CapCom

PROGRAM MANAGEMENT PLAN

DRAFT
March 31, 2006

Prepared for the
CapCom Steering Committee

DOCUMENT APPROVAL

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A. Scope

A.1 Overview

Transportation agencies in the Washington, DC metropolitan area have come together to improve safety and mobility through better coordination of transportation incident management. The Departments of Transportation of Virginia, Maryland, and the District of Columbia, along with the Washington Metropolitan Area Transit Authority and the Metropolitan Washington Council of Governments, are working to establish a coordinated program of transportation incident management, known as the Capital Region Communications and Coordination Center or "CapCom." CapCom will provide coordination in the institutional, operational, systems, and public outreach areas. A fuller description of CapCom's goals and objectives can be found in the Mission Needs Statement and Concept of Operations documents that were developed by the partner agencies (see References)

This document is a Program Management Plan (PMP) for the implementation of CapCom and the set of first-year undertakings through June 30, 2007. It describes the necessary tasks and deliverables and the responsibilities of the Program Manager and other entities. However, it does not describe the ongoing functions and activities that would take place each year after CapCom is established. It is also anticipated that CapCom's functions will evolve over time as the capabilities of the to-be-designed Regional Integrated Transportation Information System (RITIS) develop. This PMP covers the stages prior to RITIS' completion and during the initial phase of RITIS deployment.

The objective of this program of activities is to implement CapCom and thus to reduce incident-related travel delays in the region through the use of coordinated incident management. Major deliverables include the hiring of a Program Manager; development of an Organizational Plan, Implementation Plan, Training Plan, Research Plan, and Evaluation Plan; integration of Standard Operating Procedures; development of RITIS and the Traveler Information System (TIS); and establishment of CapCom's finance and administration functions. Specific dates and deliverables are described in Section 5. The approach to the work is that of a partnership overseen by the Steering Committee, managed day-to-day by a Program Manager, and with specific technical sections carried out by others partners, including the University of Maryland.

A.2 Assumptions and Constraints

<u>Assumptions:</u>

1. The PMP is predicated on the program partners' continuing commitment to CapCom and to the functionalities envisioned in the Concept of Operations, along with the ability to structure a formal Memorandum of Understanding

between the partners that provides a workable structure for the establishment of CapCom. It also assumes that sufficient funds will be available to complete the tasks according to the schedule established.

2. The partner agency Steering Committee and Working Groups will be able to devote sufficient time to support the various tasks in this plan.

Constraints: Several of the funding sources (e.g. SAFETEA-LU funds) come with restrictions as to the type and/or timing of expenditures, which may constrain the ability of the program to proceed according to the schedule outlined below. Partner agencies are also constrained with respect to their abilities to hire additional staff or incur additional expenses. Other constraints may be imposed by the needs of external stakeholders (to the extent that these are unanticipated) and by delays related to the development of information systems.

A.3 Evolution of the Plan

This Program Management Plan will be updated if there are significant changes in schedule, budget, or tasking (e.g. schedule slippage beyond 30 days, a major task budget change of more than 15 percent; additional task required, etc.) The updates will be prepared as amendments attached to this plan. The Steering Committee will be notified immediately to concur on a change in the Program Management Plan if needed.

B. References

CapCom Mission Needs Statement

CapCom Concept of Operations

Highway Traffic Operations and Freeway Management: State-of-the-Practice, Federal Highway Administration, Report FHWA-OP-03-076, March 2003.

C. Definitions

CapCom: Capital Region Communications and Coordination Program

CapCom Steering Committee: Senior members of the 5 partner agencies who will guide the overall CapCom Program. All of the plans and agreements developed with this plan will need ratification by the Steering Committee.

CapCom Working Group: Staff from each of the partner agencies responsible for regional traffic and transit operations and other invited stakeholders. The Working Group will meet to design and implement standard operating procedures for CapCom, the, the Concept o Operations for RITIS, and will continually work on improving CapCom through lessons learned and training of TMC staff.

CapWIN: Capital Wireless Integrated Network

CHART: Coordinated Highways Action Response Team (Maryland)

DDOT: District of Columbia Department of Transportation

ITS: Intelligent Transportation Systems

MARC: Maryland Rail Commuter (train service)

MDOT: Maryland Department of Transportation

MOU: Memorandum of Understanding

MWCOG: Metropolitan Washington Council of Governments

Partner Agencies: The four transportation agencies: DDOT, MDOT, VDOT, and WMATA. The Metropolitan Washington Council of Governments is a regional support agency to CapCom

PMP: Program Management Plan

RITIS: Regional Integrated Transportation Information System

SAFETEA-LU: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (P.L. 109-59)

SOP: Standard Operating Procedures

TIS: Traveler Information System

TMC: Transportation Management Center

VDOT: Virginia Department of Transportation

VRE: Virginia Railway Express

WMATA: Washington Metropolitan Area Transit Authority (Metro)

D. Program Organization

D.1 External Stakeholders

External stakeholders include numerous agencies in the Washington, DC, area that are not formal CapCom partners but whose responsibilities pertain to transportation, incident management, emergency management, and related functions:

- Federal, state, and local police and law enforcement agencies
- Fire departments, paramedics, and other first responders
- State and federal emergency management agencies
- CapWIN
- Local/municipal departments of transportation
- Other local and regional transit services, including VRE and MARC, and private express bus services

Members of the traveling public, as the ultimate beneficiaries of these efforts, are also stakeholders.

The Program Manger will initially engage stakeholder groups via established forums at the Metropolitan Washington Council of Government and take advantage of the emergency community coordination through CapWIN. In addition external stakeholders will be asked to participate in the various system Concepts of Operations. CapCom

may choose to enlist local TMCs such as Montgomery and Arlington Counties to become partner agencies when CapCom becomes a more mature organization. Every effort will be made to coordinate with external stakeholders in order to avoid duplicative efforts, to ensure clear roles and responsibilities and to build complementary, not stovepipe systems.

