

Surface Transportation Weather Decision Support Requirements (STWDSR)

Maintenance Decision Support System: Final FY 01 Project/Program Review

September 20, 2001

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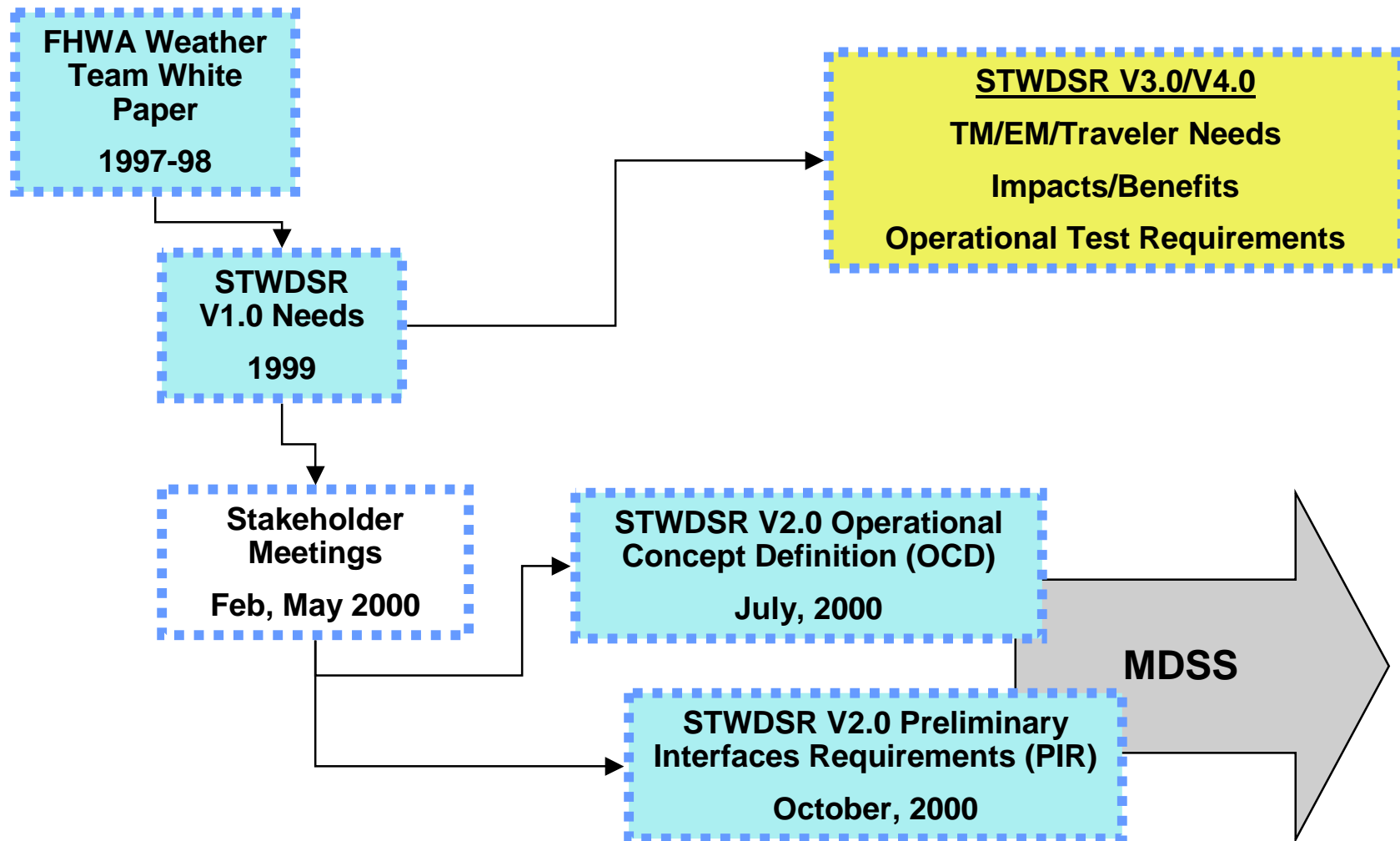
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Recap of Program Options

