

NASA's Convective Processes Experiment - Cabo Verde (CPEX-CV) Science Team Meeting

2022 MEETING REPORT



July 18–21, 2022
Sheraton Pasadena Hotel
Pasadena, CA

[Webpage for the meeting](#)

Presentation Archive:

- All presentation slides are archived according to the agenda on the NASA LaRC [CPEX-CV data portal](#) page for the Science Team Meeting
- User ID: *cpex* Password: *tropical@22*

Meeting Summary:

The NASA CPEX-CV leadership team held the first formal, in-person Science Team Meeting of the program, with a virtual option for remote participants. The meeting agenda (below) consisted of three full days and one-half day, mixing scientific talks and discussion, instrumentation tutorials, collaborator presentations, team building exercises provided by Periscope Theory, a three-day Dry Run for the upcoming field phase, and an overview and discussion of field program logistics. Early Career Scientists were given opportunities to present in either oral or poster formats, with a formal poster session occurring on Wednesday afternoon, and led the forecast preparation and delivery for the Dry Run. Much of the science discussion, including within designated breakout periods, were around developing, synthesizing, and understanding science priorities and flight strategies among the CPEX-CV science team.

During the Dry Run, the forecast team prepared and delivered a “real-world” forecast to the team, and the full science team discussed flight plans and science priorities for flights. Then, designated Mission Scientists (rotated amongst the in-person participants) prepared a flight pattern during the lunch period and briefed the plan to the full team after lunch. The final step was a quick debrief the following day, using current conditions, to discuss how the “ongoing” flight and strategy may have changed in-flight based on the actual weather occurring in the pattern area.

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Action Items:

The following is a list of action items that were presented upon the closure of the meeting...

Science Leadership [Jon Zawislak, Ed Nowotnick, and Amin Nehrir]

The following items still need to be finalized before the field phase begins:

- CPEX-CV Mission Plan
- Mission Scorecard (product of the Flight Planning Subgroup)
 - Including coordinated requirements with ASKOS and CAVA-AW
- Daily Schedule
 - Including accounting for daytime v. early morning missions
- Participant Schedules – **get those travel plans finalized!**
- Roles and Responsibilities (especially in the context of the Daily Schedule and crewing)
- Science Traceability Matrix
- Mission rules for the DC-8
- Coordination with NOAA and CAVA-AW on aircraft deconfliction
- GTS pipeline for dropsonde/RAOB operational data transmission
- Setup of MTS accounts for the team
- Working with INMG (meteorological institute in Cabo Verde) to assist in local conditions and forecast products

Flight Planning Subgroup [led by Angela Rowe and Naoko Sakaeda]:

- Before the next biweekly meeting (on Aug. 2nd) the science team needs to revisit the combined Mission Scorecard ([link](#)) and fill in and update the scorecard based on our flight planning discussions during this STM.
- There will be another meeting outside of the biweekly meetings to tag up with the Science PIs after this process, to move towards completion of the Mission Scorecard.

Forecasting Subgroup [led by Shun-Nan Wu and Ben Rodenkirch]:

- Figure out who is developing and running the website that contains all the mesoscale model outputs
 - Last year, this was https://orca.atmos.washington.edu/models_cpex_aw/models.php
- Finalize forecasting schedule for the field campaign
 - Account for potential rapid shifts in adjacent day's flight schedules
 - Divide and conquer – one forecasting crew working the next flight and a second crew working the following flight
- Finalize the forecasting template in PowerPoint

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- o Add in satellite tracks (work with Svetla and Roman) and maybe ASKOS aerosol plots?
- Once all the mesoscale models are running, update and finalize the scripts that download the imagery
 - o Assure the scripts work across all operating systems
- Virtual meeting/dry-run with the entire forecasting team in August to familiarize everyone with the scripting process (i.e., downloading the imagery and updating the forecasting template)
 - o Get all bugs/issues sorted out before the field campaign starts