D.2 Internal Organizational Structure and Staffing

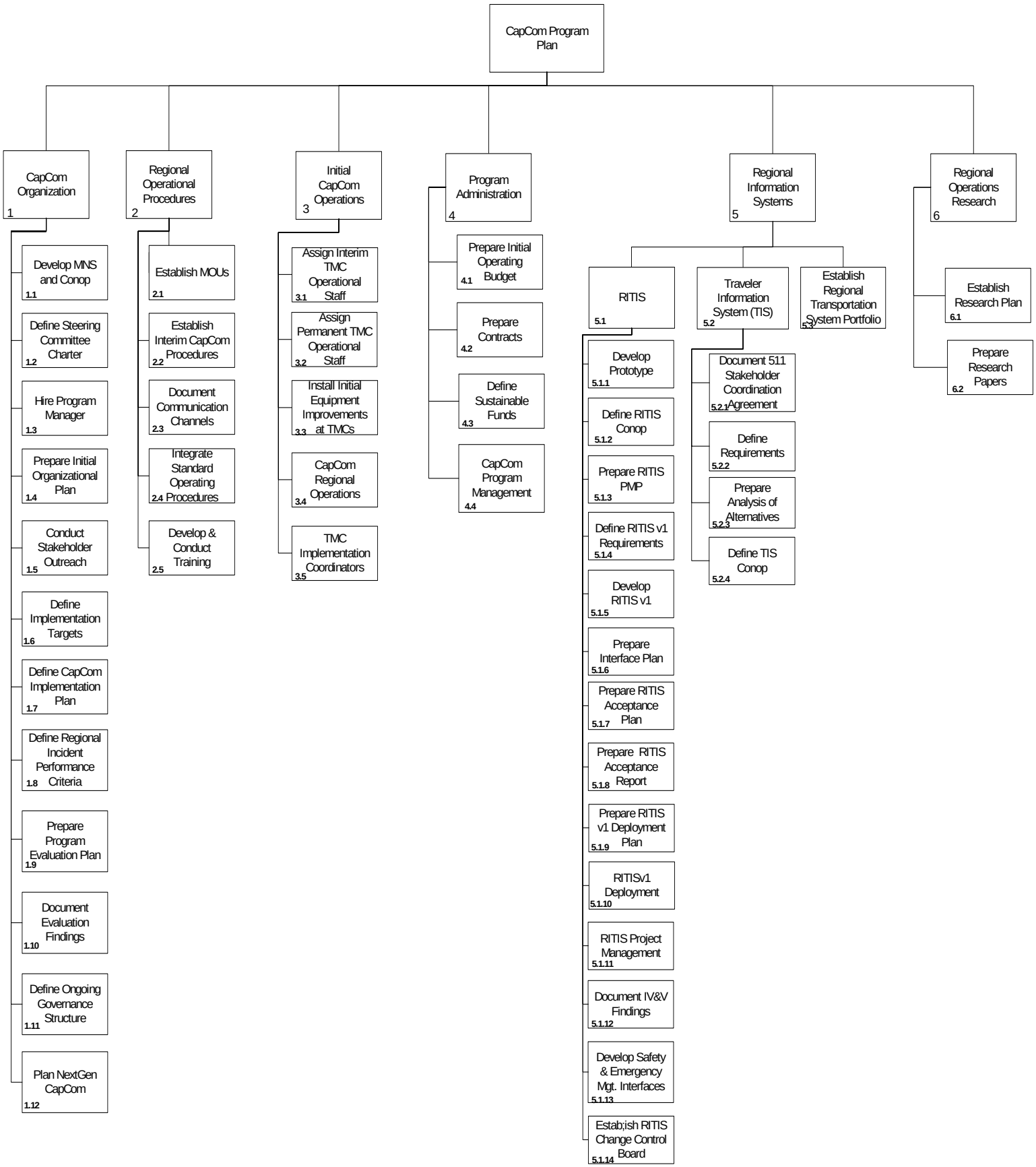
The CapCom Steering Committee, with representatives from the five agencies (DDOT, VDOT, MDOT, WMATA, and MWCOG) is responsible for policy-setting, direction, and oversight of the program of activities described below. As part of this work, the Steering Committee will hire a Program Manager responsible for much of the day-to-day implementation work. One or more Working Groups comprised of representatives from the partner agency TMCs will be significantly involved in the development of the various organization and system Concepts of Operations and in integrating the agencies' standard operating procedures. Responsibility for individual tasks is divided between the Program Manager, partner agencies, other partners including the University of Maryland, contracted support, and the Volpe Center, as described in The Deliverables and Schedule Table and in the diagram in Section E.4.

E. Work Planning

E.1 Requirements Gathering

Some initial requirements gathering has been achieved in the development of the Mission Needs Statement and Concept of Operations documents. Additional information on requirements will be gathered via stakeholder collaboration. The University of Maryland will work with the Steering Committee and partner agencies to develop requirements for RITIS. Partner agencies and their contractors working on 511 traveler information systems will work together to generate a common set of requirements and a portfolio of options. Operational staff from Transportation Management Centers will integrate their standard operating procedures.

E.2 Work Breakdown Structure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Work Breakdown Structure

1. CapCom Organization

1.1 Develop Mission Needs Statement and Concept of Operations

The Mission Needs statement outlines the overall purpose for CapCom, the shortfall with the current systems, projected functionality, and benefits. The Concept of Operations defines how CapCom will work including the business process descriptions, the overall roles and responsibilities, a high level information flow, and organizational possibilities. Both of these documents will provide direction for the CapCom program.

Deliverables: CapCom Mission Needs Statement and Concept of Operations
Estimated Cost: This task is complete
Funding Source: N/A

1.2 Define Steering Committee Charter

The CapCom Steering Committee currently is an ad hoc group of senior DOT, transit, and MPO representatives dedicated to the formation of a regional transportation incident management program in the Capitol Region. Now that CapCom has initial capital and proposed operations funding this group needs to be formally chartered to oversee the implementation of the program. The charter will include the purpose and roles and responsibilities of the Committee members.

Deliverables: Steering Committee Charter
Estimated Cost: This task is complete
Funding Source: N/A

1.3 Hire Program Manager

The Metropolitan Washington Council of Governments will hire a program manager to oversee the implementation of the work program described in this program management plan. The program manager will be knowledgeable in project management practices, traffic and transit management center operations, traffic management research and ITS (Intelligent Transportation Systems) design and development. The Program Manager will take direction from the CapCom Steering Committee.

Deliverables: Hired Program Manager
Estimated Cost: N/A
Funding Source: N/A

1.4 Prepare Initial Organization Plan

This organizational plan describes how CapCom will be implemented within and between the partner agency TMCs (Transportation Management Centers) to support initial operations. The plan will outline the roles and responsibilities of each of the players, including the CapCom program manager, staffing and funding requirements.

Deliverables: CapCom Initial Organization Plan

Estimated Cost: $10,800
Funding Source: SAFE TEA LU

1.5 Conduct Stakeholder Outreach
Outreach sessions will be scheduled with other relevant stakeholders in the region, including first responders, emergency management agencies, municipal (county and city/town) transportation departments, federal government agencies, transit services (non-WMATA), and the news media. Information on the development of CapCom will be shared, and comments and feedback will be solicited.

