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PRIMA – Pro-Active Incident Management

1st Progress Report

Deliverable D1.2a
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CEDR Call 2013: Traffic Management PRIMA Pro-Active Incident Management

1st Progress Report (D1.2a)

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1 Introduction

The aim of the CEDR programme is to realise the benefit of implementing innovation in traffic management solutions for National Road Administrations (NRAs). In this context, PRIMA targets the enhancement of current state-of-the-art Traffic Incident Management (TIM) techniques by introducing the idea of Pro-Active Incident Management with the following essential features: Anticipate, Prepare, Respond, and Monitor - anticipate that something may happen, be prepared to respond efficiently when the situation requires it, and monitor developments to minimize secondary effects.

The project work will build upon previous regulations, specifications and assessment studies regarding TIM. The **objectives** can be summarized as follows:

1. Provide clear guidance and recommendations for handling incidents and monitoring management performance and benefits, based on the assessment of risks and costs
2. Assess the technical, economical and organisational feasibility of innovative incident management based on novel technologies
3. Provide implementable solutions to facilitate proactive incident management for high-level road networks, at a transnational level.

This report summarises all activities performed in the **first reporting period from 15/05/2014 to 30/01/2015**, which includes activities in WP1 regarding organisational and management issues, as well as the research activities performed in WP2. An outlook on future actions and work is given, before the report is concluded with an updated risk register and payment schedule.

2 Work progress

The following sections describe the activities completed in each work package and task. At the end of each section, a list of milestones and deliverables is given to show the status on work progress.

2.1 WP1 Project management

WP1 involves the overall consortium management, dissemination and reporting activities.

Several physical meetings have taken place during the first reporting period:

- Inception meeting: 26-27th May 2014, Vienna
- PEB meeting, 3rd September 2014, Dublin
- PEB meeting, 13th January 2015
- First Interim meeting, 19-20th January 2015, London

In addition, monthly teleconferences are held, during which the project coordinator along with the WP leaders give updates on the work progress in the project.

The updated Gantt chart is given in Figure 1. A new milestone (M3.2) has been added to WP3, since this was found to be a crucial step towards the assessment.