DC-8 Management [Kirsten Boogaard and Brian Hobbs]:

Actions for the CPEX-CV team:

- Finalize DC-8 QNC paperwork and medical questionnaire – ASAP
- Finalize August check flight manifest (ASAP), and transit manifest
- Instrument teams need to send their export control paperwork for the aircraft

Actions for the DC-8:

- Map of FIR boundaries / warning area near Senegal – where are the airspace restrictions?
- Finalize mission rules – adding in convective cloud (IMC) penetration at low altitudes (below 3 km to min altitude of 500 ft)
- Aircraft deconfliction with Slovenian light aircraft (C.V.), the NOAA G-IV (C.V. and Central Atlantic), and the NOAA P-3s and USAFR C-130 (Central Atlantic)

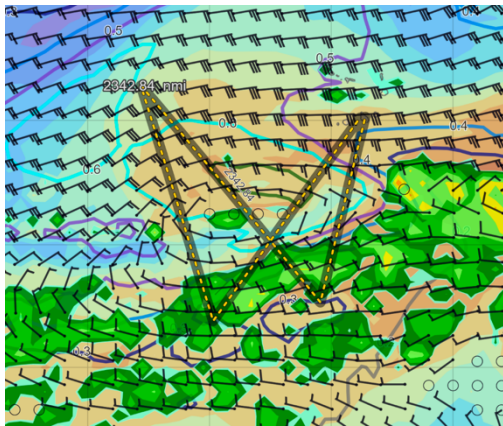
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Dry Run Summary:

Tuesday, July 19 – Day 1

- Mission Scientists: Jeff Reid, Angela Rowe, Ed Nowotnick, and Shu-Hua Chen
- Alerted for potential flights for the next three days
- Identified science priorities and planned a flight for next day (Wednesday, Day 2)



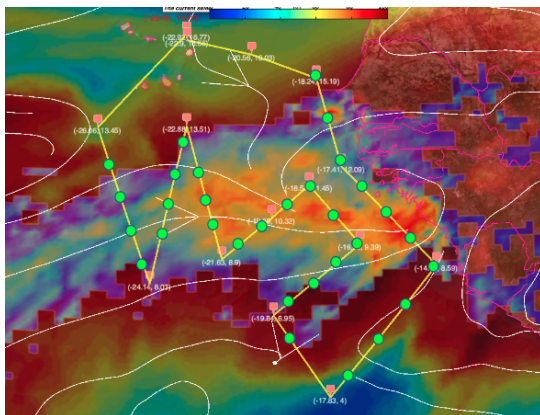
Takeoff: 1100 UTC (1000 Local), Day 2

Targets:

- Dust (primary) – gradients in moisture in dust layer, lower altitude legs of in-situ sampling, RH effects on dust optical properties, dust impacts on environment (look for shear zones), look for isolated convection/congestus for low-altitude sampling
- Convection (secondary) – during southern points, evaluate potential convective module, sample convection along edge of gradient (dry slot)

Wednesday, July 20 – Day 2

- Mission Scientists: Naoko Sakaeda, Jon Zawislak, Ed Zipser, Svetla Hristova-Veleva, Ewan Crosbie
- Briefed “ongoing” mission plan from previous day
- Alerted for potential flights for the next two days
- Identified science priorities and planned a flight for next day (Thursday, Day 3)



Takeoff: 1200 UTC (1100 Local), Day 3

Targets:

