Real Time Mission Monitoring

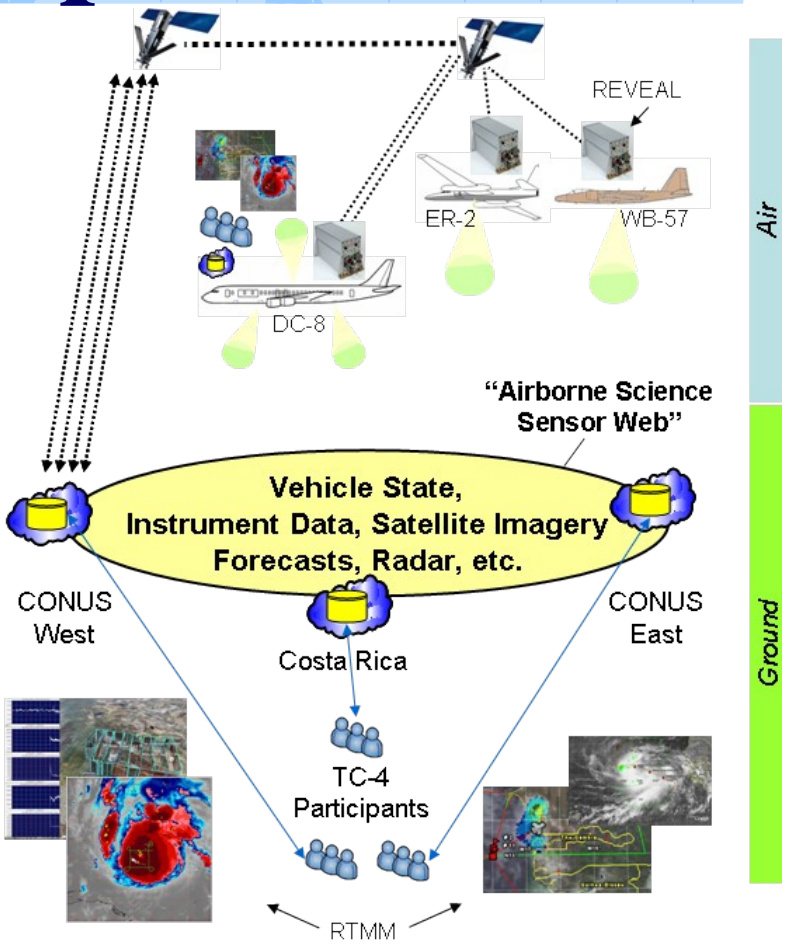
Support of the Tropical Composition, Cloud and Climate Coupling (TC^4) Experiment