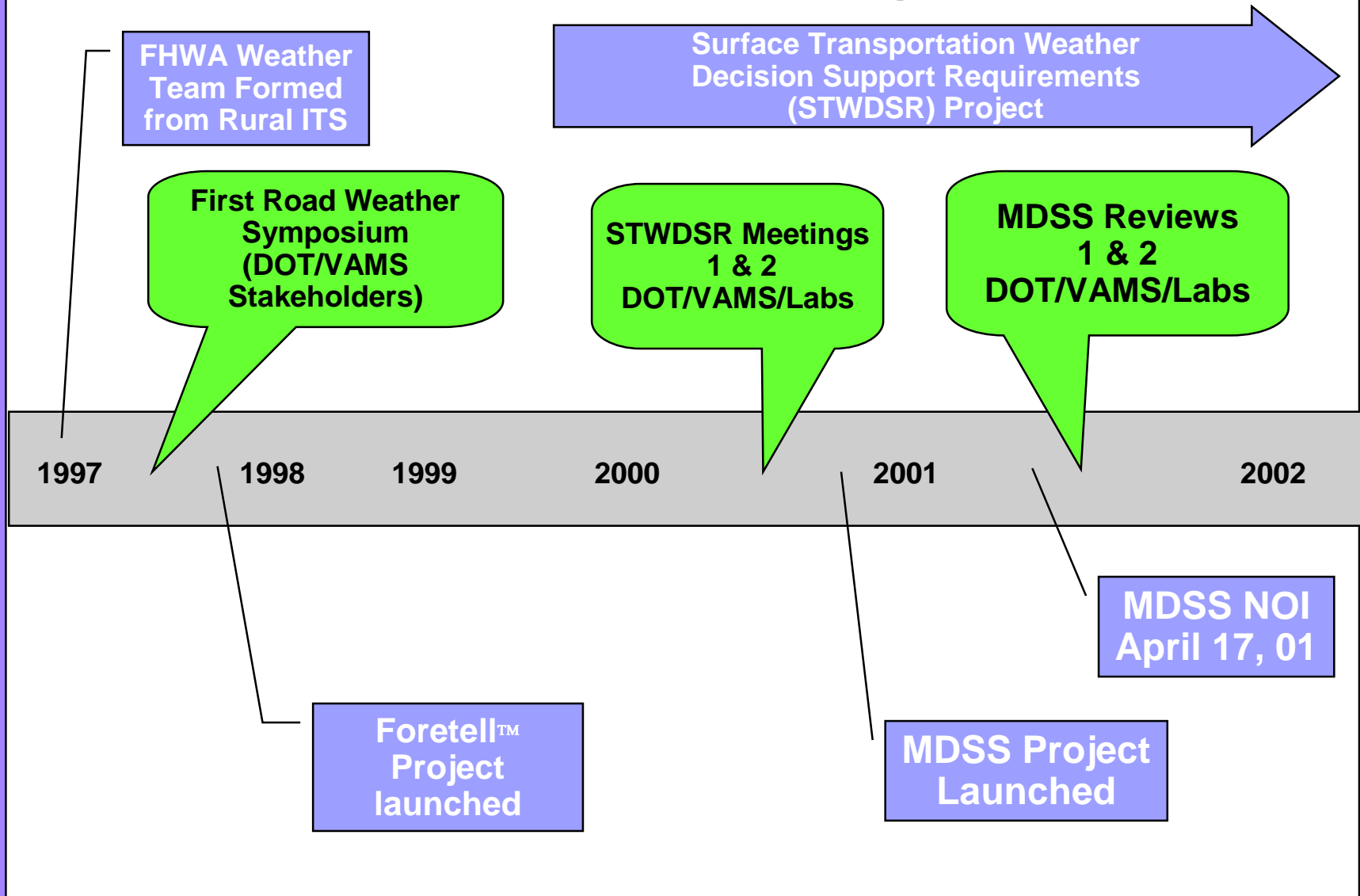
STWDSR/MDSS

- **Surface Transportation Weather Decision Support Requirements (STWDSR)**
 - **User-based requirements for a general decision support system for winter road maintenance**
- **Maintenance Decision Support System (MDSS)**
 - **A user-validated realization of the STWDSR**

