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# Presentation to ICCAGRA International Cooperation

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October 21, 2008



# Agenda

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- ICCAGRA
- ISPRS Commission 1 Working Group 1
- ISRSE 09 – Chuck Hutchinson





# Objectives



- **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. Promote the strengthening of the aircraft programs in support of science objectives
  - **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.
  - **The Interagency Working Group for Science use of Unmanned Aerial Systems** expected be formed this month as a subgroup to ICCAGRA. This working group will support the development of science interagency use of this class of vehicles. Advocate with the regulatory agencies as well as being an avenue to develop the standards for use in the science UAS community.



# IWG1 Packet Definition

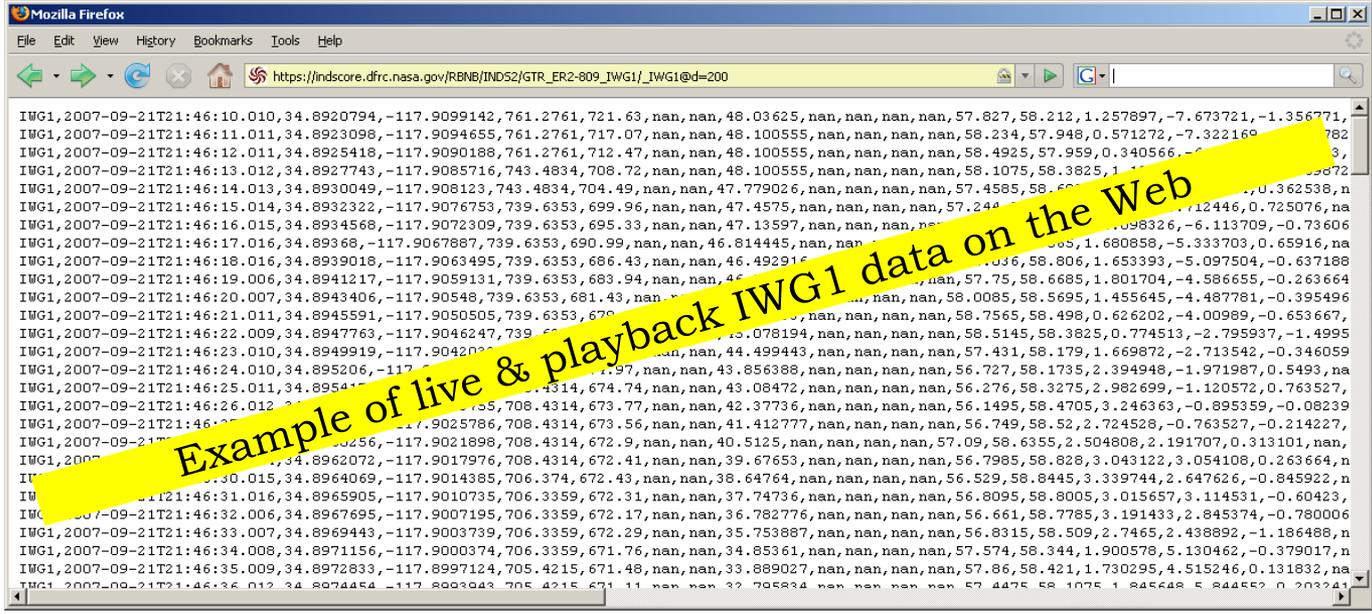
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IWG1,yyyy-mm-ddThh:mm:ss,value,value,.....,value,,value\r\n
IWG1,yyyy-mm-ddThh:mm:ss,value,value,.....,value,,value\r\n
IWG1,yyyy-mm-ddThh:mm:ss,value,value,.....,value,,value\r\n
...
...