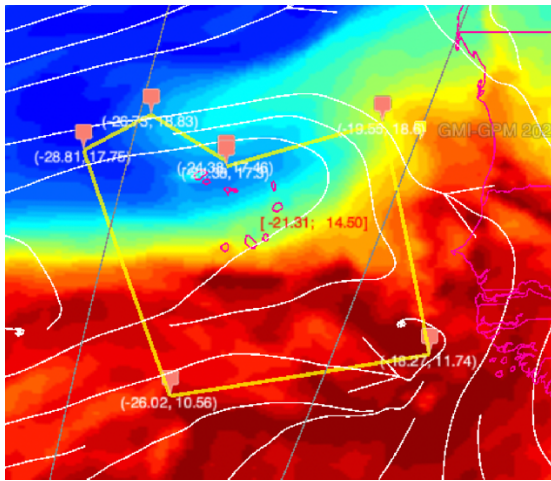
- ITCZ (primary) – eastern boundary, south to southeast of C.V.; why is there convection within the ITCZ or not? (null ITCZ?)
- Offshore Convection (primary) – southwest of Senegal, west of Guinea; focused mainly on the near environment of convection rather than individual convective systems
- CALIPSO (secondary) – will overfly near northern point of north to south coastal run
- Fly as high as possible in convection; 7-8 km (definitely below cirrus) outside of clouds

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Thursday, July 21 – Day 3

- Mission Scientists: Alan Brammer, Ed Nowotnick, Zhaoxia Pu, Roman Kowch
- Briefed “ongoing” mission plan from previous day
- Alerted for potential flights for the next two days
- Identified science priorities and planned a flight for next day (Friday, Day 4)



Takeoff: 1300 UTC (1200 Local), Day 4*

Targets:

- Dry Air / Dust (primary) – northeast and northwest of Sal
- Aeolus (primary) – underflight, overpass of Mindelo ASKOS ground site on return to Sal, coordinate with CAVA-AW aircraft
- AEW (secondary) – sample axis of emerging AEW off the coast of West Africa
- ITCZ (secondary) – convective modules on southern leg
- Fly as high as possible in convection; 8 km when in dust

*mission was not debriefed as the meeting concluded

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Notes, when available, are provided after each daily agenda

Monday, July 18:

Welcome, Meeting Logistics, CPEX-CV Overview	
8:00a – 8:20a	Check-in
8:20a – 8:40a	Welcome and Meeting Logistics <i>NASA HQ and ESPO</i>
8:40a – 9:00a	Overview of CPEX-CV <i>Jon Zawislak, Ed Nowotnick, Amin Nehrir</i>
9:00a – 9:20a	Collaborator Presentation: ASKOS & CAVA-AW (JATAC) <i>Eleni Marinou and Grisa Mocnik</i>
9:20a – 9:30a	BREAK
Team Building – Session #1	
9:30a – 11:30a	Periscope Theory – Exercise #1 <i>Rebecca Toll and Erin Zimmermann</i>
11:30a – 1:00p	LUNCH
Science Team Presentations – Session #1	
15 min presentation + 5 min for Q&A; presenters can show progress in -AW research and should plan to communicate needs for -CV based on that research or their new/revised research priorities	
1:00p – 1:20p	Hui Su (for Shuyi Chen)
1:20p – 1:40p	Shu-Hua Chen
1:40p – 2:00p	Sun Wong (for Bjorn Lambrigtsen)
2:00p – 2:20p	Ed Nowotnick
2:20p – 2:40p	Zhaoxia Pu
2:40p – 3:00p	Angela Rowe
3:00p – 3:10p	BREAK
3:10p – 3:30p	Naoko Sakaeda
3:30p – 3:50p	Ed Zipser
3:50p – 4:10p	Jon Zawislak
Collaborator Presentations	
Presentation time varies, but please leave at least 5-10 min for Q&A	

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4:10p – 4:40p	ONR TCRI / MAGPIE <i>Jeff Reid</i>
4:40p – 5:00p	NOAA APHEX / ITOFS-East <i>Jason Dunion, Jon Zawislak</i>
5:00p – 5:15p	CALIPSO <i>Roman Kowch, Chip Trepte</i>
END OF DAY	

Welcome, Meeting Logistics, CPEX-CV Overview:

