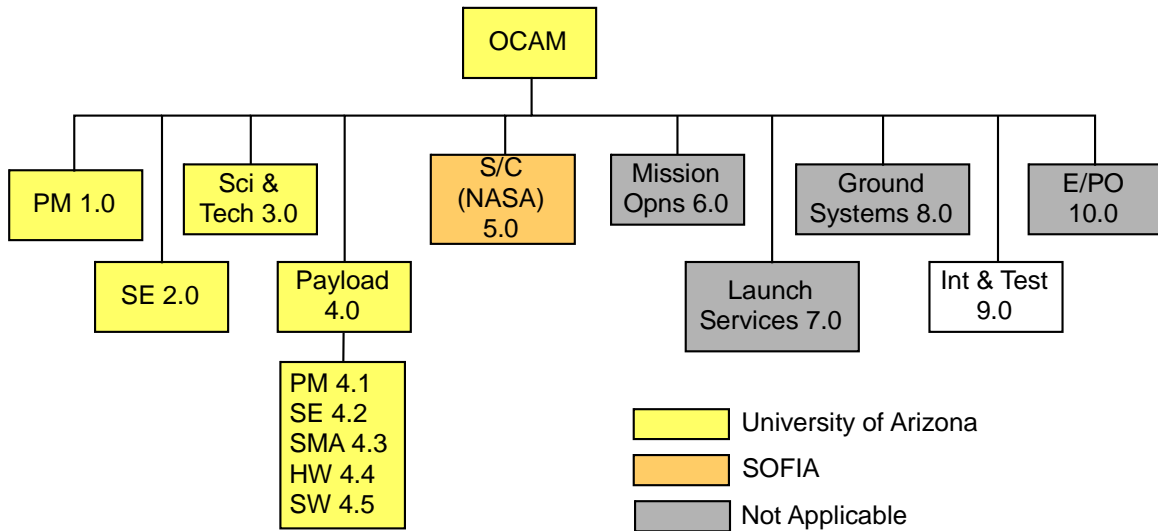


FIGURE H-1: WBS AND WBS



DICTIONARY

WBS	Title	Responsible Organization	Description of the equipment, data, services, human resources and facilities required to develop and produce integrated systems which meet Project level 1 requirements.
1.0	Project Management	UA (PI Org)	Element 1 - Project Management: The business and administrative planning, organizing, directing, coordinating, analyzing, controlling, and approval processes used to accomplish overall project objectives, which are not associated with specific hardware or software elements. This element includes project reviews and documentation, non-project owned facilities, and project reserves. It excludes costs associated with technical planning and management and costs associated with delivering specific engineering, hardware and software products.
2.0	Systems Engineering	UA (PI Org)	Element 2 - Systems Engineering: The technical and management efforts of directing and controlling an integrated engineering effort for the project. This element includes the efforts to define the project space flight vehicle(s) and ground system, conducting trade studies, the integrated planning and control of the technical program efforts of design engineering, software engineering, specialty engineering, system architecture development and integrated test planning, system requirements writing, configuration control, technical oversight, control and monitoring of the technical program, and risk management activities. Documentation products include requirements documents, interface control documents (ICDs), Risk Management Plan, and master verification and validation (V&V) plan. Excludes any design engineering costs.
3.0	Safety & Mission Assurance	UA (PI Org)	Element 3 - Safety and Mission Assurance: The technical and management efforts of directing and controlling the safety and mission assurance elements of the project. This element includes design, development, review, and verification of practices and procedures and mission success criteria intended to assure that the delivered Aircraft, ground systems, mission operations, and payload(s) meet performance requirements and function for their intended lifetimes. This element excludes mission and product assurance efforts directed at partners and subcontractors other than a review/oversight function, and the direct costs of environmental testing.

4.0	Science	UA (PI Org)	Element 4 - Science / Technology: This element includes the managing, directing, and controlling of the science investigation aspects, as well as leading, managing, and performing the technology demonstration elements of the Project. The costs incurred to cover the Principal Investigator, Project Scientist, science team members, and equivalent personnel for technology demonstrations are included. Specific responsibilities include defining the science or demonstration requirements; ensuring the integration of these requirements with the payloads, Aircraft, ground systems, and mission operations; providing the algorithms for data processing and analyses; and performing data analysis and archiving. This element excludes hardware and software for onboard science investigative instruments/payloads.
5.0	Project instrument (Payload)	UA (PI Org)	Element 5 - Payload: This element includes the equipment provided for special purposes in addition to the normal equipment (i.e., GSE) integral to the Aircraft. This includes leading, managing, and implementing the hardware and software payloads that perform the scientific experimental and data gathering functions placed on board the Aircraft, as well as the technology demonstration for the mission.
6.0	Flight System (SOFIA Platform)	NASA	Element 6 - Aircraft: The Aircraft that serves as the platform for carrying payload(s), instrument(s) and other mission-oriented equipment in space to the mission destination(s) to achieve the mission objectives. The Aircraft may be a single Aircraft or multiple Aircraft/modules (i.e., cruise stage, orbiter, Lander, or rover modules). Each Aircraft/module of the system includes the following subsystems, as appropriate: Power, Command & Data Handling, Telecommunications, Mechanical, thermal, Propulsion, Guidance Navigation and Control, Wiring Harness, and Flight software. This element also includes all design, development, production, assembly, test efforts, and associated GSE to deliver the completed system for integration with the launch vehicle and payload. This element does not include integration and test with payloads and other project systems.
7.0	Mission Operations	NA	Element 7 - Mission Operations System: The management of the development and implementation of personnel, procedures, documentation, and training required to conduct mission operations. This element includes tracking, commanding, receiving/processing telemetry, analyses of system status, trajectory analysis, orbit determination, maneuver analysis, target body orbit/ephemeris updates, and disposal of remaining end-of-mission resources. The same WBS structure is used for Phase E Mission Operation Systems but with inactive elements defined as "not applicable." However, different accounts must be used for Phase E due to NASA cost reporting requirements. This element does not include integration and test with the other project systems.
8.0	Launch Vehicle	NA	Element 8 - Launch Vehicle / Services: The management and implementation of activities required to place the Aircraft directly into its operational environment, or on a trajectory towards its intended target. This element includes launch vehicle, launch vehicle integration, launch operations, any other associated launch services (frequently includes an upper-stage propulsion system), and associated ground support equipment. This element does not include the integration and test with the other project systems.
9.0	Ground Systems Development	NA	Element 9 - Ground System(s): The complex of equipment, hardware, software, networks, and mission-unique facilities required to conduct mission operations of the Aircraft systems and payloads. This complex includes the computers, communications, operating systems, and networking equipment needed to interconnect and host the Mission Operations software. This element includes the design, development, implementation, integration, test, and the associated support equipment of the ground system, including the hardware and software needed for processing, archiving, and distributing telemetry and radiometric data and for commanding the Aircraft. Also includes the use and maintenance of the project testbeds and project-owned facilities. This element does not include integration and test with the other project systems and conducting mission operations.
10.0	Systems Integration & Testing	UA, UA & SOFIA	Element 10 - Systems Integration and Testing: This element includes the hardware, software, procedures, and project-owned facilities required to perform the integration and testing of the project's systems, payloads, Aircraft, launch vehicle/services, and mission operations.
11.0	Education & Public Outreach (EPO)	NA	Element 11 - Education and Public Outreach: Provide for the education and public outreach (EPO) responsibilities of NASA's missions, projects, and programs in alignment with the Strategic Plan for Education. Includes management and coordinated activities, formal education, informal education, public outreach, media support, and website development.