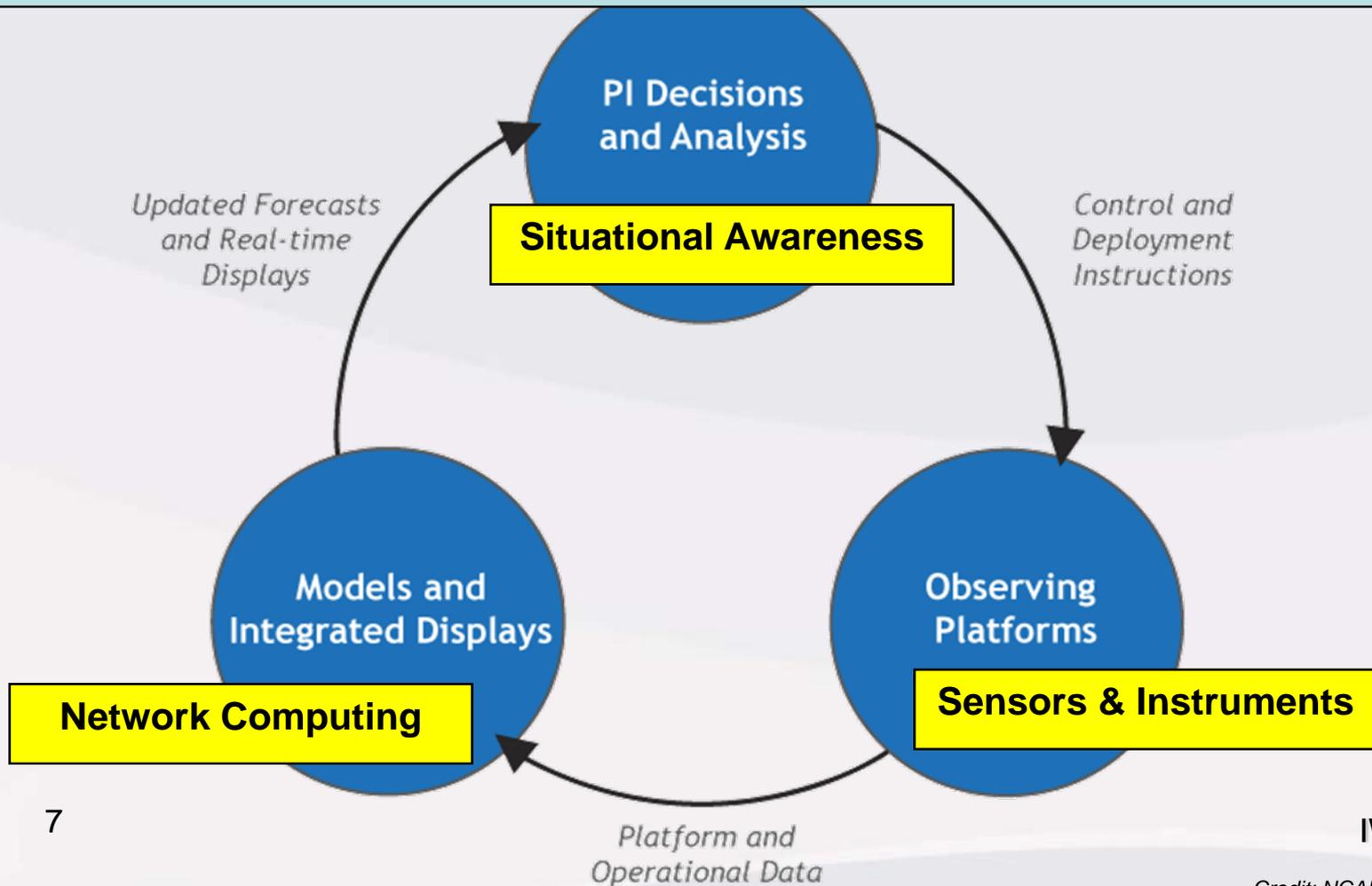
IWGADTS

The Suborbital Communications Domain



IWGADTS: Themes

Goal: make the best possible use of available time...
better capabilities... greater capacity



- Help build a suborbital platform fleet that is an effective and sustainable component of emerging Integrated Earth Observation System
- Interoperability occurs over networks; contributions emerge through software interfaces and protocols, not through the hardware systems that generate that information.
- Interactive connectivity between airborne and terrestrial networks. Instrument networks on suborbital platforms evolve toward being observation nodes on a suborbital “sensor web”.