- NASA HQ provided a perspective on CPEX-CV and programmatic priorities
- CPEX-CV Science Leadership (Zawislak and Nowottnick) presented slides on the following:
 - the “state of the program”
 - leadership philosophy
 - expectations for the science team meeting
 - the organizational chart
 - roles and responsibilities, definitions
 - the Dry Run process and expected outcomes of the Dry Run
 - the project science objectives
 - the science traceability matrix
 - and a brief overview of the project collaborators (HIWC, NOAA APHEX/ITOFs-East, ONR TCRI/MAGPIE, WindBorne Systems, and CALIPSO)
- ASKOS/CAVA-AW:
 - Encourage collaborative discussion in Dry Run and real-world flight planning, so that we can develop cohesive patterns between the DC-8 and the Slovenian aircraft; e.g., overflight of Mindelo, stacked flight patterns between aircraft, and aircraft underflight of Aeolus.
 - Dry Run flight planning for Friday of this meeting would be ideal, since our most likely coordination in the field would happen for the Friday Aeolus overpass, since it passes very close to the Mindelo ground site.

Team Building – Session #1

- Periscope Theory introduced their goals for the team, insights from the survey and interviews, and priorities for the meeting.
- Group activity, pairing up science team members at different career stages to get to know each other; for example, what excites you about being at the meeting? what is something you want to learn during the meeting? and what is a hidden talent and/or hobby? – some pairs shared their discussions with the group.
- Covered the NASA Code of Conduct, as well as the specific Code of Conduct developed for CPEX-CV; team had a chance to digest and provide anonymous feedback on these Codes.

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- Quite a bit of discussion occurred about bystander intervention, and how team members can report (and who to report to) on inappropriate behavior, complaints, etc. with assurance of no retaliation and anonymity.

Science Team Presentations – Session #1

While certainly not all inclusive, here are a few points that may be of interest that came out of these presentations:

- At times, it will help to include Ryan Torn's (SUNY at Albany) ensemble sensitivity products in flight planning as these "targeted" measurements (dropsondes) could be used to assess the impact of CPEX-CV measurements on downstream forecasts.
- Measurements across the gradient regions of moisture, temperature, winds, and aerosols are of particular interest to a number of Science PIs
- This year, we hope to fly some lower altitude legs, particularly through congestus clouds embedded in dust, dust intrusions into the boundary layer, and through the nose of the SAL, where we can sample dust in-situ (e.g., with the CAPS probe) in addition to the lidar remote sensing on the DC-8.
- Consider higher SNR and cirrus avoidance from remote sensors by flying a bit lower, which could provide better resolution of PBL features.
- Keep in mind that we would like to sample a range of convective systems, across their lifecycle, within a variety of ambient environments (humidity, moisture, shear, AEW v. non-AEW).
- Consider advanced processing from APR-3 to include products such as hydrometeor typing and vertical velocity.
- We all need high quality dropsonde data, and let's not be shy of dropping enough sondes to accomplish the science when the opportunities arise.
- In addition to our planning for flights, keep in mind we'll be launching radiosondes at least 3 times a day from Sal, and WindBorne Systems will be launching long-duration profiling (up/down) balloons from Sal, as well. Those measurements could be considered in your sampling strategies by extending measurements on flight days, or filling some gaps in measurements on off days.
- Rainfall peaks over land (western Africa) over the coastal region in the afternoon, and stronger and prolonged precipitation offshore during the morning hours – what is the key factor to compare between West Africa offshore propagation and what we observed from Puerto Rico last year?
- No matter how good our forecasts are, flying MCSs will be challenging, and it's likely many of them will already be decaying when we fly them!

