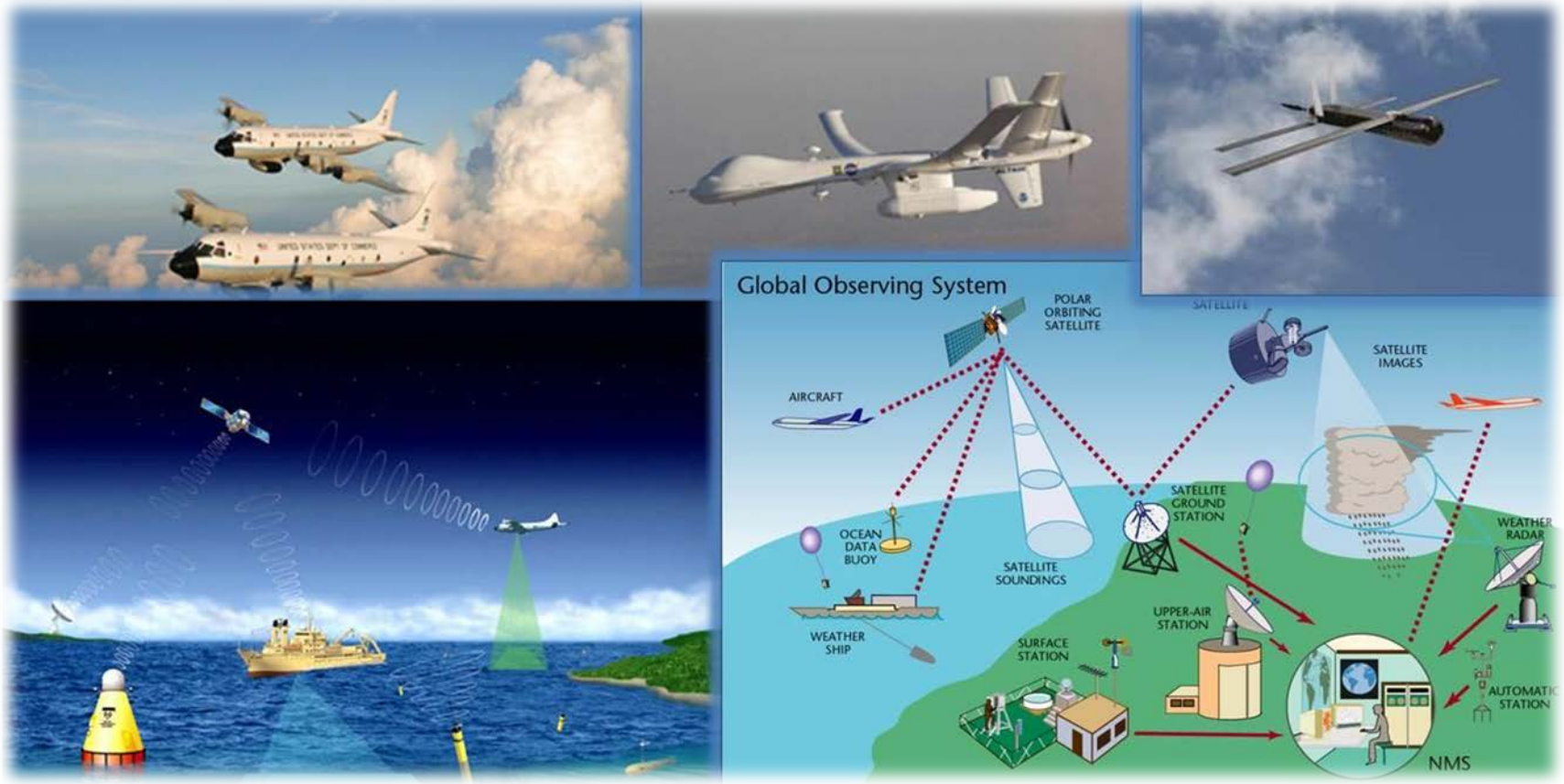
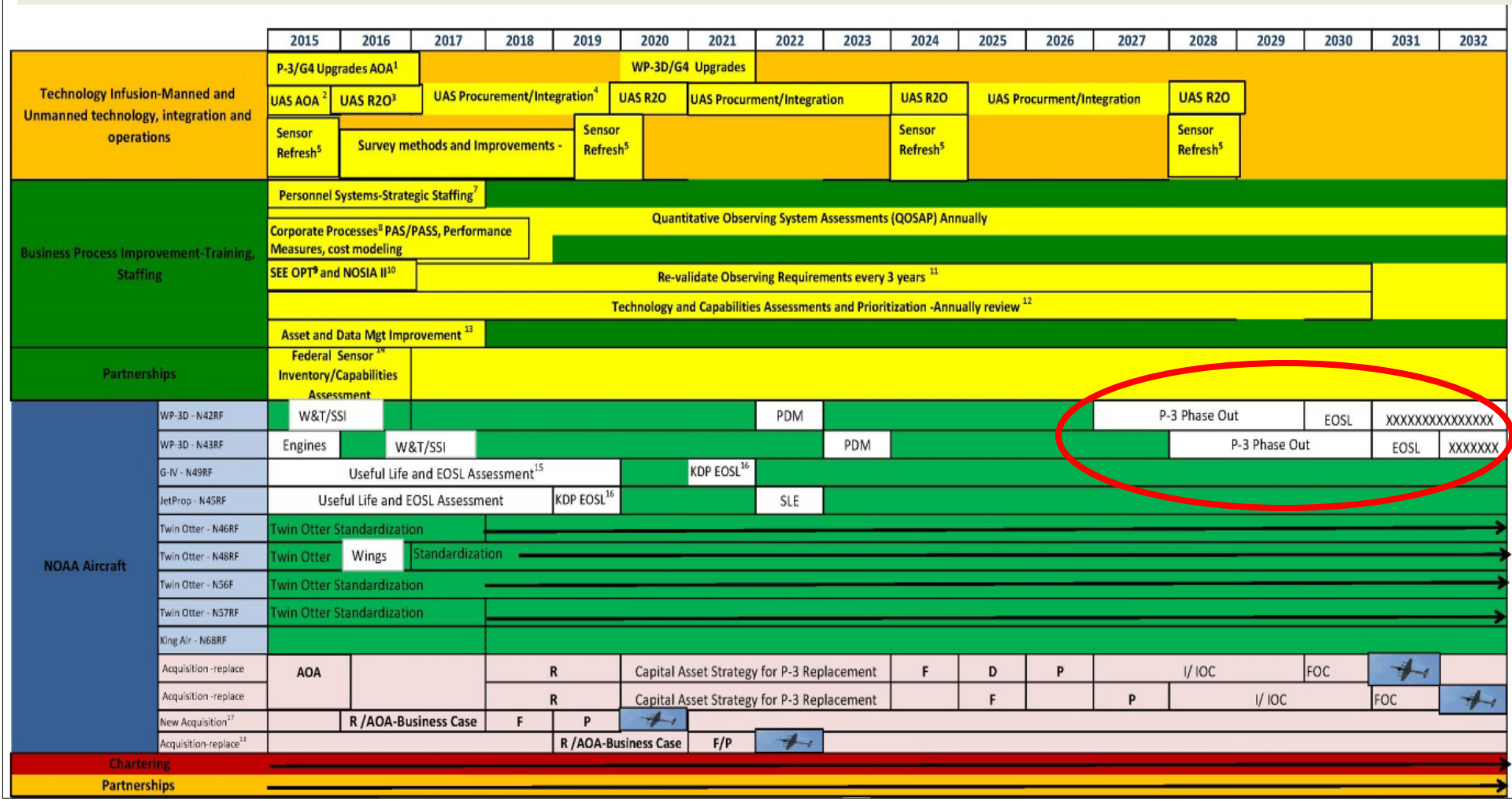
Observing Systems: *Research* and Operational Airborne Fleet in 2030