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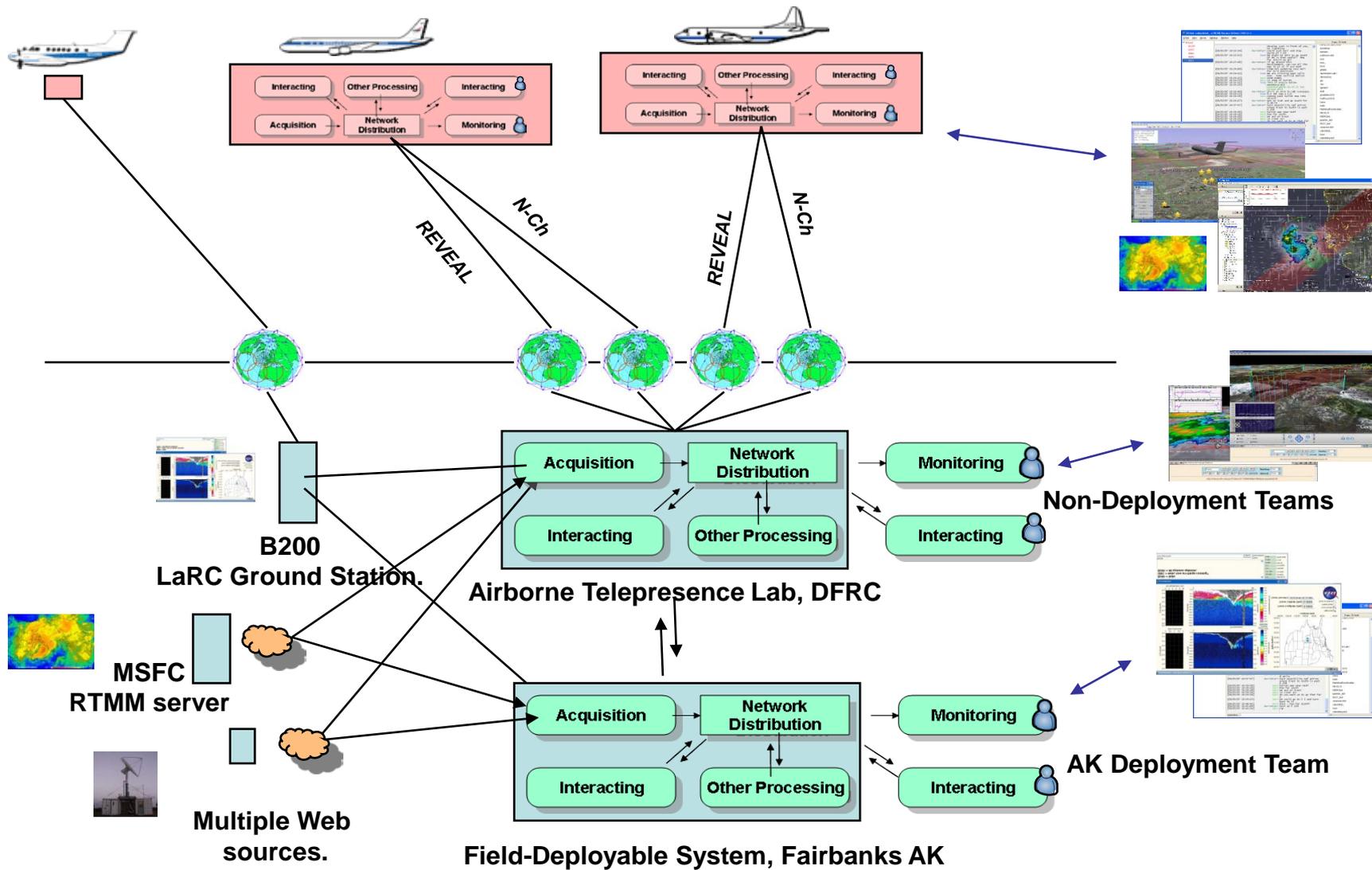
- IWG1
- Date/Time
- Lat (dec deg)
- Lon (dec deg)
- **GPS\_MSL\_Alt (m)**
- **WGS\_84\_Altitude (m)**
- Press\_Alt (feet)
- Radar\_Alt (feet)
- Grnd\_Spd (m/s)
- True\_Airspeed (m/s)
- Indicated\_Airspeed (knots)
- Mach\_Number
- Vert\_Velocity (m/s)
- True\_Hdg (degrees\_true)
- Track (degrees\_true)
- 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*





# ARCTAS Implementation Satcom/web mission interface





# ICCAGRA/IWGADTS: Themes

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- Help build a suborbital platform fleet that is an effective and sustainable component of emerging Integrated Earth Observation System
- Develop aircraft state data to Instrument Standards in the ICCAGRA fleet of Science Platforms
- 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”.