Deliverable: Outreach sessions (including agendas and presentations)
Estimated Cost: $10,800
Funding Source: SAFE TEA LU

1.6 Define Implementation Targets
The "initial," "mid-term," and "end state" phases of CapCom operations will be defined and documented. Reference will be made to the development of specific CapCom capabilities rather than to calendar dates. For example, the "mid-term" phase might be defined as the implementation of a given set of programs and activities and the achievement of a certain level of information-systems integration. In defining phases, it is recommended that reference be made to the levels of coordination described in the *Highway Traffic Operations and Freeway Management: State-of-the-Practice* report, which describes the greatest degree of coordination as that which "Involves integrating regional traffic management in a single centralized or distributed system that monitors and/or controls all traffic in all joining agencies."

Deliverable: Implementation Target document
Estimated Cost: $7,500
Funding Source: SAFE TEA LU

1.7 Define CapCom Implementation Plan
The implementation plan will detail the short-term plan strategy to reach the initial implementation stages defined in Task 1.6. The plan will specify the steps required to initialize a formal traffic and incident management program including the full range of stakeholders who will be involved, objectives of the initial stage, site responsibilities, and administrative coordination between CapCom and the agencies. The plan will detail tasks, resources required, funding source, schedule, any risks, any required contracts and procurements to achieve the implementation targets, and public relations strategies. The initial plan will include post-incident analyses that will feedback into future stages of CapCom development. The plan will be presented to stakeholders for review so that each partner can formulate realistic expectations.

Deliverable: Near-term CapCom Implementation Plan
Estimated Cost: $30,400

Funding Source: SAFE TEA LU

1.8 Define Regional Incident Performance Criteria
Performance measures will be selected, defined, and documented in order to provide a framework for assessing CapCom's progress in 1.) effectively regional communications and collaboration in responding to regional incidents and 2.) The ultimate outcome of reducing incident-related congestion and travel delays in the region. The exact measures to be used will be developed in consultation with the Steering Committee to reflect CapCom's goals and mission.

Deliverable: Document defining incident performance criteria
Estimated Cost: $5,200
Funding Source: SAFE TEA LU

1.9 Prepare Program Evaluation Plan
A multi-year plan for the evaluation of CapCom's effectiveness in achieving its goals will be developed and documented. The plan will include a schedule of evaluation activities and a list of associated performance measures (see Task 1.8). It will also identify the evaluation methodologies to be used to assess CapCom's cost-effectiveness, adherence to mission (as defined in Mission Needs Statement, Concept of Operations, MOUs, and SOPs), and customer satisfaction. Evaluation will be an ongoing annual activity, with findings used to inform the budget process. Costs and resource requirements for the evaluation itself will be included in the overall operations budget (see task 6.1).

Deliverable: Evaluation Plan
Estimated Cost: $13,755
Funding Source: SAFE TEA LU

1.10 Document Evaluation Finfings
This activity will evaluate the initial performance of CapCom as prescribed by the CapCom Evaluation Plan. The plan will identify the measurements to be taken periodically. Analyses of performance will examine factors that contribute to performance abnormalities. The program evaluation includes documenting findings and recommendations

Deliverable: Program Evaluation Report
Estimated Cost: $24,000
Funding Source: SAFE TEA LU

1.11 Define Ongoing Governance Structure
The CapCom Steering Committee and the Program Manager will review the organizational plan after 6 months of operation in order to define the governance structure going forward. The Board will consider in particular whether connection with other standing regional operational centers will produce greater efficiencies and effectiveness or to continue as is.

Deliverable: Governance Plan
Estimated Cost: $$22,200
Funding Source: SAFE TEA LU

1.12 Plan NextGen CapCom
An implementation plan will be formulated for the mid-term plan strategy to reach the mid-term implementation stages defined in Task 1.6. Planning for the mid-term will include lessons learned from the evaluation findings from Task 1.9 and the results of post incident analyses. The plan will specify the steps required to improve the initial traffic and incident management program expanding the range of stakeholders who will be involved, objectives of the mid-term stage, new site responsibilities, and improvements to administrative coordination between CapCom and agencies. The plan will detail tasks, resources required, funding source, schedule, any risks, any required contracts and procurements to achieve the implementation targets, and public relations strategies. The mid-term plan will also include post-incident analyses that will feedback into future stages of CapCom development. The plan will be presented to stakeholders for review so that each partner can formulate realistic expectations.

Deliverable: Mid-Term CapCom Implementation Plan
Estimated Cost: $14,940
Funding Source: SAFE TEA LU

2. Regional Operational Procedures

2.1 Establish MOUs
Memoranda of Understanding will be written to formalize the agreements reached by the partner agencies (DDOT, VDOT, MDOT, WMATA, and MWCOG) for improving regional mobility through better coordination of transportation incident management. The MOUs will delineate CapCom's mission and specify the CapCom-related roles and respo5nsibilities of each agency with respect to the other agencies. The MOUs will address funding and personnel commitments, consistent with the Organizational Plan developed in Task 1.4. They will also establish procedures for adding new members to the partnership and for renewing or dissolving the agreement.

Deliverables: Draft and Final Memoranda of Understanding
Estimated Cost: $7,280
Funding Source: SAFE TEA LU

2.2 Establish Interim CapCom Procedures

The partner agency TMCs can work together before RITIS is deployed to review current operating procedures for gaps in response to regional incidents using existing processes and systems. In particular WMATA needs to be more closely coordinating their operations with the state departments of transportation. The TMCs will work on developing communication channels with each other, developing regional incident criteria, and adding SOPS as needed. In addition, this period before RITIS deployment can be used to conduct regular monthly incident reviews to analyze and incorporate lessons learned.

Deliverables: interim Regional Incident Criteria; interim SOP documentation for each agency, including pre-planned responses
Estimated Cost: $31,960
Funding Source: SAFE TEA LU

2.3 Document Communication Channels

A communication plan will be developed, building on the SOPs by providing additional detail about how and when information and data and will be exchanged between CapCom and its partner agencies. This plan will be informed by the current state of technical capabilities (e.g. the development of RITIS) and will specify the senders and receivers of information as well as the mechanisms – both automated and manual – by which communication or data exchange will be established. The plan will also anticipate changes that may need to be made to facilitate further integration, and/or interim measures for exchanging data in the absence of integrated information systems.

Deliverable: Communication Plan
Estimated Cost: $2,200
Funding Source: SAFE TEA LU

2.4 Integrate Standard Operating Procedures

A series of meetings or workshops will be convened to allow transportation operations staff from the partner agencies to coordinate their Standard Operating Procedures for incident management and integrate CapCom's functions into these SOPs. As a first step, specific *regional incident criteria* will be developed and documented, specifying the incidents that are considered "regional" in their impacts and therefore within the scope of CapCom's mission. These criteria may include references to the incident's nature, location, time of day, expected impact, and/or other attributes. The criteria will be easily applicable by transportation staff during operations and, to the extent practical, will rely on information that is objective and verifiable.