STWDSR Context



STWDSR/MDSS Progress



Key Principles

- **Decision support was identified gap since 1997**
- **Evolutionary development track:**
 - **requirements (one user group), prototype, test, deploy**
- **Stakeholder involvement**
- **Utilize National Labs talent to create open products**

Key Decision Support Features

- Decision support *tailored* to decisions (needs = 53)
- Decision support on top of environmental threat, transportation and resource information
- Decision support functions *filter, fuse and present* information
- Requires an *open system*
- Statistical information key to *fusion and risk decision making*
- Collaboration and learning are potential features

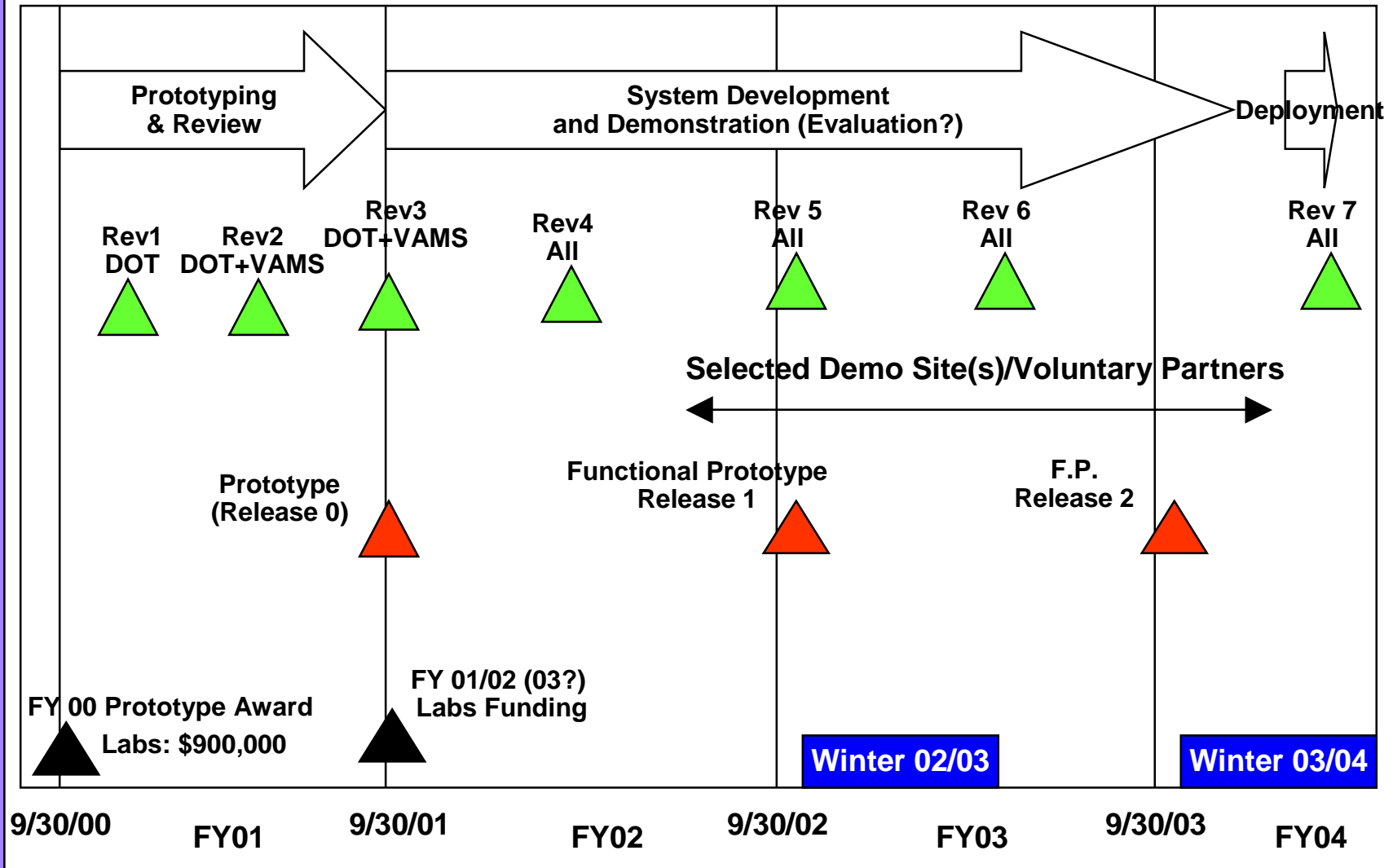
Results to 6/22/01 (MDSS Rev2)