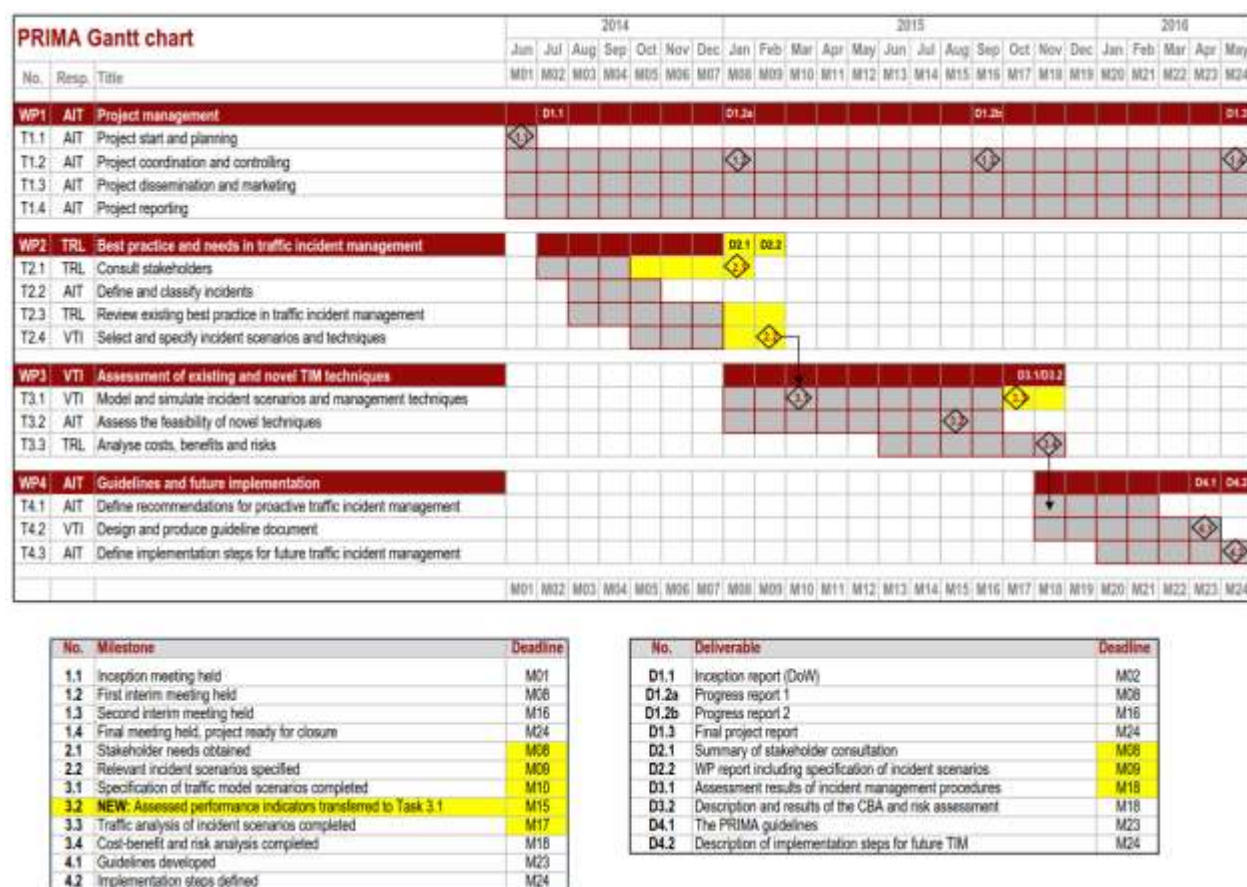


Figure 1: Gantt chart, milestones and deliverables. Changes/delays are highlighted in yellow.

With regard to the project timeline, a two-month delay has occurred in WP2, which led to a shift in the submission deadlines of Deliverable D2.1 and Deliverable D2.2. The delay will be compensated by moving the Milestone “Traffic analysis of incident scenarios completed” to month 17 and focusing the work up to the milestone on delivering the necessary data to Task 3.3. This will imply a slight delay of Deliverable 3.1, but this will not delay the project further. The project will also investigate (if needed) the possibility to shorten WP4 with one month to spread the two month delay equally between WP3 and 4.

In terms of organisational issues, the following updates can be reported:

The WP 2 leader (TRL) – Mr. Christopher Kettell – has been replaced by Mrs. Kate Fuller. Additional changes in the project team have occurred through the leave of Mrs. Nicole Sidaway (TRL) and the additions of Mr. Viktor Bernhardsson (VTI), Mr Jeroen Broos (TNO) and Mr. Jeroen Uittenbogaard (TNO). The updated project organisation is depicted in Figure 2.