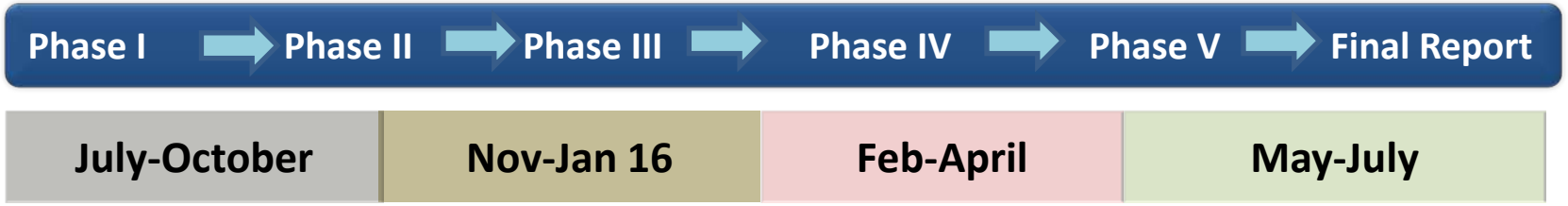


NOAA Aircraft EOSL and Capital Investment and Asset Planning



P-3 Replacement AoA- Timeline

- Phase I-Prioritize mission and data requirements, review procedures, platforms and instruments; use of aircraft observations in hurricane forecasting
- Phase II-Assess current and future needs for Observations
- Phase III-Evaluate Sensor/Platform Technology, Expendables, Data collection trends
- Phase IV-Assess and optimize Instruments, sensors, systems, R&D
- Phase V-Life Cycle Cost Analysis, economic simulation



AoA Workshop-Goal Oct 14-15 NCEP

PRIMARY GOAL

Better understand the processes and variables relevant to improving TC forecasts

- Focus on requirements rather than capabilities/solutions
- Translate science of TC forecasts to future requirements~15 yrs
- Need for expert judgement on the relative importance of many requirements

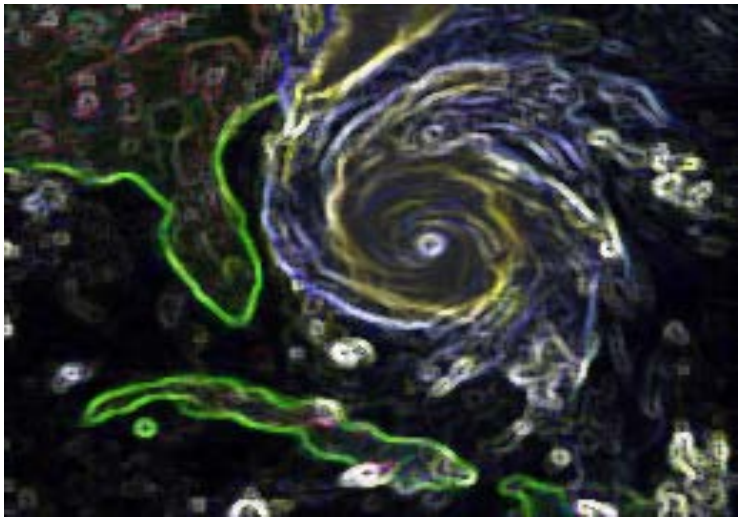
Requirements- Observing Methods-Sensors-Platforms- Total Fleet composition

1. Will we need to measure something different in 2030 and beyond?

2. How will our observation strategies change if at all?

3. What does the future of sensors look like to collect the *changing* requirements and parameters?

Assessment of Gaps in TC-related Physical Processes-NOAA AoA Workshop at NCEP Oct. 2015

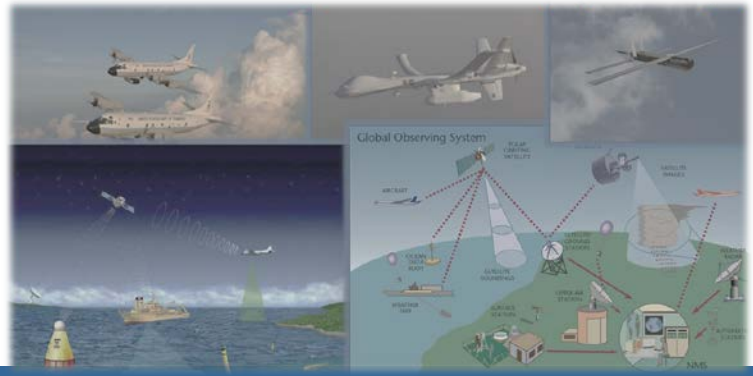


- Air-Sea Interactions-BL
- Cloud microphysics-Melting Layer
- Deep Convection -sheered environment
- Electrodynamic processes
- Ventilation in the outflow

AoA Workshop-Results

What currently measured variables need to be observed better?