Collaborator Presentations

- ONR MAGPIE/TCRI: Maximize HALO, DAWN, APR-3 utility, including 6 km flight level scans of the marine boundary layer and dust events. Fly cases that have a chance to develop into TCs and rapidly intensify downstream in the Atlantic, ideally to be subsequently flown by NOAA aircraft.
- WindBorne Systems: ready to fly long-duration, semi-controllable (altitude) balloons out of Cabo Verde beginning on July 21

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- NOAA's APHEX program: is looking to send the NOAA G-IV jet to Cabo Verde at least once in July/August to complete their ITOFS-East (Impact of Targeted Observations on Forecasts – East Atlantic) program; possibly another deployment to C.V. in September to fly with the DC-8, if enough time is available (meaning, the airplane won't be needed to fly hurricanes for NHC in the western Atlantic for several days). Either way, we need to look for opportunities to fly systems that will be of interest to NOAA flights downstream, and potentially even handshake flights between the DC-8 and NOAA aircraft in the central Atlantic. APHEX also has genesis experiments that fit within the scope of CPEX-CV.
- CALIPSO: gain further insight into the a priori assumptions used in lidar aerosol extinction retrievals (lidar ratio for marine boundary layer in the SAL); evaluate the performance of aerosol-cloud discrimination feature mask algorithm in the presence of weakly and strongly enhanced aerosol loading conditions and in the presence of broken cumulus; aid in the interpretation of the long CALIOP dataset – interested in flying 6 km and below.

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Tuesday, July 19:

CPEX-CV Dry Run — Day #1	
8:00a – 10:00a	{Breakout} Dry Run Forecast Production <i>CPEX-CV Forecasters</i>
9:00a – 10:00a	{Breakout} General Flight Planning Discussion Session #1 <i>Science PIs, Instrument PIs, Mission and Flight Scientists</i> A broad discussion about the mission scorecard and synthesizing flight patterns to meet CPEX-CV objectives
10:00a – 10:15a	BREAK
10:15a – 11:15a	Dry Run Forecast Brief and Flight Planning for Day 2
11:15a – 11:30a	GEO Worldview Tutorial <i>Bob Holz or Ralph Kuehn</i>
11:30a – 12:00p	JPL CPEX-CV Portal (New Products) <i>Svetla Hristova-Veleva</i>
12:00p – 1:15p	LUNCH Mission Scientists Produce Flight Plan for Day 2
1:15p – 1:30p	Mission Scientists Brief Dry Run Flight Plan for Day 2
Team Building – Session #2	
1:30p – 3:30p	Periscope Theory – Exercise #2 <i>Rebecca Toll and Erin Zimmermann</i>
3:30p – 4:00p	BREAK and POSTER VIEWING
Instrument PI Tutorials	
Instrument teams will provide abbreviated instrument and data product overviews (no more than 10 min), then will offer time for team members to ask questions, and discuss synergies between the datasets	
4:00p – 4:45p	Lightning Talks: DAWN, HAMSR, HALO, APR-3, Dropsondes, CAPS
4:45p – 5:30p	Q&A and Discussion
END OF DAY	

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CPEX-CV Dry Run — Day #1

- The CPEX-CV forecast team produced a 5-day forecast
- See Dry Run Summary earlier in the document for real-world flight planning for Day 2
- Svetla provided an update on new capabilities in the CPEX-CV JPL visualization portal
- Willem Marais gave a tutorial on the NASA GEO-Worldview interface, in the context of CAMP2Ex