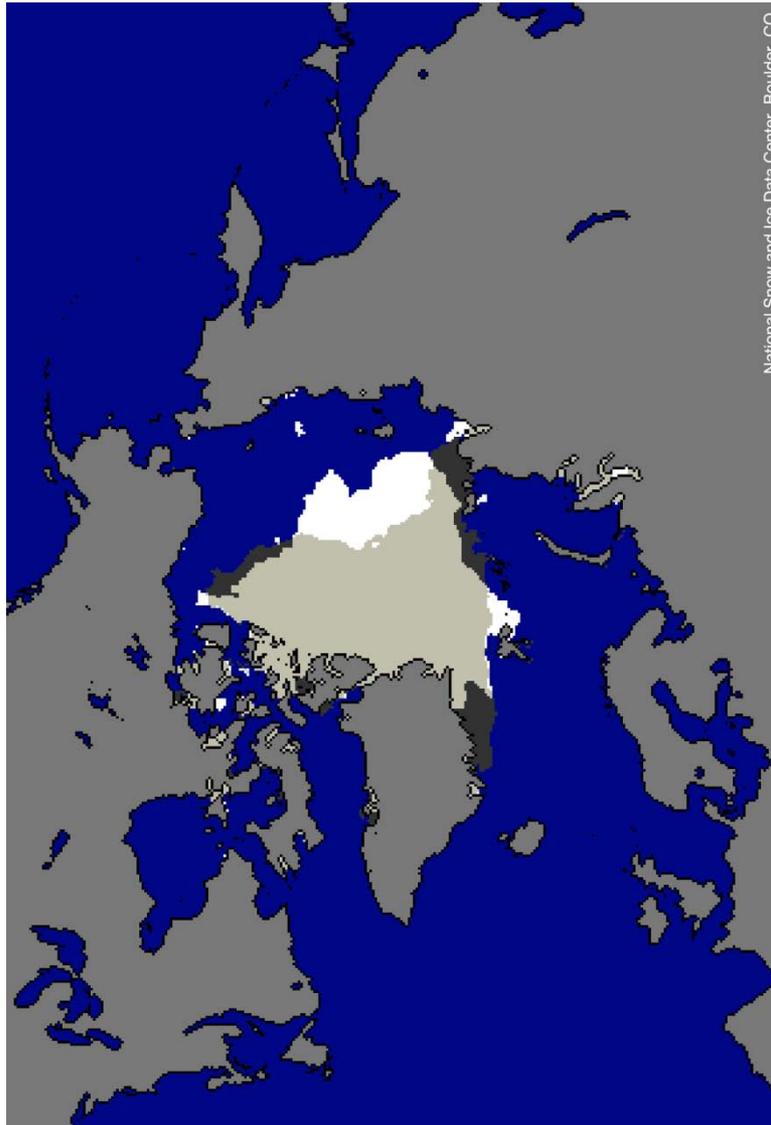
# Why International Coordination Now?

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- The European community's European Fleet for Airborne Research (EUFAR) is a large and well established organization consisting of 24 European Institutions operating over 30 aircraft.
- The timing is right for ICCAGRA and EUFAR to more fully explore how to expand collaboration. This includes program planning, sharing of physical assets (e.g., common interface for instrument and designing instruments to be as broadly usable as possible), data interface and data management issues and develop UAS science capability.
- In addition, field experiments are broader based and now include human and social dimensions. Much greater understanding is required about the coupling between natural systems and societal and economic issues to adequately address global climate change issues.



# 2008 Arctic Sea Ice Minimum



Daily Arctic sea ice extent for September 12, 2008, where the date of this year's minimum (white) is overlaid on September 16, 2007, last year's minimum extent (dark gray). Light gray shading indicates the region where ice occurred in both 2007 and 2008. Blue is open water; land mask is gray.

Despite overall cooler summer temperatures, the 2008 minimum extent is only 390,000 square kilometers or 9.4%, more than the record-setting 2007 minimum. The 2008 minimum extent is 15.0% less than the next-lowest minimum extent set in 2005 and 33.1% less than the average minimum extent from 1979 to 2000. This season further reinforces the long-term downward trend of sea ice extent.



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# ISPRS Commission I

Airborne Science Working Group

Terms of Reference



# Background

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- There currently exists a lack of communication and coordination between international participants in airborne science and related issues.
- This lack of communication and coordination often results in redundant technologies and missions, inconsistent standards, and missed opportunities for mission collaboration and data correlation



# Proposed Activity

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- A working group of the International Society of Photogrammetry and Remote Sensing (ISPRS) is proposed which would provide an international forum for improved dialogue between international airborne science programs as well as between the international airborne science community and the international spaceborne science community.
- This dialogue would be carried out via international symposia, conferences and workshops, as well as through periodic newsletters and a working group web page.
- Convene a conference of the working group at the International symposium on Remote Sensing of Environment (ISRSE) during odd number years.



# Proposed Participants

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Initial participants would include The Interagency Coordinating Committee for Airborne Geoscience Research and Applications (ICCAGRA) and the European Fleet for Airborne Research (EUFAR).

Members of those organizations would serve as chair, co-chair and secretary of the working group.

Other international participants in airborne science activities would be invited to join the working group.