These incident criteria will then be used to write new SOP documentation, listing the assigned roles for the partner agencies and (where applicable) CapCom for each level of incident severity. The SOPs will detail the sequence of operations to be performed by each agency in responding to a particular incident type. Institutional agreements will

also be established, where applicable, for the integrated coordination of corridors, arterials and freeways across agencies and geographical boundaries, including diversion plans, signal-timing and variable message sign protocols. Emergency response staff and other relevant stakeholders will be included in these workshops and/or provide comment on the pre-planned responses.

The workshops will also identify commonly occurring incidents and planned events that warrant standardized, pre-planned responses. The major categories to be considered are planned events, emergencies, day-to-day-incidents, and construction. Details of these pre-programmed responses will be agreed and documented, including agency roles, staffing, and the regional inter-agency communications plans.

Deliverables: Regional Incident Criteria; SOP documentation for each agency, including pre-planned responses
Estimated Cost: $48,360
Funding Source: SAFE TEA LU

2.5 Develop and Conduct Training

2.5.1 Develop Training Materials

Staff training needs will be identified, including "gaps" in the existing training activities conducted by the partner agencies and activities needed to implement the integrated SOPs developed in Task 2.3. These training needs will be prioritized and developed into a multi-year training plan, to be coordinated with staff assignments (see Task 3.2) and the overall operating budget (see Task 6.1). Training will be oriented toward the transportation operations staff at partner agencies, but is likely to also include first responders and staff from related agencies in the region. A set of training "modules" – i.e. curricula and materials – will be developed for the first group of high-priority topic areas. To the extent necessary, contract documents will be prepared to allow CapCom to use outside training firms.

Deliverable: Training Plan; Training Modules
Estimated Cost: $23,250
Funding Source: SAFE TEA LU

2.5.2 Conduct Training

Training will be delivered to each of the TMCs. Training classes will be conducted at the TMCs for all personnel engaged with regional incidents. Class evaluations from the students will be used in improve the training.

Deliverable: Training Itineraries; Student Evaluations
Estimated Cost: $24,200
Funding Source: SAFE TEA LU

2.5.3 Conduct Exercises and Lessons Learned

Annual CapCom exercises will be conducted to determine the efficiency and effectiveness of CapCom responses to regional incidents. On a monthly basis staff from the TMCs and a CapCom representative will examine the past month's regional incidents to analyze them for increased efficiencies or the need for revised procedures.

Deliverable: Exercise Plans; Lessons Learned Documents
Estimated Cost: $18,667
Funding Source: SAFE TEA LU

3. Initial CapCom Operations

Due to the number of stakeholders involved and the complexity of getting up-and-running, CapCom operations development will be an iterative process. The operations will be developed in three stages: initial, mid-term, and end state. This version of the PMP only deals with the initial stage.

3.1 Assign Interim TMC Operational Staff
Each of the TMCs will designate personnel assigned to interim CapCom responsibilities. A contact list for the staff that assigned the responsibilities will be published. If additional recruitment is necessary, a timeline for fully staffing and meeting these responsibilities will be created by the affected agency and tracked by CapCom.

Deliverable: List of CapCom interim operations assignments.
Estimated Cost: TBD
Funding Source: DOT Partners[1]

3.2 Assign Permanent TMC Operational Staff
Following the designation of the site responsibilities in the organizational plan, each agency will report back to CapCom with a contact list for the staff assignments. If additional recruitment is necessary, a timeline for fully staffing and meeting these responsibilities will be created and tracked by CapCom.

Deliverable: List of fully staffed roles and responsibilities
Estimated Cost: $2,160
Funding Source: SAFE TEA LU for Program Manager work

3.3 Install Initial Equipment Improvements at TMCs
Facility improvements to support additional staff, communication channels, and data compilation and distribution will be installed to achieve immediate improvements to regional traffic and incident management. Improvements could include installation of additional workstations or installation of stations from counterpart agencies.

[1] Several tasks within Task 3 are to be conducted by the DOT partners who will bear the resource costs. These costs are separate from the funding estimates in this Project Management Plan

Deliverable: Site Installation and Checkout Reports
Estimated Cost: TBD
Funding Source: DOT Partners

3.4 CapCom Regional Operations

The CapCom program manager will need to work closely with the TMCs once RITIS is established to provide regional coordination support. This task includes meetings and regional operational duties at the TMCs and coordination meetings with other stakeholders. After June 30, 2007 this task will be the basis for ongoing operational support.

Deliverable: Regional Operations Support
Estimated Cost: $144,050
Funding Source: SAFE TEA LU

3.5 TMC Implementation Coordinators

The four partners (DDOT, MDOT, VDOT and WMATA) will be responsible for implementing CapCom procedures and automation support within their respective Transportation Management Centers (TMCs). The TMC Implementation Coordinators will be temporary positions supporting CapCom and RITIS implementation. To this end, a TMC Implementation Coordinator will be designated for each of the partners who will be responsible for implementing CapCom procedures, equipment and automation support within her/his TMC. This person will be the main point of contact for planning the implementation working with the CapCom and RITIS project managers. In addition to implementation responsibilities, TMC leads will, as directed by their local management, represent their TMCs in CapCom and RITIS project workshops to formulate requirements and operational procedures.

Deliverable: Appointment email of an Implementation Lead by each partner
Estimated Cost: TBD
Funding Source: DOT Partners

4. Program Administration

4.1 Prepare Initial Operating Budget

An annual budget for the initial years of CapCom's operation will be developed based on the agreed program of activities. The budget will itemize revenues by source and expenditures by program area and object class code or category. Cost estimates for operations will be based on the best available information on labor rates, equipment costs, contract support, and other cost components. The CapCom Steering Committee will work with the Program Manager to establish accounting procedures and the appropriate level of detail.

Deliverable: Operating budget for first year
Estimated Cost: $3000
Funding Source: SAFE TEA LU

4.2 Prepare Contracts
Contract documents will be prepared in order to allow CapCom to obtain needed services from outside entities, most likely using the contracting capabilities of MWCOG. Contract language will be developed in consultation with legal counsel and contracting staff from the Steering Committee and/or partner agencies. Specific contract provisions (such as local preferences or DBE) will be based on policy decisions by the Steering Committee and the requirements of the contracting agency.

Deliverable: Contract instruments and documentation
Estimated Cost: $2,200
Funding Source: SAFE TEA LU

4.3 Define Sustainable Funding

The initial funding for CapCom includes $2 million from Safe-Tea-Lu Funds and $1 million UASI grant. In addition funds had been previously allocated for the design and development of RITIS. All of these funds are for the initial Capital expenditures and for standing up the organization. The program manager working with the partner agencies will develop a plan for how CapCom will be funded for operations and maintenance costs in future years.