General Flight Planning Discussion – Session #1

- Primary categories defining the commonalities in our science plan:
 - dust and convection
 - ITCZ and convection
 - AEW and convection
 - satellite validation/underflight
 - question to consider: what other satellites should we focus on?
- Ultimately, flight planning submissions covered widely varying level of details, dropsonde patterns, and covered entirely too many required hours! We need to continue to pare it down.
- Some discussion points:
 - Do we have the same definition of terminology; e.g., “storm”, “environment”, “wave”, and “ITCZ”? It would help us to if we could settle on some common terminology that the team can use
 - Something to consider: when can you check off the target on the scorecard?
 - What is the optimal use of dropsondes (where and how frequently)?
 - How do we obtain the desired number of samplings for all flight targets within the limited flight hours? Can we prioritize based on climatology?
 - AEW or wave definition and interests:
 - interested in the jet structure but the trough axes, as well
 - the challenge is every wave is quite different – there is wave-to-wave variability; often times the trickiest ones to track are the lowest amplitude and confined to 700 mb.
 - in September, we might see more transient waves and opportunities that trigger TC development
 - When we say, “associated with AEWs”, thinking of convection at different state of the waves, not just regions where intensification is expected, but also non-developing
 - While it’s commendable that we have a mission scorecard to check off, it will be challenging to check all of it off because of the variety of things we want to fly each day; at the end of the day weather dictates what we do and each target will be different. The mission scorecard is meant to serve to guide decision making and we cannot strictly adhere to it.
 - It’s important in all flight planning that we trace the measurement strategies to the science objectives
 - Climatology of targets:

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- Don't expect to have be able do the full lifecycle of an MCS, especially since it's hard to sample growing convection (sometimes just fortuitous!)
- SAL events drop off in September
- Land to ocean events – climatology is 1 every 9 days
- o Always have an extra hour on station and it could help to plan and communicate to the crew about A & B plans.
- o We'll have an opportunity, though tricky as it is, to shift flights between early morning and daytime hours; let's have an envelope for when things are more probable vs. less probable
- o Action: need to identify climatology for targets that are more often vs. things that are less frequent – when we encounter a target that is less frequent, we need to prioritize it.
- o Understand the consequences if we make modifications mid-flight – it requires trust and communication between mission (ground) and flight scientists.
- o One flight scientist is the point of the contact with the DC-8 crew this year

Team Building – Session #2

- Discussed the balance between flexibility and rigor (polarity management)
- Discussed the 5 D's of Bystander Intervention (Direct, Distract, Delegate, Delay, and Document)
- The team split into small groups and ran through a scenario exercise where we had to discuss where our scenario fit into the NASA and CPEX-CV Codes of Conduct, had to identify a Bystander Intervention strategy to use in the scenario, and analyze potential challenges, opportunities, and oversights. We all had a representative present to the full team what we discussed in each of our scenarios.

Instrument PI Tutorials

- Each instrument team representative gave a talk on their instrument and associated products
- APR3 – providing level-3 products like hydrometeor typing and vertical velocity is very dependent on the calibration of the data; also, remember that there is a blind region below and above the aircraft, which increases in distance from the W-band to the Ku-band to the Ka-band
- AVAPS: we appear to be in good shape for the year, but remember – make the turn, then drop!

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Wednesday, July 20:

CPEX-CV Dry Run — Day #2	
8:00a – 10:00a	{Breakout} Dry Run Forecast Production <i>CPEX-CV Forecasters</i>
9:00a – 10:00a	{Breakout} General Flight Planning Discussion Session #2 <i>Science PIs, Instrument PIs, Mission and Flight Scientists</i>
10:00a – 10:15a	BREAK
10:15a – 12:00p	Debrief of Previous Days' Flight Plan Dry Run Forecast Brief and Flight Planning for Day 3
12:00p – 1:15p	LUNCH Mission Scientists Produce Flight Plan for Day 3
1:15p – 1:30p	Mission Scientists Brief Dry Run Flight Plan for Day 3
Science Team Presentations – Session #2	
12 min presentation + 3 min for Q&A	
1:30p – 1:45p	Ben Rodenkirch (Rowe)
1:45p – 2:00p	Chu-Chun Huang (S-H Chen)
2:00p – 2:15p	Shun-Nan Wu (Sakaeda)
2:15p – 3:30p	BREAK and POSTER VIEWING
CPEX-CV Logistics	
3:30p – 4:00p	Field Phase Daily Schedule Discussion <i>Jon Zawislak, Ed Nowotnick, Amin Nehrir</i>
4:00p – 4:30p	Field Program Logistics <i>ESPO, DC-8</i>
4:30p – 5:00p	Data Management <i>Gao Chen</i>
5:00p – 5:30p	Q&A and Other Topics
END OF DAY	