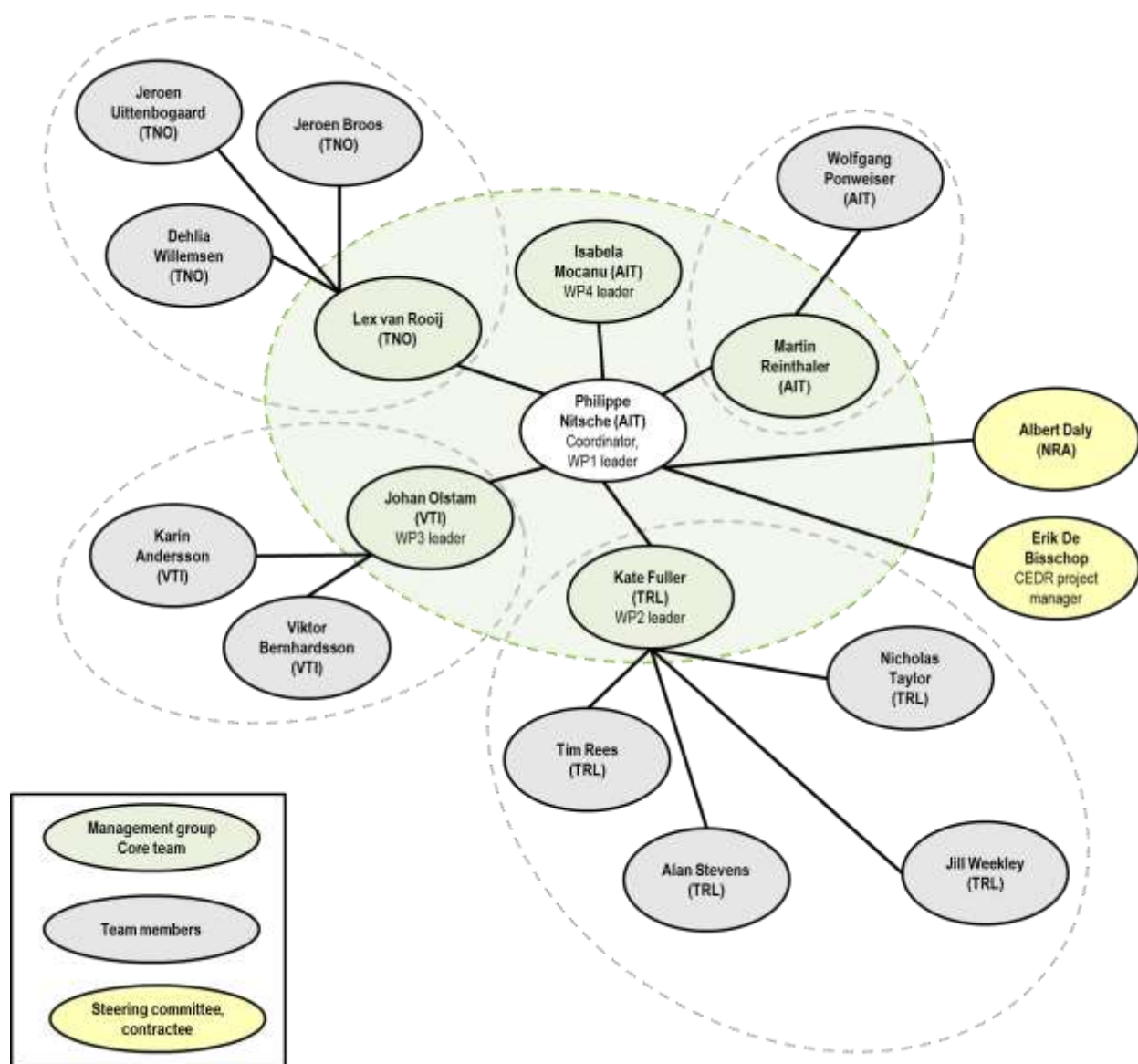


Figure 2: PRIMA organisation chart

Milestones/Deliverables:

No	Milestones/Deliverables	Planned deadline	Status
M1.1	Inception meeting held	June 2014	Completed
M1.2	First interim meeting held	Jan 2015	Completed
M1.3	Second interim meeting held	Sep 2015	On schedule
M1.4	Final meeting held	May 2016	On schedule
D1.1	Inception report	July 2014	Completed
D1.2a	Progress report 1	Jan 2015	Completed in Feb 2015
D1.2b	Progress report 2	Sep 2015	On schedule
D1.3	Final project report	May 2016	On schedule

2.2 WP2 Best practice and needs in traffic incident management

All activities of WP2 have been completed by February 2015. The objectives of WP2 were:

- Carry out a stakeholder consultation exercise to confirm the focus of the project and ensure the output is fit-for-purpose
- Review existing best practice in traffic incident management
- Identify and specify incident scenarios for the assessment in WP3

Task 2.1 Consult stakeholders

A web-based survey has been designed and offered to over 100 individuals with a professional interest in Traffic Incident Management (TIM) drawn from national and local governments, concessionaires, police and other professional bodies in 22 countries. To date, 18 responses (including one partial response) have been received from 13 countries (59%), including all those represented in PEB. Nearly all the responses are from NRAs (six being from or on behalf of the Rijkswaterstaat 'wearing two hats'). Because invitations were sent to several members of some organisations not all of whom were expected or needed to respond, the effective individual response rate is around 26%. The results show a clear pattern, which is analysed in the deliverable D2.1 (Stakeholder Consultation Report).

