**Chapter 4: Conduct of Operations**

TCI Field Experiment observation period will take place from July 15, 2015 to the end of the tropical cyclone season or complete asset expenditure. The overview project schedule is depicted in Figure # 1 .



Figure 1. TCI Project Schedule Overview.

The TCI Ops center will be both located at NRL Monterey and Virtual during Pre-and Post-SHOUT Operations. Additional TCI personnel will be located onsite at the Aircraft Operations Center. During the SHOUT Campaign, from August 23 to Sep 27, 2015 the TCI Ops Center will be co-located with the SHOUT OPS center on Wallops Island while maintaining a Virtual presence. All Operations will remain the same with the same designated staff positions while concurrent with the SHOUT Operations. One additional TCI watch stander will be integrated into the SHOUT Ops rotations for the Global Hawk. Maintaining TCI Communications and coordination between the Virtual Operations Center, Wisconsin forecast center, and the SHOUT OPS Center is essential. There is a potential extension period for SHOUT through 14Oct if required due to inactivity.

An Intense Observing Period (IOP) is a period of comprehensive airborne observations in the designated project target area, organized and launched to collect data within the TC. The decision for launching an IOP will be decided by the Science Director assisted by the Mission Science Team. The IOPs are the highest priority for TCI operations, and every effort will be made to maximize their number and duration in order to achieve the scientific goals of the program.

**TCI Participants Overview and Roles**

TCI Science Group: is made up of all of the PIs participating in the project. The scientists are associated with participating facilities, national research institutions, and government agencies. These scientists have the key responsibility to work together to accomplish the TCI research goals. All scientists are encouraged to participate in the development of the daily scientific mission proposals. A smaller sub-group of investigators will make up a Mission Planning Team (MPT), which will be led by the Mission Science Director.

**Mission Planning Team** (located virtual or at TCI Ops Center):

**Mission Science Director** (1) Leads Mission Planning Team; Rotates weekly or bi-weekly. Responsible for formulating mission plans (flight tracks, dropsonde plan); objectives; executing mission.

• Responsible for overall mission execution, plan, and operations

• Coordinate and/or delegates the TCI science and operations with other programs (SHOUT, IFEX)

• Real-time monitoring of the current flight and storm tracking

• Oversee the upcoming flight plans

• Provide summary report at daily planning meeting

• Works with forecast team to focus targets ahead of discussion

• Lead the 8am EDT TCI Flight Planning Meeting and makes the GO/NO-GO/Delay/Deploy decision

• Lead the 330pm EDT Weather and Science Discussion Meeting

• Participate in Flight Debrief

• Attend the 10am EDT IFEX and SHOUT Coordination Meeting

• TCI Plan of the Day onto the Catalog

**Deputy Director** (1) (Dunion, Bell, Moskaitis, Hendricks, Sanabia, Moore)

• Responsible for all facets of operations; coordinates with Mission Science Director

• Coordinate aircraft ops and support with Mission Science Team

• Responsible for CARCAH reports

• Responsible for facilities and instrument coordination

• Coordinate with TCI Aircraft Field Rep; establishes and maintains communications with the Aircraft Operations Center

• Monitors the status of all TCI facilities, including the use of expendable resources allocation/utilization account of flight hours

• Status Report at Science and Operations meeting at 330pm EDT

**Mission Science Team** (4-5) (Doyle, Harr, Molinari, Tripoli, Velden, Bell, Moskaitis, Hendricks, Majumdar, Black, Komaromi, Ryglicki, Cecil, Wang, Pu, Lewis, McNoldy)

• Operate flight planning software

• Real-time monitoring of current flight

• Coordinate the upcoming flight plans

• Participate and advise in the 8am meeting and 330pm EDT meetings

• Formalize the mission plan and report to Science Director the plan

• Advises Mission Science director

**Data Manager and Analysts** (2-3) (Molinari, Bell, Creasy, Tripoli, Komaromi, Majumdar, McNoldy, graduate students, post docs)

• “Dropsonde Czar”

• Data flow from aircraft to prelim QC, quicklooks, data portal and access from field catalog, MTS, to archive

**Field Catalog and MTS Support** (2) (Stossmeister, Duley)

• Responsible for support of field catalog and MTS; training; limited scientist support

Forecasting Team (Velden, Herndon, Komaromi)

• Coordinates with Mission Science Director on targets, logistics

• Responsible for scheduling forecasting and nowcasting support

• Report uploaded to catalog and overview given at daily planning meeting

**NOAA SHOUT Mid-Shift** (1)

**On-site Aircraft Operations**

TCI Aircraft Field Reps (2 people) (Feldmeier, Hendricks, Moskaitis, Ryglicki, Cecil, Sanabia, Cossuth, others)

• Lead interface between NASA and Mission Science Director and Deputy Director

• Use MTS and Flight planning tools

• Make last minute small changes to the flight plan in coordination with NASA

• Provide Flight Plan brief to NASA

• Participate in Flight Debrief

**HDSS Lead** (1) (Mark/Lee)

**HDSS Support** (3) (Ryglicki, Cossuth, McNoldy, students, post docs)

• Load the sondes

• Quicklook of data

• Download data from the plane

**Daily Timeline and Schedule**

0800 EDT: TCI Flight Planning Meeting

-Science Director will decide if the 0800 Flight planning meeting is required (during non-IOP)