- **A growing, collegial, stakeholder participation**
 - **30 DOTs (56 individuals)**
 - **66 VAMS, Canadian Met**
- **“Patient” with STWDSR, enthused by MDSS (2/21 MDSS review)**
- **NOI (April) promised Operational Test, re-planned at 6/22 review**

The Re-Plan

- **Responded to FHWA management concerns:**
 - **product risk/maturity**
 - **openness to all stakeholders**
- **Consensus on “Option B” for the MDSS demonstration phase**

Demo Phase Plan (Option B)



Option B: Features

- **Product Risk**
 - **Extended development: extra months to demo functional prototype 1 (FP1)**
 - **FP1 not an operational system**
 - **FP2 adds another year to mature product**
 - **Approx. 2 years to product ready for operational integration (adds 1 year over old FOT plan)**
- **Openness**
 - **No formal downselect of any vendor partner**
 - **Internet interface available at any site (but demo domain is site specific)**

Option B: Costs

FOT Budget (Option A)

FY 01 \$900K

FY 02 \$500K

FY 03 \$350K (depl. Advocacy)

Total \$1750K

Demo Estimates (Option B): Years are of expenditure

| | | | | |
|---------------|-----------------------------|---------------------------------|---------------------------|---------------|
| Labs: | (1) Demo Site Award: | (4) Reviews, DOT travel: | Focus Group (CHI): | Total: |
| FY 02 \$1500K | FY 02 \$100K | FY 02 \$60K | FY 02 \$100K | FY 02 \$1760K |
| FY 03 \$500K | FY 03 \$100K | FY 03 \$60K | (may be in demo cost) | FY 03 \$660 |
| | | | | <hr/> |
| | | | | Total \$2420* |

*Multiple demo sites can raise cost

Summary of FY 02 SOW

Reflection on Option B

- **Assumed product risk would be addressed by more time/money**
 - **neither extended by SOW, FP 2 not included**
- **Deferred integration: MDSS never intended as operational product**
- **Demo phase to avoid downselect: remains vague and needs to be planned**
- **Number of reviews important to “openness”**

FY 02 SOW

- **Continues Labs' development from FY 01**
- **Contains one-year Functional Prototype (FP) development**
 - **End-to-end, live test domain, demonstration system**
 - **One demo domain: Downselect implications (vendor/DOT relationships)**
- **Budget**
 - **\$900K for Labs (same as "Option A")**
 - **\$30K for one full stakeholder review**
 - **\$10K to support DOT "GUI Group"**

FY 02 SOW: Technical Content

- **The “front end” (GUI) with rules-of-practice is essential to realize STWDSR**
 - most variable across locations and individuals
 - necessary to demo, but may not be transferable
 - CRREL/NCAR with GUI Group advice
- **Road Weather Forecast System (NCAR)**
 - essential to the fusion function
 - embodies climatic adaptivity (learning)
 - benefits from ensemble input (FSL)
 - depends on observational inputs (scarce, radar not included, LL video sacrificed)

FY 02 SOW: Technical Content concl.

