Task ID	Subtasks	Start Date	Completion Date	Lead	Dependencies	Collaborators	Project	Responsible POC / PM
1.1	Implement HWRF physics in FV3 through CCPP	Oct-18	Jun-19	EMC	None	GMTB/GSD	3A.2	
1.2	Develop pre-processing capability based on WPS to initialize FV3 with HWRF ICs	Oct-18	Jun-19	EMC	1A4 regional FV3 subtask	GSD	3A.2	
1.3	Develop model hurricane evaluation diagnostics (storm tracker on native grid and GFDL tracker for products)*	Oct-18	Jun-19	GFDL	None	AOML, EMC	3A.1	
1.4	Testing and evaluating GFS physics in the nested FV3 model	Oct-18	Sep-19	PSD	None	AOML, EMC	3A.1	
1.5	Telescopic Nests: Start running the stand-alone regional model	Oct-18	Mar-19	GFDL	None	AOML, EMC	1A.4	
1.6	DA capability in the regional stand-alone FV3	Oct-18	Sep-19	EMC	EMC's ongoing regional DA project	AOML	3A.2	
1.7	Implement moving nest framework in FV3GFS:	Oct-18	Sep-19	AOML	None	EMC, GFDL	1A.4	
	1) Code development and testing for prescribed nest motion							
	2) Code development for automatic nest motion algorithm within FV3 dycore							
	3) Test and evaluation of FV3 dynamics with nest motion framework within one tile							
1.8	Modify FMS utilities for nest to shift data after moving	Oct-18	Sep-19	GFDL	None	AOML, EMC	1A.4	
1.9	Vortex initialization and storm relocation for FV3	Oct-18	Sep-19	EMC	None	AOML	3A.2	
1.10	Develop coupling capability for the regional stand-alone FV3	Oct-18	Sep-19	NESII		EMC	1A.3	
1.11	HWRF preprocessor (WPS) transitions for telescopic and moving nest within regional/global FV3	Oct-18	Sep-19	EMC	1A.4 regional FV3 subtask	AOML	3A.1	
1.12	Develop hurricane specific model diagnostic products for HAFS v0.A and v0.B	Oct-18	Sep-19	AOML	None	GFDL, EMC	3A.1	
1.13	Use inner core data assimilation and observations to evaluate HAFS v0.0 with both FV3 and HWRF physics in TC environments to improve RI (especially in moderate shear) and pre-formation guidance with focus on air-sea interaction, PBL and microphysics to inform model development and provide a baseline for HAFS v0.1	Oct-18	Sep-19	AOML	4A.1 observation procurement subtask 1.17; 3B ocean observations subtask 1.15; 4A.2 OSE subtask (see 1.16); ongoing regional DA task at EMC	GFDL, EMC, GMTB/GSD	3A.1	
1.14	Evaluate impact of embedding static nest into global domain on track guidance out to 7 days	Oct-18	Sep-19	AOML	HFIP goals	EMC, NHC	3A.1	
1.15	Sustained ocean observations (?include IR dropsondes to compare)	Oct-18	Sep-19	AOML	None	IOOS, AOC	3B	

1.16	Use observations within the DA system (OSEs) to conduct data impact studies to quantify and optimize new and existing ocean (expendables and AUV), airborne (manned and UAS) and satellite (GOES-16/17 and NOAA-20) observations to improve RI (especially in moderate shear) and provide a baseline for HAFS v0.1	Oct-18	Sep-19	AOML	4A.1 observation procurement subtask 1.17; 3B ocean observations subtask 1.15	EMC, NHC, AOC	4A.2	
1.17	Procure additional dropwindsondes ($500K) and	Oct-18	Jun-19	AOML	None	AOC	4A.1	
1.18	Advance moving nest framework for existing	Feb-19	Sep-19	AOML	Task 1.7	GFDL, EMC	1A.4	
1.19	Telescopic Nests: Implement multi-level nesting	Apr-19	Sep-19	GFDL	Task 1.5	AOML, EMC	1A.4	
1.20	Prepare and Run HAFSv0.A and HAFSv0.B	Oct-18	Sep-19	EMC	Tasks 1.1, 1.2 and 1.9	AOML	3A.2	
2.1	Configure, test and validate single storm HAFSv0.1	Oct-19	Jun-20	EMC	Tasks 1.1, 1.2,1.8, 1.9, 1.10, 1.19	GMTB/GSD	3A.2	
	(a) HWRF physics,					90K		
	(b) HWRF VI,							
	(c) DA and							
	(d) coupling to ocean			(1A3)				