- Wind Speed
- Temp
- Humidity
- Hydrometeors
- Fluxes across air-sea interface
- SST
- Wave height and Wave Spectra
- Surface currents
- Salinity/Conductivity



AoA Workshop-Results

What new atmospheric and oceanic variables should be observed? Persisting Through 2030

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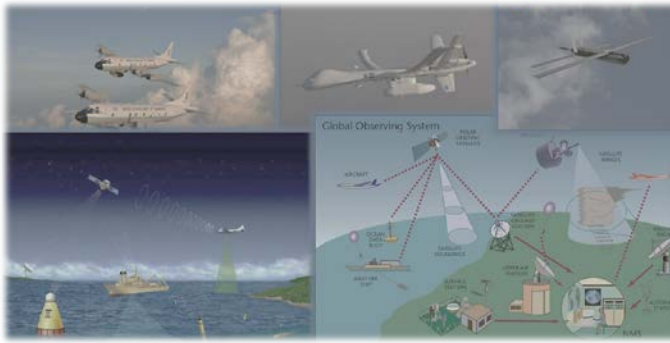


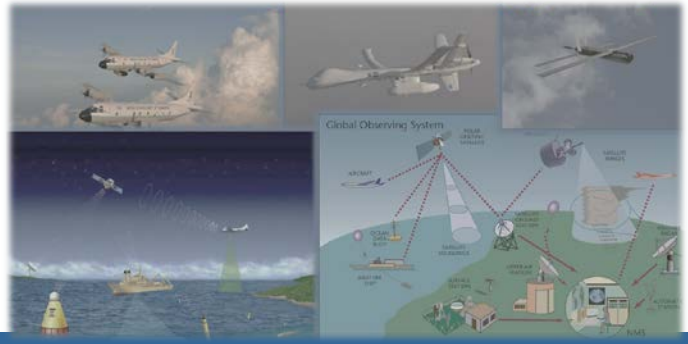
- Turbulence
- Aerosols
- Cloud microphysics measurements
- Radiative flux at the sea surface
- Airborne dual-pol and dual-frequency radar
- Rain Rates
- Humidity measurements
- More frequent/better measurements for all variables

AoA Workshop-Results

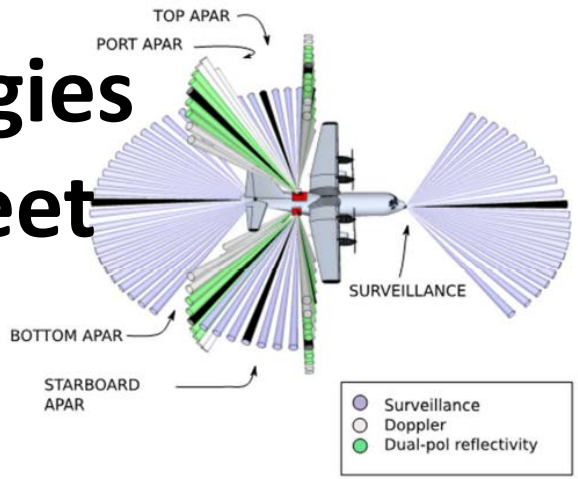
What current manned data collection efforts might transition to unmanned collection? Why and when?

The gaps in capacity and capability between manned and unmanned systems are expected to remain large in the near future~15 years

- **Platform Responsiveness • Availability**
- **Efficiency • Reliability**
- **• Safety • Flexibility**



Major Players –Observing Strategies that will Define "our" Future Fleet



1. Dual Pol-Doppler Radars
2. Airborne launched UAS
3. Autonomous Systems airborne/ocean
4. High altitude observations
5. Results of OSSE/OSEs GH data
6. Still a need to penetrate severe weather
7. Surveillance/Research Modules

Future Platforms-need to accommodate rapidly changing sensor technology

- Wing mounted pods and ports
- Fuselage mounted instruments
- Upward, Downward, Side looking
- Nose mounted
- Heavy Payloads
- Robust
- Move fast and slow
- Operate Low and high

Requirements- Observing Methods-Sensors-Platforms- Total Fleet composition

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One Platform Does Not and Should Not Meet every Observational Need