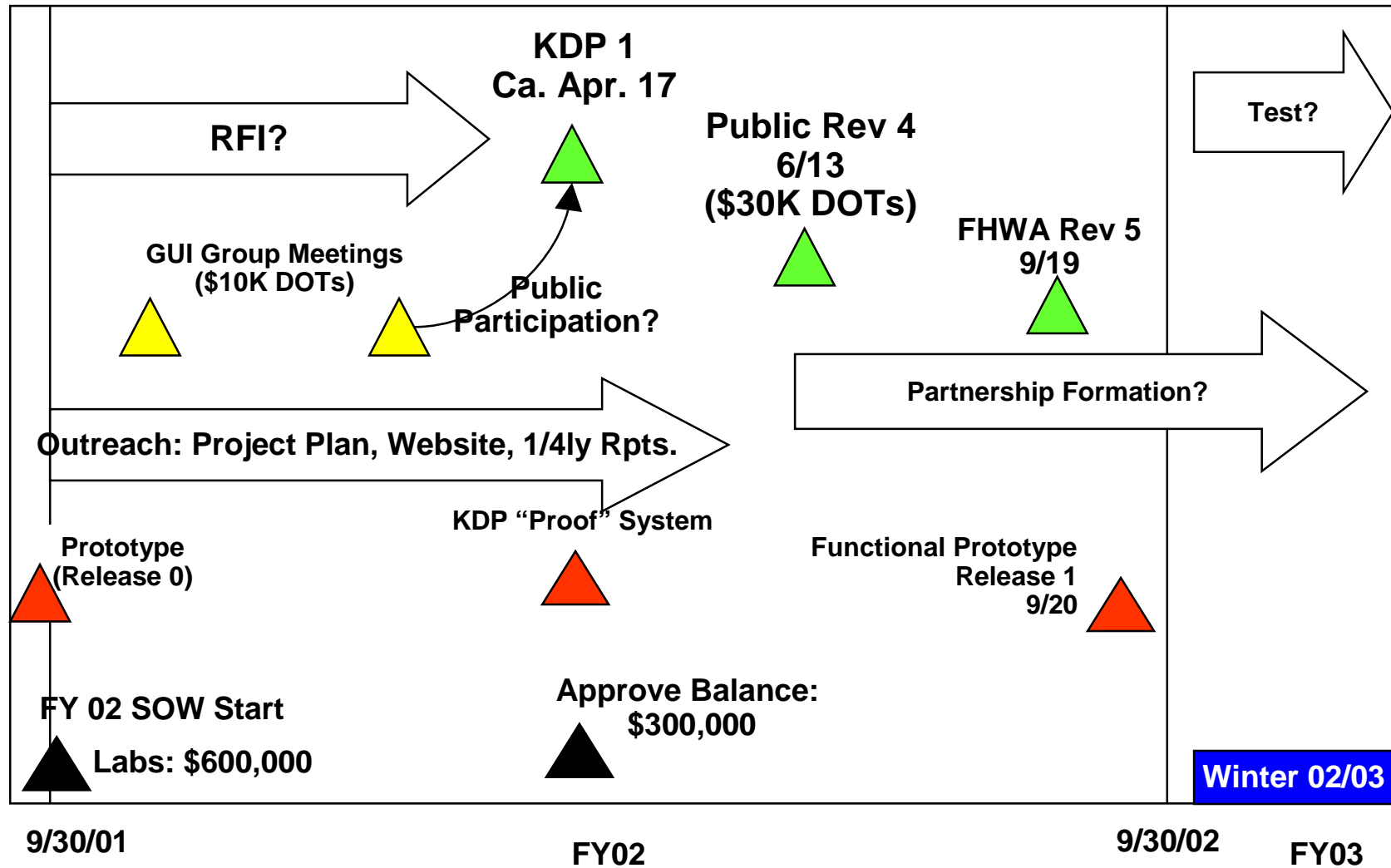
- **Road condition algorithms (temperature and chemical concentration) (CRREL)**
 - necessary for credible demo
 - most substitutable for vendor products
 - still important to create “open” development
- **Precipitation-type algorithms (NSSL)**
 - key environmental parameter for most road-weather uses
 - lack of radar again a deficiency
- **ETL sensor technology: cut but vital to future infostructure planning**
- **Overall a tremendous bargain by leveraging Labs’ capabilities**