Charter Review



IWGADTS: Charter (Purpose)

- **Identify interagency needs** for data and networked systems
- **Improve interoperability** of airborne platforms between agencies
- **Enhance opportunities for interagency sharing** of aircraft resources, airborne instrumentation and data to minimize duplication, and to expand science investigators' access to interagency assets
- **Provide recommendations** to senior level decision makers regarding technical standards
- **Evaluate the current state of interoperability** and recommend, as appropriate, interagency standards to facilitate the development of common data and networking systems leading to a fully interoperable global observing system which includes suborbital and space-based components

IWGADTS: Charter (Administrative)

Membership

- Principal geosciences research aircraft sponsoring agencies (NSF, NOAA, NASA, ONR, DOE, DOI,...)
- Academia & other platform representatives
- Leadership via elected chairman & executive secretary

Meetings & correspondence

- Twice per year
- Inter-meeting communication via iwgadts@eol.ucar.edu
- Collaborative ‘Wiki’ website

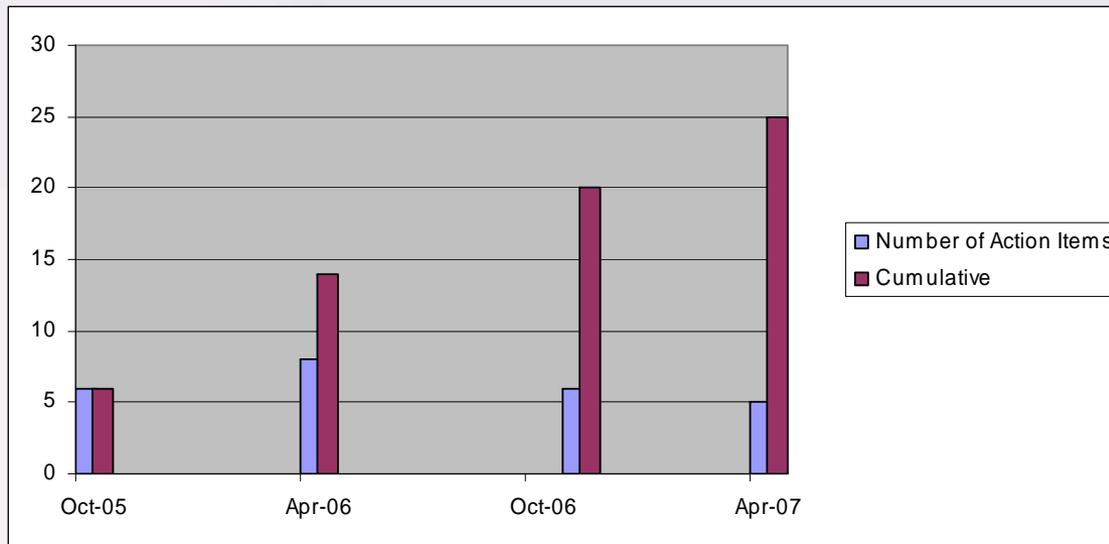
Review the charter every three years (2008)

Participation is voluntary (no direct funding source)

Status & Progress discussion

Brief Look @ IWGADTS

- 2004 – Informal conversation establishes need
- 2005 – First meeting; charter; Wiki/Web Presence
- 2006 – Vision paper; Poster@UNOLS; IWG1 format; Outreach Plan (!); metadata Interoperability discussions
- 2007 – timing discussions (IRIG-B; IEEE-1588; PPS); NexGenNavRec discussion; updated IWG1 definition
 - [planned] 3D models; Web Services discussions; satcom user inputs
- 2008 – [planned] First Charter review