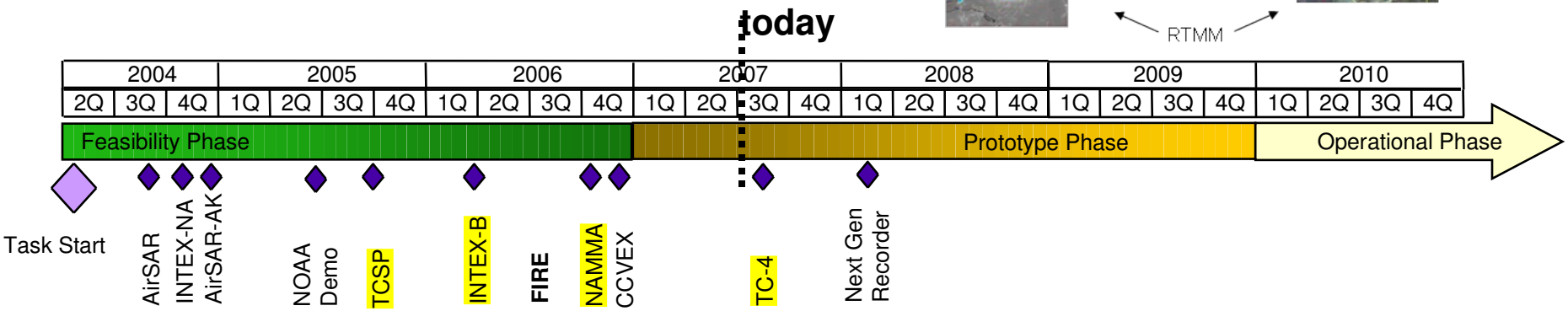
Science Team Meeting
25-27 April 2007

Suborbital Telepresence

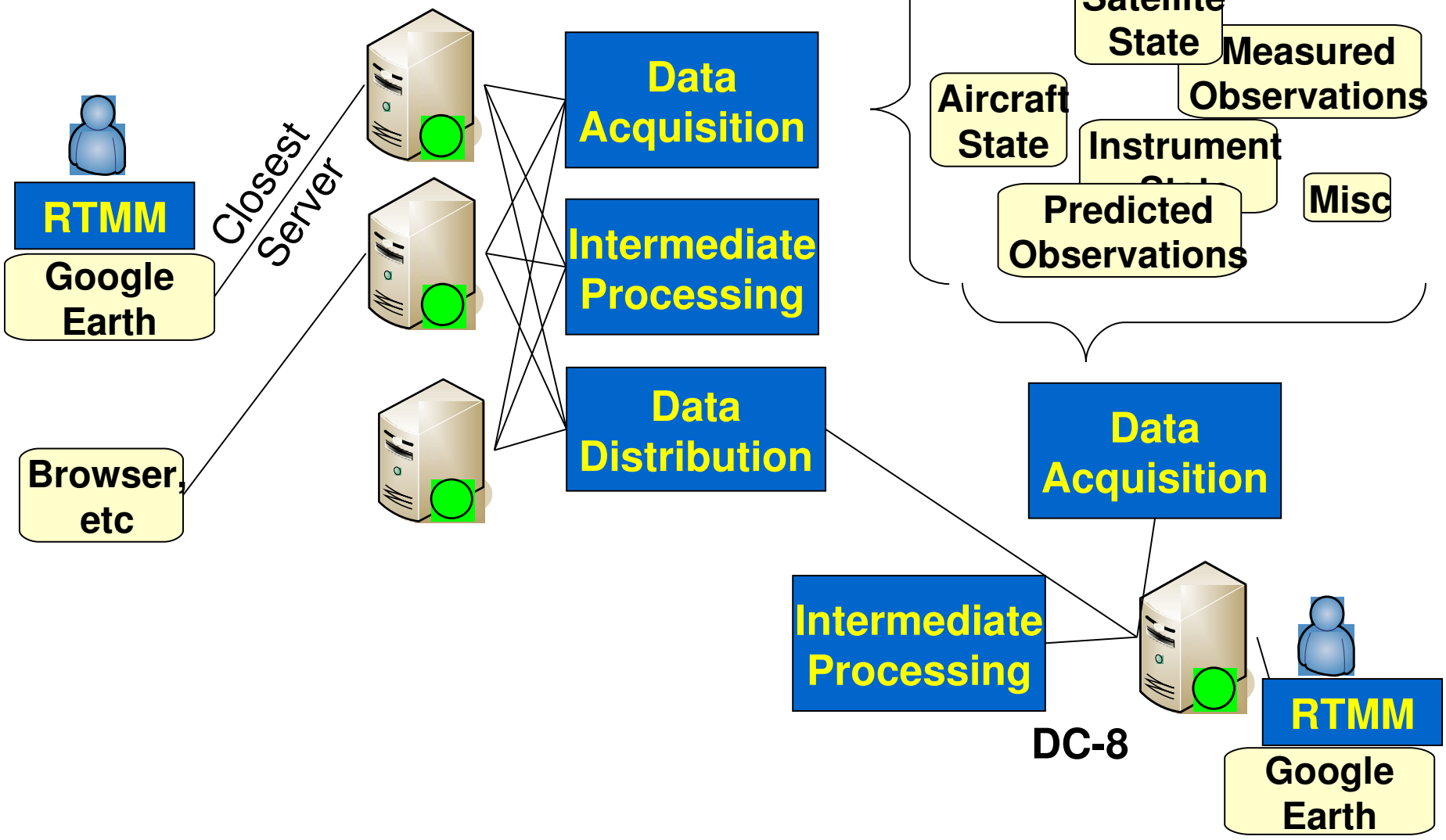
Objectives

- Develop/demonstrate low-cost products and services for airborne science
  - Situational awareness, decision support
  - Sensor web: *i.e.* Instrument interaction/C4I
- Necessary on future autonomous vehicles, but value in application to *all* platforms
- Onboard system focus: payload needs
  - Acquisition, integration, recording, processing, communications mgmt services
- Terrestrial system focus: operation needs
  - Data processing, fusion, distribution, display, playback services