Deliverable: Outline of Long-Term Operating Funding Stream
Estimated Cost: $10,800
Funding Source: SAFE TEA LU

4.4. CapCom Program Management
This activity will support the CapCom Program management time required to monitor project activities, schedule and cost as well as project risks, quality, and communications. The Program Manager will routinely provide Program Status information to the CapCom Steering committee and CapCom stakeholders.

Deliverables: CapCom Program Status Reports and Briefings, Updated CapCom Implementation Plan
Estimated Cost: $66,480
Funding Source: SAFE TEA LU

5. Regional Information Systems

5.1 RITIS

5.1.1 Develop Prototype

The University of Maryland will develop a custom software capability to demonstrate regional transportation information sharing. The prototype will acquire and archive:

- CHART, D.C, NOVA, and WMATA incident data
- CHART and NOVA STC volume and speed data
- MCTMC sensor data.

The above data sources will be integrated and available for display of the regional transportation system using a web browser. The RITIS prototyping activity will include research of literature, sample data feeds, data filters, data usage, and sensor diagnostics. Research deliverables will include requirement and design recommendation papers and the incorporation of these into prototype software.

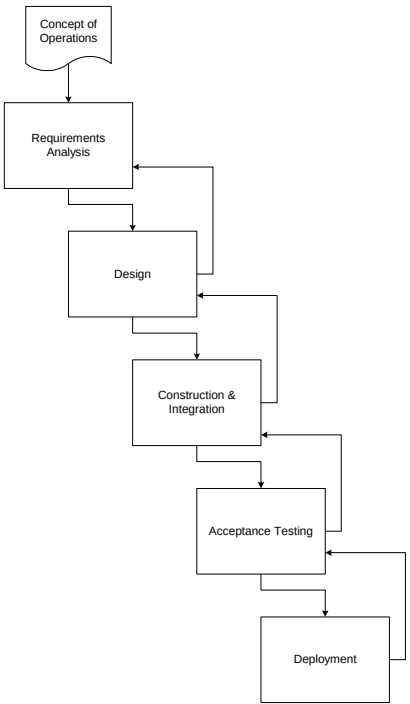
Experience with building and using the prototype will provide insights into the requirements and design of a full RITIS capability.

Deliverables: RITIS Prototype
RITIS Requirements and Design Recommendations
Estimated Cost: $100,000
Funding Source: TEA 21

5.1.2 Define RITIS Concept of Operations (ConOp)

The University of Maryland will lead and facilitate a working group of transportation specialists from D.C, Maryland, Virginia and WMATA to define the operational concept for RITIS. The concept of operations will define RITIS capabilities and information flows. The ConOp will be a user-oriented document describing how RITIS will support CapCom by compiling and distributing information to facilitate a Regional response to reduce incident related travel delays.

Deliverable: RITIS Concept of Operations (ConOp)
Estimated Cost: $52,902
Funding Source: TEA 21



5.1.3 Prepare RITIS PMP

The developers will prepare a RITIS Project Management Plan to guide both project execution and project control. The plan will be based on the spiral model of the software development life cycle. Basically, the spiral model is evolutionary development, using the waterfall model (depicted to the left) for each increment to help manage risks. The entire system is not defined in detail at first. The developers will only define the highest priority features. Design and build those, then

get feedback from users/customers (such feedback distinguishes "evolutionary" from "incremental" development). With this knowledge, the developers will then go back to define and implement more features in smaller chunks.

The project management plan will include plans for:
Scope, Schedule, Cost, Quality, Staffing, Project Communications, Risk Management and Procurement.

Deliverable: RITIS Project Management Plan
Estimated Cost: $54,902
Funding Source: TEA 21

5.1.4 Define RITIS V1 Requirements
The requirements document will specify the engineering and qualification requirements for the RITIS software application. The document will be the basis for the design and formal testing of the application. Engineering requirements include external interfaces, functional capabilities, internal interfaces, data definitions, sizing and timing, security and design constraints. Qualification requirements specify the methods for determining how the software requirements have been satisfied.

Deliverable: RITIS V1 Requirements
Estimated Cost: $43,199
Funding Source: TEA 21

5.1.5 Develop RITIS Version 1
The RITIS developer will acquire and build the RITIS application software for the first version to be released for operational use. The first version of RITIS will be based on the scope statement defined in the RITIS Project Management Plan. The first version of RITIS is expected to re-use and potentially extend the RITIS Prototype to provide the capabilities described in the project scope statement. The first version of RITIS will include weather and GIS information. The developer will establish and maintain a facility for RITIS software development and support.

Deliverable: RITIS Version 1
Estimated Cost: $1,500,000
Funding Source: TEA 21 $800,000 UASI $700,000

5.1.6 Prepare RITIS Interface Plan
A RITIS Integration Plan will describe the systems to be modified to send data to RITIS and accept data from RITIS. Each affected organization will contribute a chapter in this plan describing the modifications to its operational systems.

Deliverable: RITIS Interface Plan
Estimated Cost: $14,551
Funding Source: TEA 21

5.1.7 Prepare RITIS Acceptance Plan

The CapCom Program Manager will be responsible for defining the acceptance criteria for RITIS software. The criteria will be the basis of an Acceptance Testing Plan to be defined and executed independent of the RITIS software development team.

Deliverable: RITIS Acceptance Plan
Estimated Cost: $28,371
Funding Source: TEA 21

5.1.8 Prepare RITIS Acceptance Report

The CapCom Program Manager will oversee the acceptance testing of RITIS based on the Acceptance Test Plan. The report will document the test procedures and test results. The report will identify the test environment, involved personnel, dates and times of test conduct. A recommendation will be included to accept, accept with conditions or defer with an action plan.

Deliverable: RITIS Acceptance Report
Estimated Cost: $13,213
Funding Source: TEA 21

5.1.9 Prepare RITIS v1 Deployment Plan

A RITIS Deployment Plan will describe how to make RITIS version 1 operational for each partner. The plan will address the preparation of each site, the installation of equipment improvements and software, training, installation checklists and describe operational impacts. Each of the partners will have the ultimate responsibility for making RITIS operational at their TMCs. Deployment will include installation of equipment improvements and software, the delivery of training, and the use of operational checklists.

Deliverable: RITIS Deployment Plan, Training Plan, Training Materials, Installation Checklists
Estimated Cost: $52,902
Funding Source: TEA 21

5.1.10 RITIS v1 Deployment Results

Deployment Results will be documented at each of the partner TMCs. Deployment results will discuss installation of equipment improvements and software, the delivery of training, and the use of operational checklists. Deviations from the plan and lessons will be recorded.