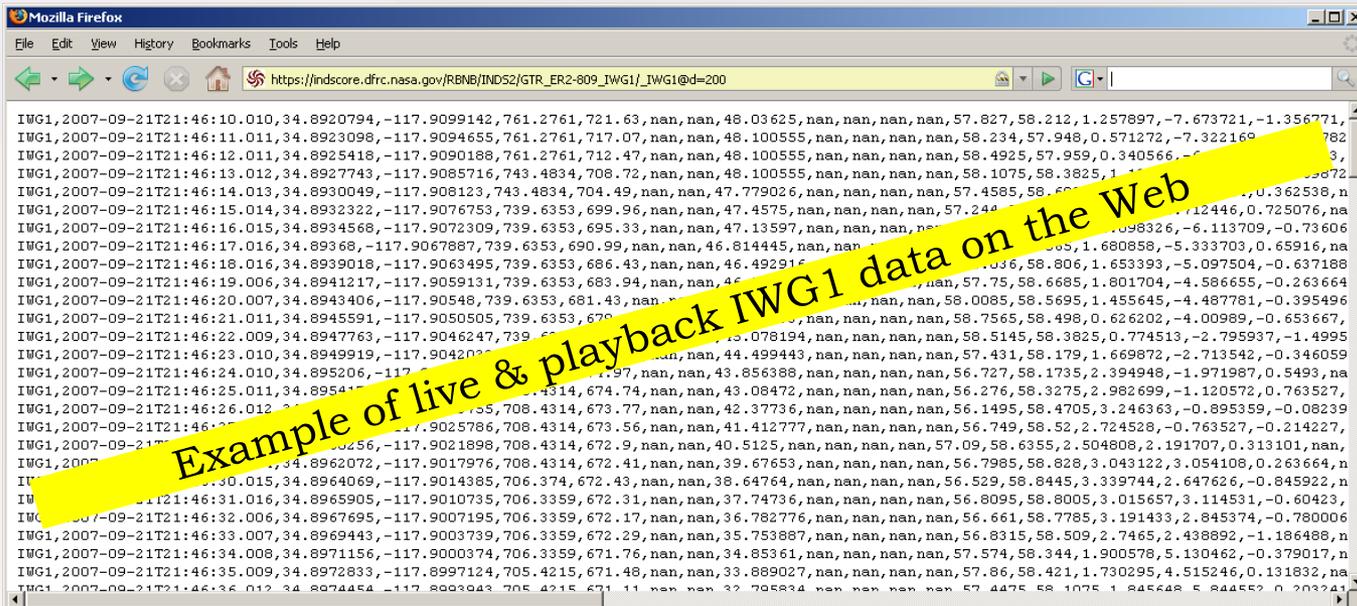
IWG1 Packet Definition

```
IWG1,yyyy-mm-ddThh:mm:ss,value,value,.....,value,,value\r\nIWG1,yyyy-mm-ddThh:mm:ss,value,value,.....,value,,value\r\nIWG1,yyyy-mm-ddThh:mm:ss,value,value,.....,value,,value\r\n...  
...
```

- IWG1
- Date/Time
- Lat (dec deg)
- Lon (dec deg)
- GPS_MSL_Alt (m)**
- WGS_84_Altitude (m)**
- Press_Alt (feet)
- Radar_Alt (feet)