Notional Architecture



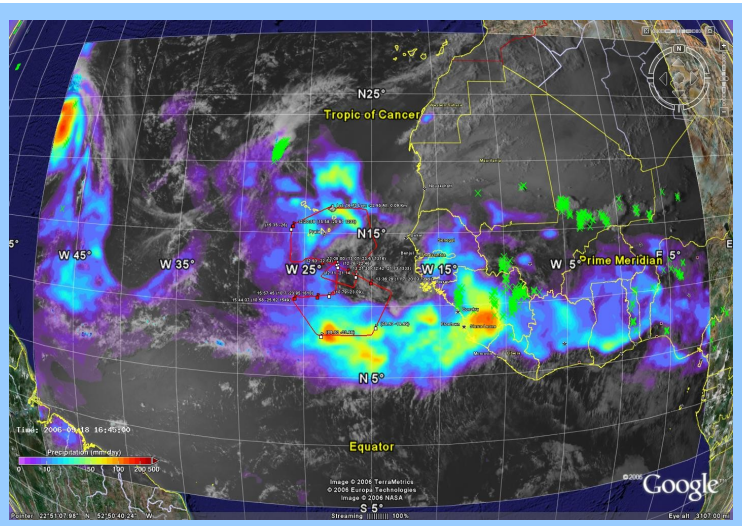
What is RTMM?

The Real Time Mission Monitor (RTMM) is an interactive visualization application that provides situational awareness and enables adaptive and strategic decision making.

- Utilizes distributed web-based architecture
- Leverages satellite-aircraft communications strategies
- Monitor aircraft tracks
- Access and display satellite, sub-orbital, and surface measurements
- Visualize model output parameters
- Integrated with an easy-to-use freely available visualization package
- Built upon a solid heritage of field campaign real time monitoring applications

Planning, Support, and Analyses

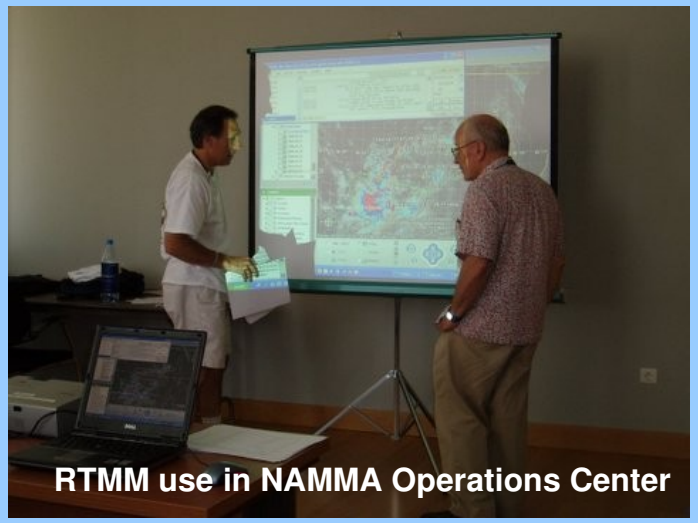
RTMM facilitates:



- Pre-flight planning
- In-flight monitoring and adaptive flight management strategies
- Post-flight analyses, research, and assessments (in playback mode)