Deliverable: RITIS Deployment Report including deviations from plan and lessons learned.
Estimated Cost: N/A

Funding Source: TEA 21

5.1.11 RITIS Project Management
The position of RITIS Project Manager will be a full time responsibility responsible for planning and executing the implementation of RITIS. The project manager will be responsible for change management, scope management, schedule and cost management, quality assurance and control, project organization and staffing, project communications management, risk management and project related procurements.

Deliverable: RITIS Project Manager
Estimated Cost: $131,722
Funding Source: TEA 21

5.1.12 Document RITIS IV&V Findings
Independent Verification and Validation (IV&V) is an activity performed by personnel independent of the software development organization. The IV&V activity will have pre-defined objectives supported by a work plan. The work plan will be coordinated with the RITIS software development plan and call for reports of findings at critical junctures in the software development life cycle. IV&V personnel will have experience with and participate in requirements definition, design reviews, code inspections, and configuration control. IV&V findings must address the software development process as well as deliverables.

During the IV&V process findings will be reported routinely to the CapCom Program Manager to make the necessary program to make process improvements as well as adjustments to scope, resources, funds and schedule.

Deliverables: IV&V Plan
IV&V Finding Reports
Estimated Cost: $25,781
Funding Source: TEA 21

5.1.13 Develop Safety and Emergency Management Interfaces
RITIS capabilities will be extended to provide traffic information to safety and emergency management agencies. Interfaces will be defined and developed for CAPWIN, EMMA, and WEBEOC.

Deliverable: Interface Requirements Documents, Interface Control Documents, and Interface Acceptance Test Reports
Estimated Cost: $300,000
Funding Source: UASI

5.1.14 Establish RITIS Change Control Board (CCB)

A RITIS Change Control Board will be established after formal acceptance and deployment of the system. The board will be responsible for establishing and overseeing a systemic method of defining, estimating, evaluating, coordinating, approving/disapproving and implementing approved changes. A charter will be defined for the board outlining membership, roles and responsibilities, and operating procedure.

Deliverable: RITIS CCB Charter, Change Control Activities
Estimated Cost: $50,000
Funding Source: TEA-21

5.2 Traveler Information System

5.2.1 Document 511 Stakeholder Coordination Agreement

There are currently several efforts underway in Maryland and Virginia to provide 511-traveler information services. These efforts need to be coordinated with each other and with the CapCom program to ensure consistency and efficiency. In particular the 511-traveler information services needs to be coordinated with the RITIS capabilities. It is assumed that all of the current 511 efforts will be subsumed under the CapCom program.

5.2.2 Define Requirements

Traveler information system requirements will be analyzed and defined as the basis for analyzing alternatives. Regional traveler information system requirement will address the determination of the current status of the regional transportation network and making this information accessible real-time to the traveling public.

Deliverable: CapCom Traveler Information System Requirements
Estimated Cost: $50,000
Funding Source: TBD

5.2.3 Prepare Analysis of Alternatives

Once the RITIS Concept of Operation has been defined, CapCom Traveler Information System alternatives will be identified, defined and analyzed. The analysis of alternatives will include the quantification of costs and benefits. Alternatives will include the outsourcing of RITIS information to third parties and the private sector organizations engaged in providing traveler information to the general public.

Deliverable: Regional Traveler Information Alternatives Analysis
Estimated Cost: $100,000
Funding Source: TBD

5.2.4 Define TIS Concept of Operation

Based on the alternatives analysis, the operational concept for the TIS will be further refined, with definitions of TIS capabilities, information flows, and user interfaces. The ConOp will be a user-oriented document describing how the region's travelers will access and interact with the TIS to obtain information on travel conditions and options.

Deliverable: TIS ConOp
Estimated Cost: $30,000
Funding Source: TBD

5.3 Establish Regional Transportation System Portfolio
An initial inventory of systems and projects in the region that support or affect the regional transportation system will be documented as an input to planning RITIS development. At a minimum, the inventory will identify those systems from which RITIS will compile data and to which RITIS will distribute data. The CapCom steering committee may use the inventory to consider recommendations on information technology investments in the region, such as identifying opportunities to use common transportation management tools to improve functionality or realize cost savings.

Deliverables: Regional Transportation System Portfolio
Estimated Cost: $6,300
Funding Source: TBD

6. Regional Operations Research

6.1 Establish Research Plan
A multi-year plan will be developed to structure and prioritize the program of research to be sponsored by CapCom. Research topics will be decided by the Steering Committee in consultation with the Program Manager, but are likely to include research on predictive algorithms for forecasting incident effects and the development of real-time estimates of point-to-point travel times within the region. Development of the plan will take into account budget constraints, resource availability, potential benefits of research findings, relationship to performance measures, and logical interrelationships between topics.

Deliverable: Multi-year research plan
Estimated Cost: $20,700
Funding Source: TBD

6.2 Prepare Research Papers
The research papers will outline the initial concepts and the cost/benefit to go forward to prototype, design, and development and/or be incorporated within subsequent RITIS builds.

Deliverable: Research Papers
Estimated Cost: $250,000
Funding Source: TBD

E.3 Cost Estimation and Budget Allocation through 6/30/07

E.4 Deliverables and Schedule

The table below summarizes the deliverables from each task in the WBS, in order of their estimated completion date, the identity of the approving and the performing organization(s) primarily responsible for the task.