Task 2.2 Define and classify incidents

Task 2.2 defined and classified incidents that represent the focus of the project. Starting with an initial list of incident types that resulted from the initial planning workshop, the work was continued by incorporating valuable feedback from the PEB meeting as well as by reviewing literature and TIM guidelines. The final list of incident types was concluded with results and input from the stakeholder consultations performed in Task 2.1.

Task 2.3 Review existing best practice in incident management

Deliverable 2.2 reviews the previous CEDR projects Tasks 5, 12 and 13, national TIM experience and guidance documents (including outside Europe and FHWA initiatives), important aspects of best practice and features of pro-active TIM. Further sections deal with classification and costing incidents, specification of scenarios (detailed in an appendix) and cost-benefit analysis methods for the assessment, later in WP3. The report concludes with summary lists of requirements, methods for taking PRIMA forward and proposed guidance outputs from the project. Numerous references are included.

Task 2.4 Identify and specify incident scenarios

In Task 2.4, a plan for choosing incident scenarios has been established. By using the information from the stakeholder consultation as base, a total of four different incident scenarios were developed during a comprehensive workshop held with the project team. The main target was to obtain a large variety of scenarios and at the same time satisfy the desired requests from the stakeholder consultation. Most of the highest ranked incidents and technologies according to the stakeholder consultation were covered in the developed scenarios, here stated below:

Scenario 1: Car to car collision involving injury, before traffic peak

Scenario 2: Unsafe road conditions due to adverse weather leading to congestion

Scenario 3: Large Goods Vehicle stranded on a motorway

Scenario 4: Unpredictable congestion due to obstruction on a motorway

Variable factors were added to these basic scenarios (e.g. traffic flow, existing TIM infrastructure etc.), leading to a set of sub-scenarios, assessment of possible impacts and a list of potential TIM techniques to be applied. The scenarios and the TIM techniques that will be considered for each scenario are documented in Deliverable 2.2.

Milestones/Deliverables:

No	Milestones/Deliverables	Planned deadline	Status
M2.1	Stakeholder needs obtained	Sep 2014	Completed in February 2015
M2.2.	Relevant scenarios specified	Dec 2014	Completed in February 2015
D2.1	Summary of stakeholder consultation	Sep 2014	Completed in February 2015
D2.2	WP report including specification of incident scenarios	Dec 2014	Completed in February 2015

2.3 WP3 Assessment of existing and novel traffic incident management techniques

Planning of WP3 started at the kick-off meeting. The WP3 started in January 2015, in connection with the first Progress Meeting, with aim of finalizing WP2 and handover from WP2 to WP3. WP3 looks to estimate the risks and costs of the chosen combinations of incident scenarios and TIM techniques. An additional milestone has been added in WP3. The milestone is for the handover of results from Task 3.2 to Task 3.1 with respect to assessment of potential time and cost savings in the Discovery and Verification phases (of the TIM cycle) when using novel technologies.

Task 3.1 Model and simulate incident scenarios and management techniques

This task has started with planning of the framework for assessment of costs of congestion for the combinations of incident scenarios and techniques chosen in Task 2.4. The plan is to use macroscopic traffic flow simulation to assess speed, delay, shockwave speed etc. for the different cases. Changes in delay, speed, shockwave speed etc. for 'do-minimum' and 'do-something' cases will be the main output from Task 3.1 to Task 3.3. At the moment the work in this task focuses on getting the framework finished for the Milestone 3.1 "Specifications of traffic model scenarios completed".

Task 3.2 Assess the feasibility of novel techniques

As a first step to assess the feasibility of novel techniques, a best practice review has been carried out. A list of novel technologies and TIM techniques were identified and grouped by their main characteristics. Based on the scenario descriptions (from Task 2.4), a prioritisation for the further assessment was done and promising technologies (e.g. Floating Vehicle Data, eCall) were assigned to the planned scenarios.

The next step to assess the feasibility of novel techniques will be the collection and definition of key performance indicators for time and quality. At the moment, the work focusses on a review of performance indicators for incident detection and verification and the extension to include time relevant indicators such as availability and timeliness of data/information as well as quality based indicators such as accuracy and reliability.