User-base and Application

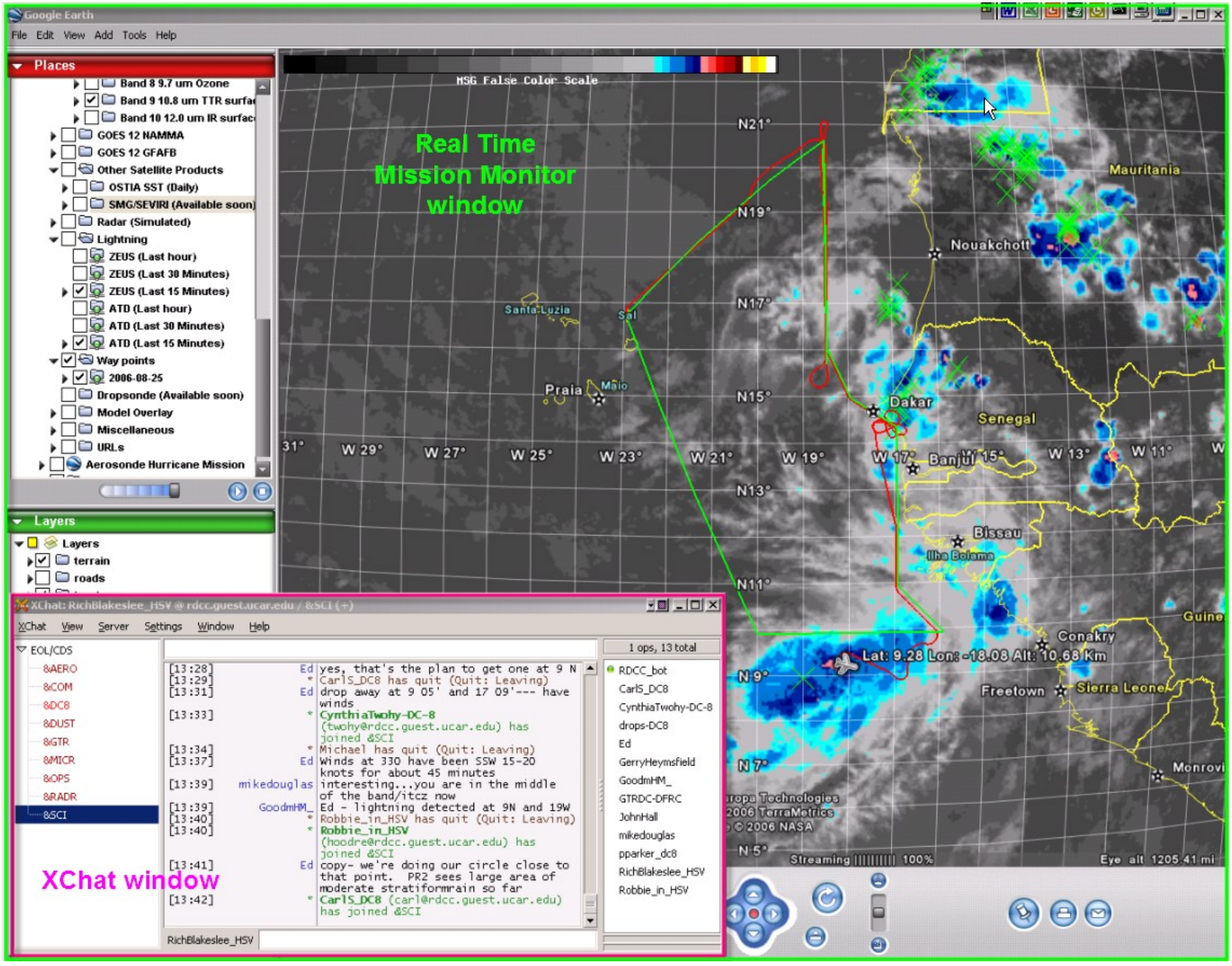
- RTMM is available for use by:
  - Program Managers
  - Mission Scientists
  - Mission Management
  - Research Scientists
  - Educators/Students
  - Science Attentive Public