# Time Frame

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- The working group would be established in ISPRS Commission I and would remain in effect until the next ISPRS congress in 2012.
- **Proposed Events**
  - International Symposium on Remote Sensing of Environment (ISRSE) May 2009, Stresa, Italy
  - Commission I symposium, June 2010 Calgary, Canada
  - ISRSE 2011, Brisbane, Australia
  - ISPRS Congress, 2012, Melbourne Australia



# Working Group Terms of Reference to Include:



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- 1. Coordinate a forum for discussion between the international airborne science communities Andrew Roberts, Jim Huning
  - 2. Develop airborne sensor interface format standards in coordination with other working groups to promote maximum sensor portability between aircrafts increasing science yield from the sensors. Larry Freudinger
  - 3. Develop airborne satellite data relay systems use for science research programs between aircraft and ground in coordination with other working groups. Chris Webster
  - 4. Develop an airborne science literature search to identify peer reviewed published papers and citations and make a available in a data base. George Seielstad
  - 5. Support the regulatory agencies in supporting airborne science sensor certification and approval requirements for Lidar, Dropsonde and electromagnetic spectrum emissions. Jim McFadden; Bob Curry
  - 6. Maintain an inventory of the international airborne science capabilities and report annually. Rick Shetter, NCAR (Peter will get us a name)
  - 7. Develop a forum to discuss transnational access system(s) for airborne users. Huning, Roberts
  - 8. Support the use of UAS vehicle activity for science observations in civil and restricted airspace on an international basis and engage the ICAO. Brenda Mulac, Phil Hall
  - 9. Promote the education and outreach on an international basis of airborne based science activity. Alexandra Novak, USGS (Tom will get a name)
  - 10. Develop a forum to coordinate expert workshops in airborne science sensor categories. Greg Roberts?, Matt Fladeland,



# EUFAR Contribution

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- Co-Chair: Jean-Louis Brenguier / France / Meteo / 1,4,6
- Reusen IIs /Belgium / VITO / Education and Outreach/ 9
- Phil Brown/England/Meteo/ Transnational Access of science platforms/ 1,7
- Stefanie Holzwarth/Germany/DLR/ Network Activity and standards development/ 2, 3
- Stephan Kommallein/Germany/DLR/ Regulatory issues to enable science activity/ 5
- Koen Meuleman/Belgium/VITO/ UAS issues to support airborne science activity/ 8
- Manfred Wendisch/Germany/ U of Mainz/ Expert workshop coordination/ 10



# ICCAGRA Contribution

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- Chairman: – Andrew Roberts/USA/NASA/1,6
- Secretary: - Jim Huning/USA/SAIC/1,7
- ???



# ISRSE 33 in 2009



The JRC will provide support to the organization of the 2009 ISRSE-33 in close collaboration with:



- the European Space Agency (ESA)
- the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)



- the GMES Bureau
- the GEO Secretariat
- the European Space Industry
- the Italian Authorities
- other Services of the European Commission
- other partners





## The Joint Research Centre of the European Commission

is pleased to propose hosting the

2009 edition of the

International Symposium for Remote Sensing of the Environment

(ISRSE 33)

in **Stresa, Lago Maggiore, Northern Italy.**

4-8 May 2009 (Call for Papers due Nov 5)

<http://isrse-33.jrc.ec.europa.eu/welcome.html>



# Discussion



- Activities which will more closely integrate Airborne Science Program activities and results with those of the international airborne and spaceborne community.
  - a. To begin to carry out these activities, NASA will participate in the organizing and planning of the 33rd International Symposium on Remote Sensing of Environment to be convened and hosted by the European Union's Joint Research Centre in Stresa, Italy in May of 2009. It is anticipated that a number of EUFAR members will participate in this meeting.
  - b. NASA participated in the International Society of Photogrammetry and Remote Sensing Congress in Beijing, China during July of 2009 to explore mechanisms for increased cooperation with that organization.
- Activities which will greatly increase international cooperation between the US Airborne Science Community, as represented by ICCAGRA and Airborne Science Programs in other Countries. Some of these possible activities/topics for discussion include:
  - a. Examine the role of instrument integration and the potential for sharing physical assets; requires common interfaces for instrumentation.
  - b. The role of certification vs. public use operations; agencies approach this issue differently.
  - c. We suggest putting pointers on the ICCAGRA and EURAR websites referencing each other.
  - d. We suggest a biannual meeting of EUFAR and ICCAGRA members. Would it be possible to have the initial joint meet at the ISRSE09 conference in Stresa, Italy?
  - e. Would EUFAR be interested in enhancing its presence in the ISRSE conferences, and perhaps use that biannual forum to include an international airborne science element.
  - f. What concrete steps should we take to help build up one another in light of the global climate change issues facing us?
  - g. What steps can we take to get our science communities to advocate the use of our aircraft or do we believe we are getting all the support we need right now?