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CPEX-CV Dry Run — Day #2

- The CPEX-CV forecast team produced a 5-day forecast
- We debriefed the “ongoing” flight
- See Dry Run Summary earlier in the document for real-world flight planning for Day 3

General Flight Planning Discussion – Session #2

- The team went through an excellent exercise where scientists with common interests came together in three breakout groups on three selected cases (that each cover the three common themes identified from the flight planning submissions) to work out a single plan to present to the group. Angela and Naoko picked out three days where some PIs created example patterns for:
 - 1 September 2021: had an organized convective system associated with an AEW, dust impacts on convection, and a possible TC development south of Cabo Verde [AEW and convection]
 - 10 September 2021: had offshore propagating convection, an organized convective system, ITCZ convection, and an associated AEW [ITCZ and convection]
 - 6 September 2021: had isolated convection within a strong SAL outbreak [dust and convection]
- The charge of the exercise was to consider the following:
 - Can you design a flight plan that would meet multiple objectives without compromise? If not, what are the compromises? Which objectives could best be met with this plan?
 - Be specific on locations/goals of dropsondes
 - Be specific on flight levels (in consultation with instrument PIs)
 - What is the total flight duration, is the scenario time of day dependent, and what do those answers mean for back-to-back flights?
 - What questions do you have in terms of flight logistics/safety?

Science Team Presentations – Session #2

- Three early career scientists in the program gave excellent presentations on their research: Ben Rodenkirch, Shun-Nan Wu, and Chu-Chun Huang.

CPEX-CV Logistics

- *Data Management*
 - LaRC will host the CPEX-CV field data (prior to final archival of data to the DAACs) and document archive: user id: cpex, password: tropical@22
 - Need to be answered: where can we download quicklooks from our instrumentation? who is going to host them, the JPL portal? the LaRC portal?
 - There's concern about the risk if quicklooks are publicly available on the JPL Portal. Need to talk to each instrument team about whether they're comfortable with posting quicklooks publicly. One solution could be to place watermark on the quicklook image, or put on a “do not cite” on the quicklook image.

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- *Daily Schedule Discussion:*
 - Make sure you're aware of many stressors that could occur while you're in the field (e.g., being away from family for so long, time zone differences, exhaustion, not feeling integrated with the team). Periscope Theory has provided some methods to address these, especially if you observe it in a team member
 - Let's have trust and support each other
 - ESPO will try to organize social events in the field
 - Risk/protective factors – hard to reduce risk factors, but it is possible to increase protective factors

- *Feedback during the Daily Schedule Discussion:*
 - The challenge is how to handle the schedule for early AM v. PM takeoffs – do we have people on two separate schedules, or do we shift the entire teams' schedule?
 - One suggestion for above was to start the field program on a certain takeoff time, for at least a week to 10 days, and then evaluate when we would switch
 - Let's give ourselves enough time to get the navigator comfortable with the plan!
 - Is there a set schedule ahead of time of who will be the mission/flight scientists on each day? Answer: not yet, but will work up a plan for this ahead of the program (i.e., do we have a set schedule, or play it by ear, day to day when we get there?)
 - We would like to have two science crews working at once – one is preparing for the flight T-1 day, and another prepping for T-2 days – need to have enough people in the field at once
 - Our daily schedule plans will then dictate shuttle service to/from the hotel and airport
 - We're taking this feedback back with us to work on the schedule after the meeting