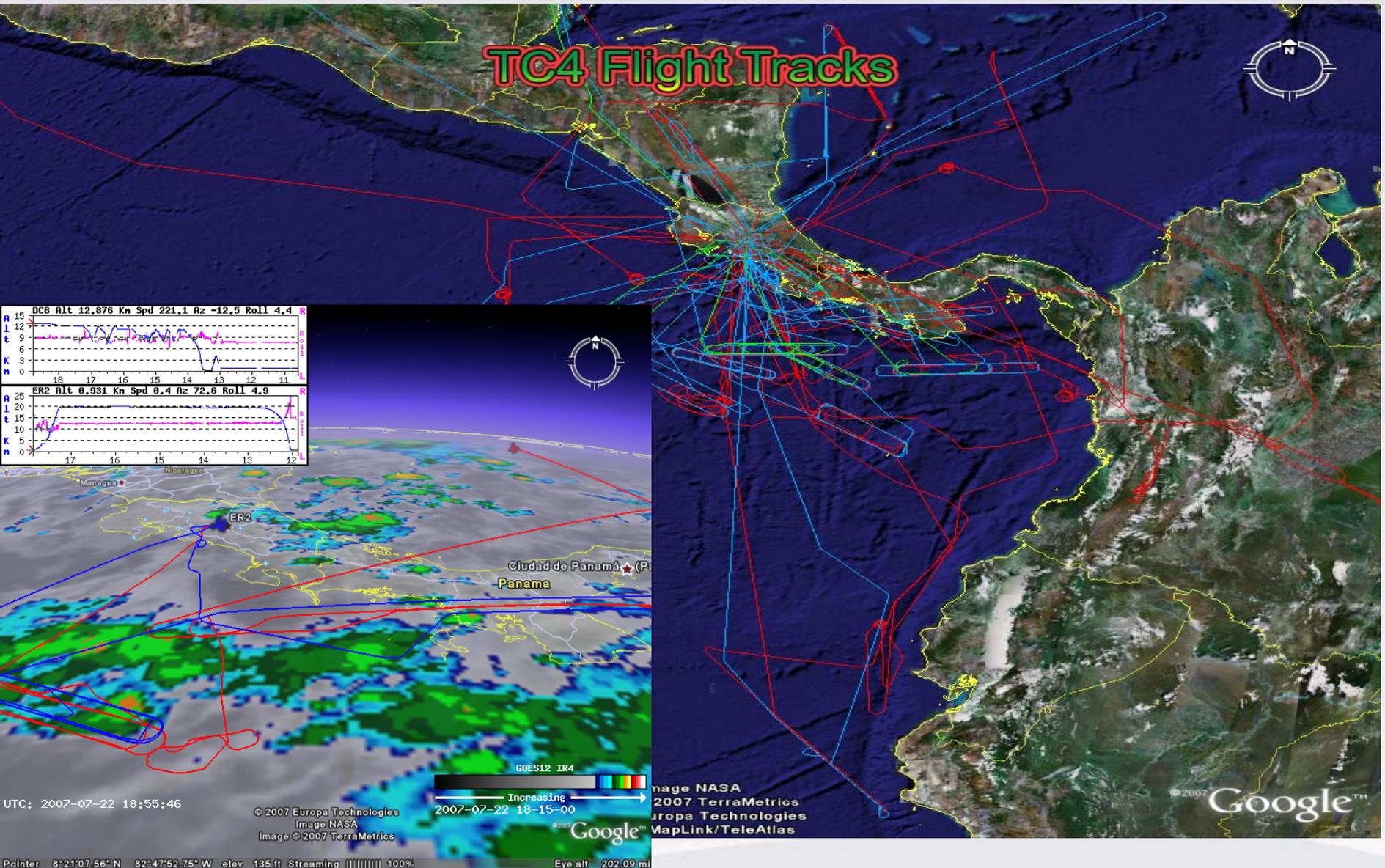
- Grnd_Spd (m/s)
- True_Airspeed (m/s)
- Indicated_Airspeed (knots)
- Mach_Number
- Vert_Velocity (m/s)
- True_Hdg (degrees_true)
- Track (degrees_true)
- Drift (degrees)
- Pitch (degrees)
- Roll (degrees)
- Side_slip(degrees)
- Angle_of_Attack (degrees)
- Ambient_Temp (degrees_C)
- Dew_Point (degrees_C)
- Total_Temp (degrees_C)
- Static_Press (mbar)
- Dynamic_Press (mbar)
- Cabin_Pressure (mbar)
- Wind_Speed (m/s)
- Wind_Dir (degrees_true)
- Vert_Wind_Spd (m/s)
- Solar_Zenith_Angle (degrees)
- Sun_Elev_AC (degrees)
- Sun_Az_Grd (degrees_true)
- Sun_Az_AC (degrees_true)

Example of live & playback IWG1 data on the Web



...