Technical Task Funding Allocation

| Task | Lab | Cost \$K |
|-------------------------------|------------|-----------------|
| Road Wx Forecast System | NCAR | 116.5 |
| Display (GUI) | NCAR | 50. |
| Rules of Practice | CRREL/LL | 100. |
| Temp. and Chemical Algorithms | CRREL | 152.3 |
| Ensemble modeling | FSL | 105. |
| Precip-Type Algorithm | NSSL | 35. |
| Management, Integration etc. | | 342.3 |

Stakeholders and Reviews

FY 02 MDSS Reviews



Review Management

- **Mitretek handles outreach and logistics**
 - Will manage \$40K in DOT travel funding
- **Issue on review 5**
 - SOW states it is “public”, but no DOT funding
- **KDP 1: Public input?**
 - Believe it essential to hear from stakeholders
 - Assume we will continue with RFI
 - Consider inviting GUI Group (need travel \$)
- **Concern about “ad hoc” input**
 - Project has come a long way with stakeholder concurrence
 - If there is concern re VAMS, FHWA needs to articulate policy

Conclusion

- **The stakeholder group is a valuable institution by itself:**
 - **FHWA to state contact**
 - **Exposure to Labs' capabilities, new technology**
 - **Public-private meeting ground**
 - **an open exchange of information**
- **Continuity in and beyond MDSS must be considered.**
- **Consider a further evolutionary cycle.**

Deployment Planning

***By the end of FY 02 we will have spent
3 years and over \$2million
on this project.***

**The end game—deployment—will determine
whether it was worthwhile.**

Concerns

- **Our stakeholders make plans based on what we tell them to expect**
- **Any test requires resource planning by partners: We need to get into their >1 year budget cycle.**
- **We would *like* to leverage deployment demo funds etc.**
- **When we waffle, we look disorganized**
- **If FHWA mgt. sets constraints, they also have to know where we are**

Status

- Stakeholders *think* we are operating to Option B.
- There are at least two anxious candidates to deploy (WA and ATWIS) and others who are ready.
- Under SOW, an operational test for winter 02/03 would be pressed and risky
 - FP not more mature, and no integration compared to original plan
- Under SOW, the test domain not integrated operationally, but is still a “downselect”.

Status, concluded

- **Have stated openness to tech transfer and integration at any time**
- **Practically, Labs hard pressed to take on any parallel work**
- **Intend to have open, web demo in small domain in winter 02/03**
 - **domain choice critical re future deployment cost and time**
 - **prefer to work primarily through DOTs**
- **But need to show real integration and operational test some time to complete cycle**

Factors

- **Have \$500K (FY 02) and \$350K (FY 03) in budget.**
- **Funds probably marginal for one operational test**
 - **old problem of downselect and exclusion**
 - **labs need funding for integration and IOC work**
 - **small “incentive” fund to partners, may need substantial matching**
- **A piecemeal integration without FHWA participation could lose evaluation opportunity entirely**
- **Can we do a third-party evaluation even in demo phase? (JPO, university)**

Options

- 1. Work out from demo into operational test**
 - winter 03/04 ?
 - implies early downselect
- 2. Multiple demo sites into ops. tests**
 - requires more demo phase and ops test phase funding
 - mitigates downselect
- 3. Old plan: Ops test in winter 02/03**
- 4. Old Plan shifted: Ops test winter 03/04**
- 5. Terminate with FP demo: No further FHWA funding**
- 6. Terminate and “deploy incentive”**

Options:

| Option | Cost: 02 and 03 | Schedule |
|----------------------------------|----------------------|------------------|
| 1. Demo→Test | \$900K \$850K + | End ~5/04 |
| 2. Demo+→Test | \$900K + \$850K++ | End ~5/04 |
| 3. Old plan | \$900K \$850K | End ~5/03 |
| 4. Old Plan, 03/04 | \$900K \$850K+ | End ~5/04 |
| 5. Terminate (after winter demo) | \$900K <\$500K | End ~3/03 |
| 6. Terminate and incentivize | \$900K \$850K | Open evaluation? |