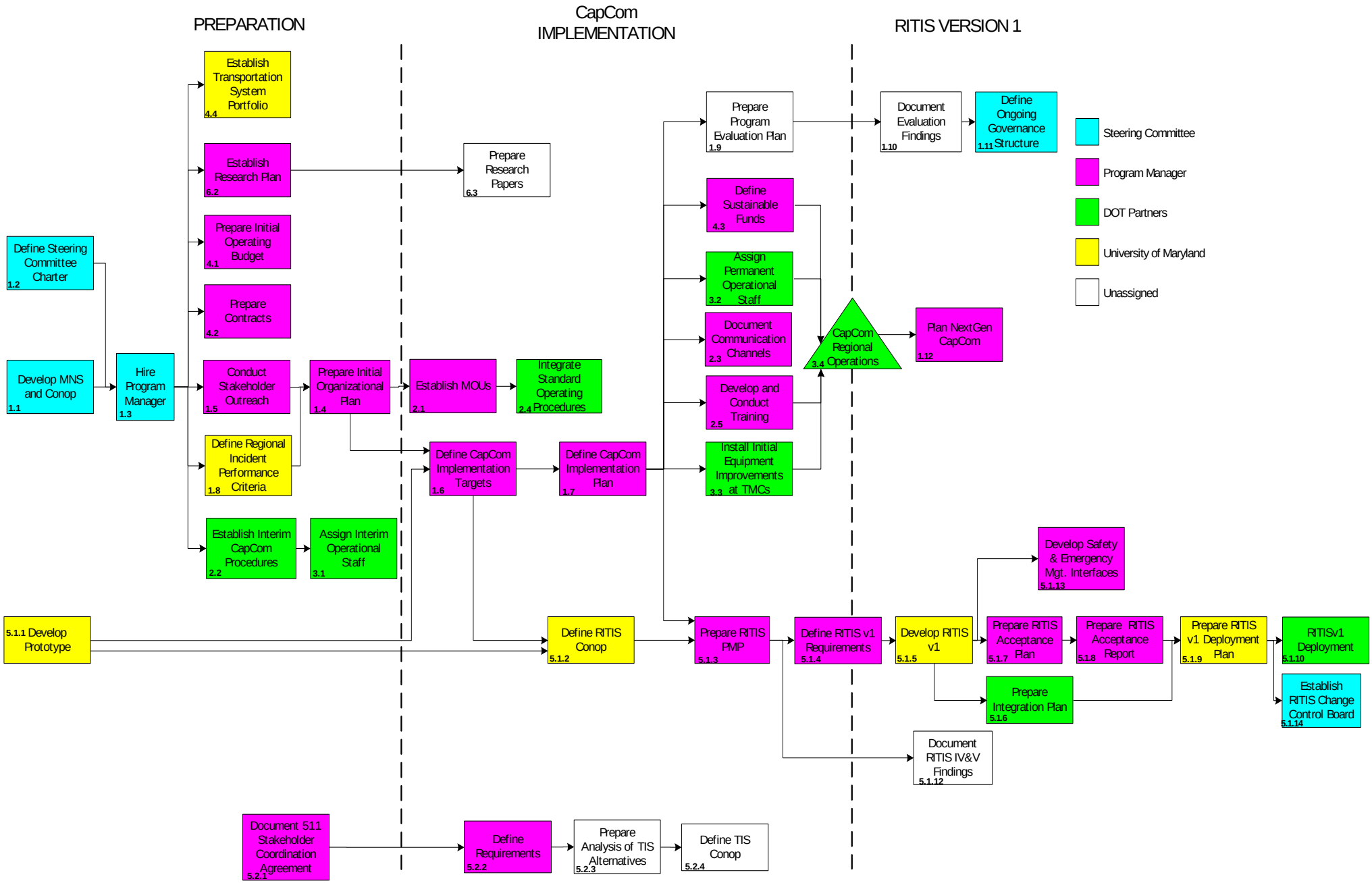
	CapCom Program	**5/9/05**	**6/29/07**	
Task	**Name**	**Start**	**Finish**	**Primary Responsibility**
1	**CapCom Organization**	**1/3/06**	**2/23/07**	
1.1	Develop Mission Need Statement and CONOP	1/3/06	1/9/06	Steering Committee
1.2	Define Steering Committee Charter	3/1/06	3/27/06	Steering Committee
1.3	Hire Program Manager	3/1/06	4/28/06	Steering Committee
1.4	Prepare Organization Plan	5/1/06	6/14/06	Program Manager
1.5	Conduct Stakeholder Outreach	5/1/06	6/2/06	Program Manager
1.6	Define Implementation targets	5/1/06	5/30/06	Program Manager
1.7	Define CapCom Implementation	5/31/06	7/13/06	Program Manager
1.8	Define Regional Incident Performance Criteria	5/31/06	6/21/06	Program Manager
1.9	Prepare Program Evaluation Plan	7/14/06	8/15/06	Program Manager
1.10	Document Evaluation Findings	10/2/06	12/22/06	Program Manager
1.11	Define Ongoing Governance Structure	12/25/06	1/26/07	Program Manager
1.12	Plan NextGen CapCom	1/29/07	2/23/07	Program Manager
2	**Regional Operation Procedures**	**3/1/06**	**6/18/07**	
2.1	Establish MOUs	6/14/06	7/7/06	Steering Committee
2.2	Establish Interim CapCom Procedures	3/1/06	6/20/06	DOT Partner Agencies
2.3	Document Communication Channels	7/14/06	7/28/06	DOT Partner Agencies
2.4	Integrate Standard Operating Procedures	6/21/06	8/16/06	Program Manager/ DOTs
2.5	Develop and Conduct Training	7/14/06	6/18/07	Program Manager/ DOTs
2.5.1	Develop Training Materials	7/14/06	8/28/06	Program Manager/ DOTs
2.5.2	Conduct Training	8/29/06	10/25/06	Program Manager/ DOTs
2.5.3	Conduct Lessons Learned and Exercises	1/18/07	6/18/07	Program Manager/ DOTs
3	**Initial CapCom Operations**	**3/1/06**	**6/29/07**	
3.1	Assign Interim TMC Operational Staff	3/1/06	6/20/06	DOTs
3.2	Assign Permanent TMC Operational Staff	7/14/06	6/29/07	DOTs
3.3	Install Initial Equipment Improvements at TMCs	8/4/06	9/14/06	DOTs
3.4	CapCom Regional Operations	7/24/06	6/29/07	Program Manager
3.5	TMC Implementation Coordinators	7/21/06	6/29/07	DOTs
4	**Program Administration**	**5/9/05**	**6/29/07**	
4.1	Prepare Initial Operating Budget	5/1/06	5/19/06	Program Manager
4.2	Prepare Contracts	5/1/06	6/12/06	Program Manager
4.3	Define Sustainable Funding	7/14/06	8/24/06	Program Manager
4.4	CapCom Program Management	5/9/05	6/29/07	Program Manager
5	**Regional Information Systems**	**1/3/06**	**3/9/07**	
5.1	**RITIS**	**1/3/06**	**3/9/07**	
5.1.1	Develop Prototype	1/3/06	1/16/06	U. Maryland
5.1.2	Define RITIS Conop	4/18/06	5/30/06	U. Maryland
5.1.3	Prepare RITIS PMP	5/31/06	6/29/06	U. Maryland