-Discuss potential targets

-Discuss deployment logistics (aircraft & personnel)

-TC nowcast and forecast brief

-Flight Planning decision (MTS Plan)

-Aircraft flight decision: GO/ NO–GO/ DELAY

-IFEX/SHOUT coordination

-Begin future brainstorming WB-57 flight patterns

0930 EDT: Submit POD to CARCAH

-Revise flight plan way points and “tomorrows plan” in POD

1000 EDT: Aircraft OPS Center, Flight plan review with Aircraft operators

-Minimally revise flight plans and sonde drop locations with Aircraft operators

-Transmit to flight crew

1000 EDT: Coordination call with NOAA IFEX & SHOUT

-Highlight interest in TC

-Discuss IFEX & SHOUT interests & targets with a small group

-NOAA HRD telecon line (866-700-1361; 491147)

1030 EDT: Plan of the Day email and EOL TCI Site

 -Operations

 -Aircraft Status

 -Instrument Status

 -Personnel

T0-3.5hours: Aircraft Team Planning (non-flying crew, scientists)

T0-2.5hours: Aircraft Crew Brief

T0: Launch Aircraft

1200 EDT: NOAA HRD weather discussion (~20 min)

-Highlight TC

-NO WEEKEND BRIEFINGS

1530 EDT: TCI Science and Operations discussion

-Science Director will decide if the 0800 Flight planning meeting is required next day (during non-IOP)

-Weather discussion and forecast

-Emphasis on TC when in IOP

-Summary of ongoing and planned TCI operations and data collection

-Proposed mission objectives for the upcoming or next phase of IOP

-Facility status and flight hours

-Propose deployment or mission planning

-NOAA HRD TCI weather discussion on WEEKEND

T0+5.5 hours: Recover Aircraft

-L+0.5 Flight Debrief

**5 Day TCI Timeline and Communications with the NASA Flight Operators**

**T0–5 da (120 hr):**

* Notify WB-57 Team of possible flight in 5 days by 1330Z (0930 EDT): estimate large region location with box coordinates
* TCI daily planning meeting (DPM) 1930Z (1530 EDT)

**T0–4 da (96 hr):**

* GO/ NO**–**GO Deploy Decision submit to WB-57 and Aircraft Ops team by 1700Z (1300 EDT)
* Send Aircraft Ops personnel names to verify base access to forward deployment locations
* TCI daily planning meeting (DPM) 1930Z (1530 EDT)

**T0–3 da (72 hr):**

* TCI Flight Planning Update, 1230Z (830 EDT)
* Verify GO/NO**–**GO Deploy Decision by 1700z (1300 EDT)
* WB-57 Equipment ship from Ellington
* CARCAH POD: Submit comment on possible mission by 1330Z (0930 EDT)
* TCI daily planning meeting (DPM) 1930Z (1530 EDT)

**T0–2 da (48 hr):**

* TCI Flight Planning Update, 1230Z (830 EDT)
* Verify GO/NO**–**GO Deploy Decision by 1700z (1300 EDT)
* Aircraft Ops team and WB-57 Personnel travel
* Develop Flight plan including way points and drop points, send to Aircraft Ops Lead for submission to WB-57 team
* CARCAH POD: Submit by 1330Z (0930 EDT)
* Type
* Date
* Take-off time
* On-station time
* large box coordinates: ‘outlook’ section
* flight region coordinates
* center point
* initial point
* TCI daily planning meeting (DPM) 1930Z (1530 EDT)
* Revise flight plan as necessary

**T0–1 da (24 hr):**

* TCI Flight Planning Update, 1230Z (830 EDT)
* Verify GO/NO**–**GO Deploy Decision by ????z
* WB-57 Aircraft Deploys to forward deployed location
* Revise Flight pattern way points and sonde points, send to Aircraft Ops Lead for submission to WB-57 team
* Aircraft crew and TCI Aircraft OPS update flight plan and submit to MTS/EOL Catalog
* Revise mission parameters and submit CARCAH POD by 1330Z (0930 EDT)
* Date/ Take-off time,
* On-station time
* center point,
* initial point
* Revise flight plan way points: ‘tomorrows plan’ section in CARCAH POD
* TCI daily planning meeting (DPM) 1930Z (1530 EDT)
* Revise flight plan as necessary

**T0 Flight:**

* TCI Flight Planning Update, 1230Z (830 EDT)
* Aircraft flight decision: GO/ NO**–**GO/ DELAY
* Revise mission parameters and submit CARCAH POD by 1400Z (1000 EDT)
* Date/ Take-off time,
* On-station time
* center point,
* initial point
* Revise flight plan way points: ‘tomorrows plan’ section in CARCAH POD
* Revise Flight pattern way points list, transmit to flight crew
* Revise Sonde location and times, transmit to flight crew
* Aircraft crew and TCI Aircraft OPS update flight plan and submit to MTS/EOL Catalog
* WB-57 Pre-flight Meeting
* Real-time monitoring of flight**–** send necessary in-flight changes to Aircraft Ops Lead
* TCI daily planning meeting (DPM) 1930Z (1530 EDT)
* Flight Debrief