The task to investigate the feasibility of in-vehicle data to improve incident management has also started in time. The first steps include the preselection and definition of crash cases in collaboration with the scenario descriptions (Task 2.4).

Task 3.3 Analyse costs, benefits and risks

At the time of this report delivery, this task has not been started yet. However, potential methods for achieving the task's objectives have been investigated in advance. There are two options for estimating benefits (based mainly on delay reduction):

- (1) Apply a simple queuing approach to estimate delays for each particular incident scenario depending on assumptions of demand, capacity and duration in 'do-minimum' and 'do-something' cases, plus value of time. Some parameters could be drawn from INCA (next);
- (2) Apply the UK DfT's INCA spreadsheet-based model, which assumes realistic daily traffic profiles and that up to twelve different incident types occur at specified rates. INCA could also be used to estimate secondary incidents, which could be of any type.

The above will estimate the benefits of TIM depending on prior assessment of the impacts of TIM measures on duration, capacity etc. (provided by Task 3.1). It will be necessary to estimate the costs and risks of TIM measures associated with given impacts on the incidents, which will be based on their descriptions (provided by Task 3.2).

Milestones/Deliverables

No	Milestones/Deliverables	Planned deadline	Status
M3.1	Specifications of traffic model scenarios completed	Feb 2015	On schedule
M3.2.	Traffic analysis of incident scenarios completed	Sep 2015	On schedule
M3.3	Assessed performance indicators transferred to Task 3.1	Aug 2015	On schedule
M3.4	Cost benefit and risk analysis completed	Nov 2015	On schedule
D3.1	Assessment results of incident management procedures	Sep 2015	On schedule
D3.2	Description and results of the CBA and risk assessment	Nov 2015	On schedule

2.4 WP4 Guidelines and future implementation

The activities in WP4 will start in November 2015.

Milestones/Deliverables

No	Milestones/Deliverables	Deadline	Status
M4.1	Guidelines developed	M23	On schedule
M4.2	Implementation steps developed	M24	On schedule
D4.1	The PRIMA guidelines	M23	On schedule
D4.2	Description of implementation steps for future TIM	M24	On schedule

3 Planned activities

3.1 WP1 Project management

The next activities within WP1 include:

- Dissemination activities: submission of an abstract for the TRA 2016 conference
- Second Interim meeting, September 2015 in Delft / Linköping
- Communication and coordination with the funding organisation and the consortium members
- Correspondence with the project coordinators of METHOD and UNIETD
- Financial management and distribution of funding to the project partners
- Risk management, including risk analysis and updated risk register

3.2 WP2 Best practice and needs in traffic incident management

The work within this WP has been completed.

3.3 WP3 Assessment of existing and novel traffic incident management techniques

The next activities within this WP are:

- Use macroscopic traffic flow simulation to assess speed, delay, shock wave speed, etc. for the different cases of each scenario.
- Changes in delay, speed, shock wave speed, etc. for 'do-minimum' and 'do-something' cases will be investigated;
- Evaluate the feasibility of novel incident management methods, identified in Task 2.4
- Estimate the costs and risks of each incident scenario;

3.4 WP4 Guidelines and future implementation

The activities will start in November 2015.

4 Project risks

With regards to the risk register presented in the inception report D1.1, the following risks were identified (see Table 1), which were and will be relevant in the previous and upcoming project phases.