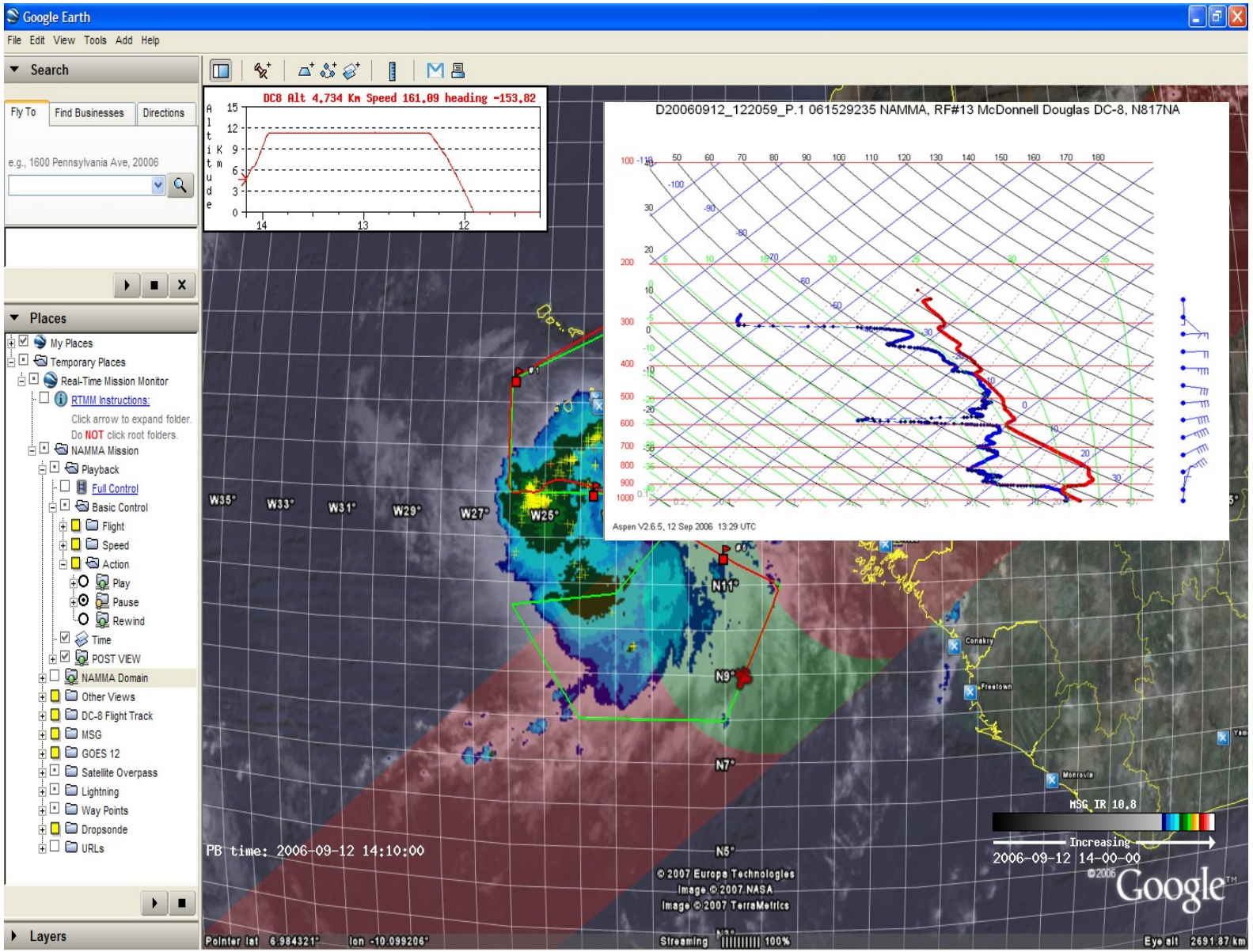
RTMM use in NAMMA Operations Center

- RTMM enables real time collaborations
- RTMM capability now available on-board the DC-8 aircraft itself during flights