2.2	Telescopic Nests: Develop pre-processing tools	Oct-19	Mar-20	GFDL	Tasks 1.5, 1.19	AOMl, EMC	1A.4	
2.3	Code nest moving algorithm crossing the faces of	Oct-19	Sep-20	AOML	Task 1.7	GFDL, EMC	1A.4	
	1). Implement the algorithm in the single moving							
	2). Advance nest motion algorithm targeting for							
	3). Test and evaluate moving nest framework in							
	4). Merge all development in FV3GFS repository							
2.4	Transition idealized/semi-idealized HWRF utility in	Oct-19	Sep-20	AOML	Task 1.18	EMC, GFDL	1A.4	
2.5	Modify FMS code to implement the crossing edge	Oct-19	Sep-20	GFDL	Task 1.18	AOMl, EMC	1A.4	
2.6	Add multiple nests to HAFS v0.2 (regional and global), extend HAFS to other basins	Oct-19	Sep-20	EMC	Task 1.19	AOML	3A.2	
2.7	Develop hurricane specific model diagnostic	Oct-19	Sep-20	AOML	3A.2 subtask 2.1	GFDL	3A.1	
2.8	Use inner core data assimilation and observations to	Oct-19	Sep-20	AOML	3A.2 subtask 2.1, 4A.1 observation procurement	EMC	3A.1	
2.9	Develop and evaluate track, RI and pre-formation	Oct-19	Sep-20	AOML	3A.2 subtask 2.1	EMC, NHC	3A.1	
2.10	Evaluate TC rainfall in high terrain in HAFS v0.1 for	Oct-19	Sep-20	WPC	3A.2 subtask 2.1	AOML	3A.1	
2.11	Sustained ocean observations (?include IR dropsondes to compare)	Oct-19	Sep-20	AOML	None	IOOS, AOC	3B	
2.12	Use observations within the DA system (OSEs) to	Oct-19	Sep-20	AOML	3A.2 subtask 2.1, 4A.1 observation procurement	EMC, NHC, AOC	4A.2	
2.13	Telescopic nests: Improve FV3 core nesting routines to	Apr-20	Sep-20	GFDL	Task 2.2	AOML, EMC	1A.4	
2.14	Prepare and Run HAFSv0.1 in real-time for FY20, document performance and compare against operational HWRF/HMON	Oct-19	Sep-20	EMC	Task 2.1	NHC	3A.2	
3.1	Extend coupling to waves and multiple nests in	Oct-20	Jun-21	NESII	Tasks 1.10, 2.13	EMC	1A.3	
3.2	Develop inner-core DA capability	Oct-20	Jun-21	EMC	Tasks 1.6, 1.13, 2.1 and 2.8	AOML, JCSDA	3A.2	
3.3	Configure HAFSv0.2 with fully coupled, inner core DA and multiple moving nests, prototype for replacing HWRF/HMON with HFV3	Oct-20	Jun-21	EMC	Tasks 2.3, 3.1 and 3.2	AOML	3A.2	
3.4	Optimize HFV3 performance for real-time	Oct-20	Jun-21	EMC	Task 3.3		3A.2	
3.5	Evaluate HAFS v0.2 for initial operational capability	Oct-20	Sep-21	AOML	Task 3.3	EMC, GFDL	3A.1 → 1A.4	
3.6	Extend hurricane specific model diagnostic products	Oct-20	Sep-21	AOML	3A.1 subtask 3.3	EMC, GFDL,	3A.1	

3.7	Use data assimilation system and observations to evaluate HAFS v0.2 physics in TC environments to improve RI (especially in moderate shear) and pre-formation guidance with focus on air-sea interaction, PBL, microphysics, and upper ocean to inform coupled model development	*Oct-20*	Sep-21	AOML	3A.1 subtask 3.3; 4A.1 observation procurement subtask 1.17; 3B ocean observations subtask 3.10; 4A.2 OSE subtask (see 3.11); ongoing regional DA task at EMC	EMC, NHC	3A.1	
3.8	Develop, refine, and evaluate track, RI and pre-	*Oct-20*	Sep-21	AOML	3A.1 subtask 3.3	EMC, NHC	3A.1	
3.9	Develop TC QPF guidance for high terrain in HAFS	*Oct-20*	Sep-21	WPC	3A.1 subtask 3.3	AOML	3A.1	
3.1	Sustained ocean observations (?include IR dropsondes to compare)	*Oct-20*	Sep-21	AOML	None	IOOS, AOC	3B	
3.11	Use observations within the DA system (OSEs) to	*Oct-20*	Sep-21	AOML	3A.1 subtask 3.3; 4A.1 observation procurement	EMC, NHC, AOC	4A.2	
3.12	Prepare and Run v0.2 in real-time for FY21, document performance and compare against operational HWRF/HMON	*Oct-20*	Sep-21	EMC	Tasks 3.3, 3.4 and 3.5	NHC	3A.2	