- *ESPO:*
 - Everyone must register with EASE 5 days before travel to Cabo Verde
 - Arrival tax – can pay tax on arrival in cash (Euros) or credit card (Visa or Mastercard)
 - USD not accepted anywhere – only Euros or the local currency
 - See the Introduction Letter from Vidal – check to make sure your name is on the list – carry this with you
 - Check to see how long HTSOS is valid vs. CTAT – this is NASA center specific
 - International lines at Lisbon airport are very long (~1 hr)
 - How long did it take to get back into airport if you left it in Lisbon? Answer: 30-35 mins
 - May consider getting a hotel close by the airport in Lisbon for longer layovers – it's reimbursable
 - NASA Civil servants – have to specify locations on IT and you'll have to check with your center to make sure you don't need a visa; non-NASA civil servant passports don't need visas prior to arrival – can get them on arrival in Cabo Verde
 - Need to talk to Vidal about a meeting room to use at the hotel
 - Portugal doesn't require a Covid vaccination card or PCR test – Cabo Verde requires one or the other on arrival
 - suggest downloading an official copy of your vaccination card
 - 3 vaccinations are considered good – if you have at least one booster, you are OK

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- 270 days for those with J&J and only 2 shots
- DC-:8
 - o 7-hour flight means we can take off the same the next day; an 8-hour flight means we would have to push an hour later the next day
 - o One navigator will be on the ground during planning – typically they file the plan that they fly
 - o Reviewed potential mission rules (e.g., hazard avoidance, minimum altitudes over land v. ocean, night v. day differences, T-minus schedule)
 - o Can't fly on same day as you get the egress training
 - o Reviewed an event that occurred during HIWC that has been mischaracterized as a depressurization.

Poster Viewing:

Poster Presenters	
Longtao Wu, Hui Su, Derrick Posselt, Xubin Zeng, Shuyi Chen	Uncertainty of Atmospheric Winds in the Reanalysis Datasets
Allan Lee	Using CPEX-AW Observations for Model Performance Evaluation
Alexis Wilson	Observed Structural and Environmental Characteristics of Pre-Ida (2021) during CPEX-AW
Jon Zawislak	A Look Back at the Flights of NASA's African Monsoon Multidisciplinary Analysis (NAMMA) Experiment in 2006
Brian Knosp	The CPEX-CV Portal: Data and Tools to Enable Planning and Investigations
Margaret Hollis	A Late-summer Climatology of Tropical Easterly Waves Over North Africa and the North Atlantic Ocean

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Thursday, July 21:

CPEX-CV Dry Run — Day #3	
8:00a – 9:30a	{Breakout} Dry Run Forecast Production <i>CPEX-CV Forecasters</i>
8:00a – 9:30a	{Breakout} General Flight Planning Discussion Session #3 [if necessary] <i>Science PIs, Instrument PIs, Mission and Flight Scientists</i>
9:30a – 10:45a	Debrief of Previous Days' Flight Plan Dry Run Forecast Brief and Flight Planning for Day 4
10:45a – 11:15a	BREAK Mission Scientists Produce Flight Plan for Day 4
11:15a – 11:30a	Mission Scientists Brief Dry Run Flight Plan for Day 4
Meeting Wrap-up	
11:30a – 12:00p	Wrap-up, Action Items, Final Planning <i>HQ, ESPO, Science Leadership</i>
END OF MEETING	

CPEX-CV Dry Run — Day #3

- The CPEX-CV forecast team produced a 5-day forecast
- We debriefed the “ongoing” flight
- See Dry Run Summary earlier in the document for real-world flight planning for Day 4

General Flight Planning Discussion – Session #3

- We were quizzed on the flight patterns developed by other breakout teams (the ones we didn't ourselves participate in) in the previous day's session to test whether we understood other people's science objectives for the flight plan, targets, measurement requirements, and dropsonde strategies.
- We then returned to the Mission Scorecard to discuss how we will revise it; e.g., how we can get more specific, and find synergies to begin paring down the scorecard to a reasonable number of targets given our 100 hr flight hour allocation.

Meeting Wrap-up

- Presented the Action Items listed earlier in this meeting report.