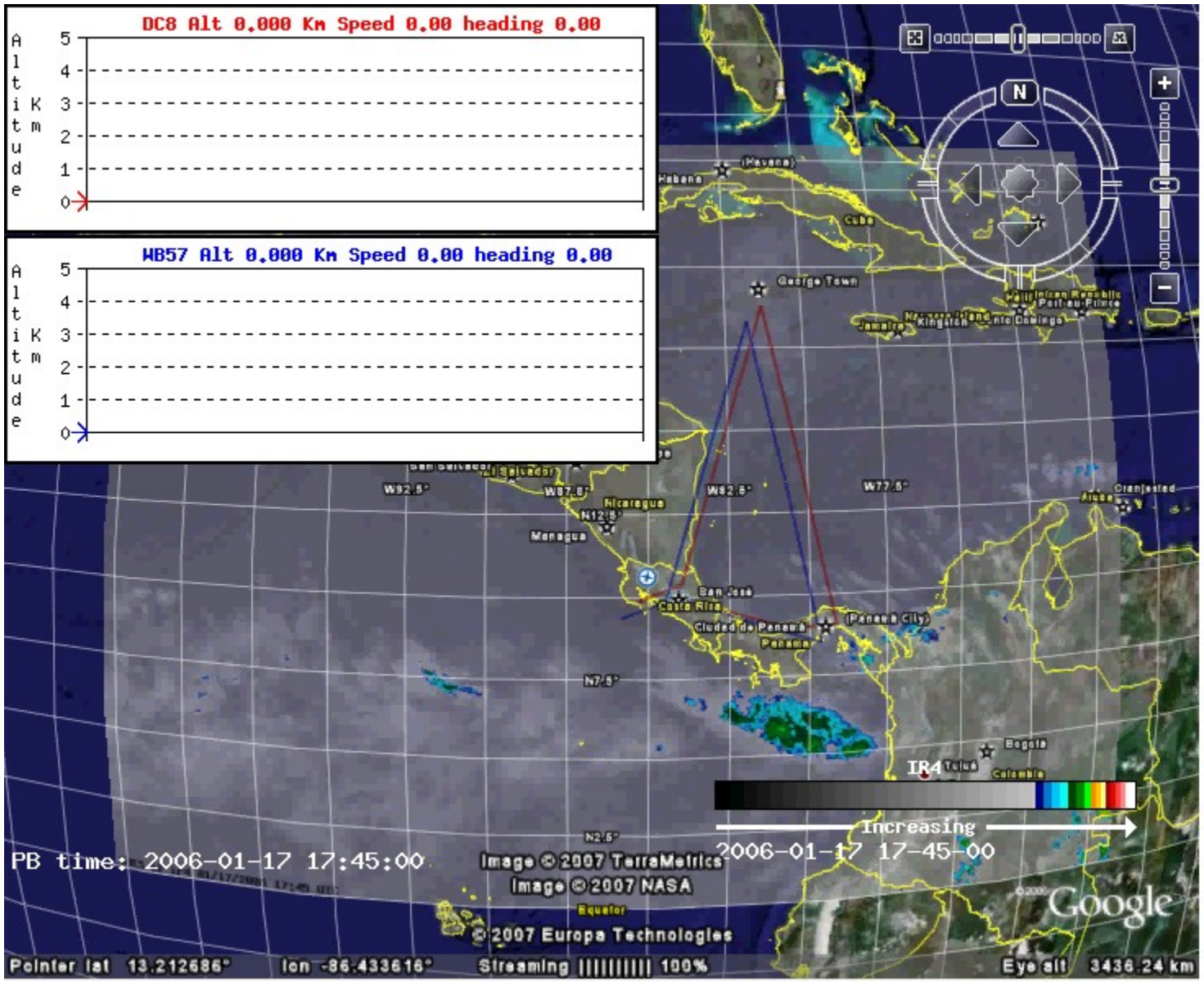
Example: Operations Support



Satellite FOV & Instrument Data

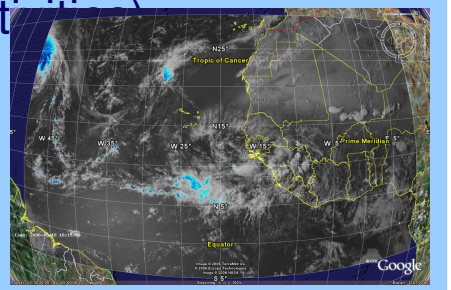


Example: TC⁴ Simulation



TC4: RTMM Data Sources

- Data Sets planned or available for TC⁴ (we can add to these)
  - Satellite Imagery
    - GOES-E, GOES-10 (vis, infrared, 15 min update, some rapid scan)
    - Satellite & instrument FOVs – current and predicted tracks
    - Satellite products (e.g., to support postflight acti[illegible])
  - Model Output
    - GEOS-5, WRF, NCEP, MM5, other
  - Aircraft Instruments
    - Flight tracks (waypoint, real time tracks, etc.)
    - Dropsonde (time/locations and skew-T)
    - Aircraft Instruments: health/status, data, cmd/cntrl (case-by-case) (LASE, Dial, AMPR, MTP, SSFR, CAFS, PANTHER, …)
  - Surface and Balloon Observations
    - Radar (NPOL, SMART)
    - Lightning (Vaisala long range, Costa Rica lightning, WWLLN)
    - TicoSonde
    - Other (NATIVE)
- Playback capabilities available for review and analyses



TC4: Additional Inputs Sought

- Questionnaire has been developed by TC^4 Suborbital Telepresence and RTMM team to help identify and prioritize additional data acquisition, integration, management and display tasks that might be pursued beyond existing baseline.
- Responses can be given to Richard Blakeslee or Larry Freudinger or emailed to:

  ssp-global-range-staff@lists.nasa.gov
- URLs for accessing and testing the RTMM will be provided soon to the TC^4 Science team