5.1.4	Define RITIS Requirements	6/14/06	08//01/06	U. Maryland
5.1.5	Develop RITIS v1	6/21/06	10/24/06	U. Maryland
5.1.6	Prepare Interface Plan	6/21/06	7/13/06	U. Maryland
5.1.7	Prepare RITIS Acceptance plan	10/06/06	10/24/06	U. Maryland
5.1.8	Prepare RITIS Acceptance Report	10/25/06	11/27/06	U. Maryland
5.1.9	Prepare RITIS v1 Deployment Plan	11/09/06	11/27/06	U. Maryland
5.1.10	RITIS v1 Deployment	10/11/06	02/05/07	U. Maryland
5.1.9.1	Develop RITIS Training Materials	10/11/06	11/23/06	U. Maryland
5.1.9.2	Conduct RITIS Training	11/24/06	02/05/07	U. Maryland
5.1.9.3	Document Deployment Results	11/28/06	12/29/06	U. Maryland
5.1.11	RITIS Project Management	6/30/06	3/9/07	U. Maryland
5.1.12	Document RITIS IV&V Findings	6/30/06	11/24/06	U. Maryland
5.1.13	Develop Safety and Emergency Management Interfaces	12/4/06	2/23/07	U. Maryland
5.1.14	Establish Change Control Board	01/20/07	06/30/07	Steering Committee
5.2	**Traveler Information System**	**5/1/06**	**7/21/06**	TBD[2]
5.2.1	Document 511 Stakeholder Coordination Agreement	5/1/06	5/12/06	TBD
5.2.2	Define Requirements	5/15/06	6/9/06	TBD
5.2.3	Prepare Analysis of Alternatives	6/12/06	6/23/06	TBD
5.2.4	Define TIS Conop	6/26/06	7/21/06	TBD
5.3	Establish Transportation System Portfolio	5/1/06	5/29/06	U. Maryland
6	**Regional Operations Research**	**9/18/06**	**6/29/07**	TBD[3]
6.1	Establish Research Plan	9/18/06	10/30/06	TBD
6.2	Prepare Research Papers	10/31/06	6/29/07	TBD

Dependencies between individual tasks in the WBS are illustrated in the block diagram below.

[2] The Responsibilities and funding for the Traveler Information System seems to be split among many current projects. The Steering Committee and the CapCom Program Manager will need to work with the 511 stakeholders to agree on projects and interfaces going forward

[3] The Regional Operations Research is a needed function as outlined in the CapCom Concept of Operations but needs further definition and funding assigned accordingly.


PREPARATION
CapCom IMPLEMENTATION
RITIS VERSION 1
Establish Transportation System Portfolio 4.4
Establish Research Plan 6.2
Prepare Research Papers 6.3
Prepare Initial Operating Budget 4.1
Prepare Contracts 4.2
Define Steering Committee Charter 1.2
Develop MNS and Conop 1.1
Hire Program Manager 1.3
Conduct Stakeholder Outreach 1.5
Prepare Initial Organizational Plan 1.4
Establish MOUs 2.1
Integrate Standard Operating Procedures 2.4
Define Regional Incident Performance Criteria 1.8
Define CapCom Implementation Targets 1.6
Define CapCom Implementation Plan 1.7
Establish Interim CapCom Procedures 2.2
Assign Interim Operational Staff 3.1
Prepare Program Evaluation Plan 1.9
Document Evaluation Findings 1.10
Define Ongoing Governance Structure 1.11
Define Sustainable Funds 4.3
Assign Permanent Operational Staff 3.2
Document Communication Channels 2.3
Develop and Conduct Training 2.5
Install Initial Equipment Improvements at TMCs 3.3
CapCom Regional Operations 3.4
Plan NextGen CapCom 1.12
Steering Committee
Program Manager
DOT Partners
University of Maryland
Unassigned
5.1.1 Develop Prototype
Define RITIS Conop 5.1.2
Prepare RITIS PMP 5.1.3
Define RITIS v1 Requirements 5.1.4
Develop RITIS v1 5.1.5
Develop Safety & Emergency Mgt. Interfaces 5.1.13
Prepare RITIS Acceptance Plan 5.1.7
Prepare RITIS Acceptance Report 5.1.8
Prepare RITIS v1 Deployment Plan 5.1.9
RITISv1 Deployment 5.1.10
Prepare Integration Plan 5.1.6
Establish RITIS Change Control Board 5.1.14
Document RITIS IV&V Findings 5.1.12
Document 511 Stakeholder Coordination Agreement 5.2.1
Define Requirements 5.2.2
Prepare Analysis of TIS Alternatives 5.2.3
Define TIS Conop 5.2.4

E.5 Acquisition

The Program Manager will be hired via the MWCOG contracting process, and it is assumed that other acquisitions of necessary goods and services will likewise be handled through the MWCOG acquisitions capabilities. The information systems development work being conducted by the University of Maryland, however, will be funded directly via grants.

F. Program Control

F.1 Program Tracking and Communications

The Steering Committee will set the overall goals for this program and will meet on a monthly basis to establish policies and review progress. The Program Manager will track project costs and accomplishments monthly by task area and provide monthly reports or briefings to the Steering Committee on actual costs vs. budgeted costs and progress toward task completion. Projected schedule variances will be resolved during these monthly reports/briefings or through interim communications. The Program Manager will also be available on an as-needed basis to provide technical advice to the Steering Committee.

F.2 Change Control

Significant changes to this program of work, or their associated schedule and budget, must be approved by the Steering Committee. The Program Manager will report to the Steering on the likely effect(s) of the proposed change(s) with respect to the program budget, timetable, and impacts on existing program components.

F.3 Risk Management

The Program Manager will prepare a “risk matrix” that identifies, analyzes, and prioritizes program risk factors and specifies mitigation procedures for each. The matrix will be updated at regular intervals throughout the course of program implementation and operation.

F.4 Quality Assurance

The Program Manager will prepare a Quality Assurance plan describing the internal controls and reviews that all work products will undergo. All CapCom deliverables and work products will be subject to the QA procedures before presentation to the Steering Committee, partner agencies, or external stakeholders.

F.5 Acceptance Plan

The Steering Committee, on behalf of the partner agencies, will accept work produced by this program according to the procedures described in the Memorandum of

Understanding. Individual information systems being developed will also have their own testing and acceptance plans.

F.6 Transition or Closeout Plan

As described in Section 1.1, this plan covers only CapCom implementation and initial set of start-up activities. After these activities have been completed, CapCom will make the transition to ongoing operations. The Program Manager in consultation with the Steering Committee will develop a new PMP for the next set of tasks. The Program Manager will also brief the Steering Committee on "lessons learned" during the initial implementation phase and how these may affect the activities and deliverables envisioned for subsequent phases.

G. Technical Process Plans

G.1 Infrastructure and Security Plan

An infrastructure plan, including details of development methodologies, programming languages, and technical standards, will be developed for each of the Information Systems sub-components of this program.

G.2 Security Plan

Security of information is a key consideration, particularly for transportation data that have a security and emergency management component. Data privacy is also an issue for the traveling public. Therefore, a security plan will be developed for each of the Information Systems sub-components of this program to address these issues, as relevant to the system.

G.3 Documentation Plan

See Section 5.4 for a timetable of deliverables.

G.4 Verification and Validation

A program of independent verification and validation is planned for each major Information System sub-component. See the Work Breakdown Structure.

G.5 Deployment Plan

The Work Breakdown Structure includes a task for developing a Deployment Plan for CapCom itself and for each of the major Information Systems components.

G.6 Configuration Management Plan

A configuration management plan will be part of the PMP for each Information Systems component.