Progress: Multi-Aircraft Displays



Progress: Network Chat Works Great

IRC Chat Server at rdcc.guest.ucar.edu is *de facto* service for airborne science

The screenshot shows an IRC chat window titled "XChat: ChrisWebster-Jeffco @ RDCC / #GV (+)". The chat log contains the following messages:

```
[11:02] --> You are now talking on #GV
[11:02] --> MarkBradford-Boulder (mark@145F388B.856A83D9.7E9474C1.IP) has joined #GV
[11:02] <MarkBradford-Boulder> Morning, Chris
[11:06] --> MikeDaniels-Jeffco (daniels@eol-DAF479D.atd.ucar.edu) has joined #GV
[11:06] <MikeDaniels-Jeffco> How are we doing?
[11:06] <MarkBradford-Boulder> So far, so good
[11:07] <MikeDaniels-Jeffco> Great!
[11:08] --> JohnAllison-NCAR (jja@eol-D5E38F54.eol.ucar.edu) has joined #GV
[11:09] <MikeDaniels-Jeffco> Here is some stuff Jeff Stith talked about in pacdex
[11:09] <MikeDaniels-Jeffco> ram, Right now we are at 270 and still seem to be in a large particle plume, so we
have been in it for a long time, now. There are some clouds up ahead on the image,
so I thought I would stay at this attitude until I get past them, in the hope of
getting sample in cirrus. Following that there might be time for one profile, but
it depends on how close we are to the coast after we finish with the clouds
[11:09] <MikeDaniels-Jeffco> ram, we're seeing very consistent repeat of sampling pattern because the plume
slopes down to the north. Flying level, we go out of plume with decrease in large
aerosol and CCN, increase of CN. Then we descend a few kfeet and enter the plume
again.
[11:10] --> MikeDaniels-Jeffco is now known as ram
[11:10] <ram> jeff_stith_g5, and DaveR-gv_cvi I agree with your deduction. Iam wondering about
the implications since as it descends it is getting warmer and the volatiles will
be evaporating and the dust chemistry will be changing; wonder what Paul is seeing
jeff_stith_g5, this is crucial info to check the models and also understand
transport; it looks from GOES, you may also be running into cold clouds soon?
[11:18] <ChrisWebster-Jeffco> I'll go bring the GV online.
[11:19] --> ads-GV (ads@eol-E0BA4731.gv.ucar.edu) has joined #GV
[11:20] <ads-GV> Entering cloud at 12k ft.
```

A yellow box highlights the following chat log entry:

```
:32:34] davidstarr develop just in front of you,
no lightning
could just bail and stay
north of 7.5N
:32:52] toon We might be able to go south
of 6N is that useful? How
far should we go?
:33:40] davidstarr if go around this
development, can run all the
way to pt 13 if you want
:34:08] davidstarr rtmn not updating very well
for dc-8 positioon
:34:21] toon We are cruising past cells
now. Some vertical motion
:34:23] mark some bumps
:34:32] mark in edge of turret
:35:25] toon lots of precip below.
:35:32] * wennberg-dc8
(wennberg@190.10.67.2) has
joined #SCI
:36:09] davidstarr still 35 mins to C&C overpass.
:36:12] toon 0.6 IWC saw a 1,0
:36:36] mark coming past turret now into
shield
:36:57] davidstarr get on tcaak and go south for
a while
:37:57] davidstarr next possibility opf action
along track to south is past
```

PACDEX Example

TC-4 Example

IWGADTS still getting traction

- Monitoring technology landscape
- Working to clarify airborne science needs

The IWG1 packet is clearly useful

- Being used to feed multiple applications, realtime monitoring
- Being used postflight

Text messaging (XChat) is clearly useful to community

2006 was a good IWGADTS year; 2007 a slow year (workloads)



Concluding Comments

- IWGADTS assembled in Jan 2005
- Met 4 times since accepted under ICCAGRA
- Demonstrating interagency cooperation for mutual benefit
- Demonstrating consensus approach to joint innovation
- More to come!
- Email us at iwgadts@eol.ucar.edu