Table 1: Risk table

Risk description	Potential Impact	Risk mitigation
Lack of accident data	Negative impact on project delivery: Novel technologies for incident classification (injury severity) cannot be fully assessed for collision scenarios	Possible incident scenarios involving collisions were considered in an early project stage. Preliminary data access requests were done by TNO to check availability.
Scenarios cannot be applied by our methods	Not all scenarios can be assessed and included in the guideline, which may lead to unsatisfied stakeholders	Possible incident scenarios were considered in an early project stage. 1) We only defined TIM scenarios that we can assess, 2) We might consult a subcontractor for work we cannot assess by ourselves
No adequate existing software tools available	Additional software must be purchased, which involved an internal shift of costs; OR not all scenarios can be assessed and included in the guideline	We only defined scenarios that we can assess. If necessary, we might purchase additional tools and shift costs.
Needs of stakeholders are not addressed	Stakeholders and the PEB are not satisfied with the guidelines	Regular consultation of stakeholders. Before producing the recommendations and guidelines in WP4, consult relevant stakeholders.
List of scenarios do not include collisions	Negative impact on project delivery: TNO cannot conduct the assessment of injury level classification methods	One of our four scenarios includes a collision incident, as it was defined as highly relevant in the stakeholder consultation phase.
Legal changes and their implications	Chance of legal circumstances can lead to invalid recommendations for the PRIMA guideline, especially when it comes to data access, privacy or liability issues.	Check for legal developments in the field of TIM in order to react before writing the recommendations.
Delays regarding the guideline	Project end must be postponed.	The production of the guidelines must be planned ahead. Upcoming delays must be communicated early enough. A cost-neutral project extension must be discussed with the NRA/PEB.
Level of detail for guidelines is inadequate	Stakeholders cannot use the guide because it has not enough detail OR the guidelines are too comprehensive to be applied	Discuss with stakeholders early enough, what level of detail is desired. Also clarify the format to produce the guidelines.
Change of key personnel	Key tasks cannot be fulfilled due to change of level of expertise or lack of available other persons. This can result in delays and/or modification of objectives.	Brief the new key personnel on PRIMA and clarify open questions. Choose an expert who is able to fulfill the tasks in PRIMA. Extend WPs or the project end date if necessary

Too many scenarios of interest	Not all scenarios can be assessed and included in the guideline, which may lead to unsatisfied stakeholders	To keep the work effort in a reasonable frame, four scenarios with an appropriate number of variables have been defined.
Conflicting needs/requirements of different stakeholders	Certain stakeholders and the PEB are not satisfied with the guidelines	Try to find a good mixture of different needs (covering different countries) and set the scenarios accordingly. Together with the stakeholders, find a consensus/common ground in the list of scenarios. Eventually, discard the scenarios we cannot assess with our methods and discuss it with the stakeholders.
Number of scenarios too low for guidelines for stakeholders	The PRIMA guidelines are not useful enough for the stakeholders, because they require more scenarios.	By choosing four scenarios with an adequate number of variables, we found a consensus between stakeholder requirements and reasonable work effort.
Lack of stakeholder response and/or availability	Important information is delivered too late, which may lead to delays in the project AND/OR the guideline may miss the point and is not useful for TIM	This risk occurred in terms of poor response to the web survey and led to a delay of WP2. By being more pushy and contacting relevant persons individually, the number of respondents could be increased to a reasonable amount.
Non-quantifiable assessment of costs, risks and benefits	TIM techniques cannot be compared, because they are not quantifiably measurable. This may lead to an incomplete assessment only based on qualitative performance of TIM techniques	At the interim meeting, we identified the interplay between the technical assessment and the cost-benefit and risk analysis. They are linked by quantifiable indicators such as improved delay/travel times, accident costs etc.
Non-objectives and scope become unclear	Misunderstandings within the project team, without regular communication, WP subteams may work in the wrong direction, i.e. out of the scope	The scope has been clearly defined in the inception report. The coordinator always keeps the project in scope and recognizes deviation. Discuss possible scope changes, e.g. due to inputs from the PEB, within the team.

5 Finance

Personnel and travel costs incurred according to the project plan. The payment schedule is given in Table 2.

Table 2: Payment schedule

Payment	Planned payment date	Status	Amount in €
First rate for reporting period 05/2014–07/2014 Associated with D1.1 (inception report)	08/2014	Paid	€ 31,345.60
Second rate for reporting period 08/2014–02/2015 Associated with D1.2a (first progress report)	03/2015	Planned	€ 125,382.34
Third rate for reporting period 03/2015–10/2015 Associated with D1.2b (second project report)	11/2015	Planned	€ 125,382.34
Final rate for reporting period 11/2015–05/2016 Associated with D1.3 (final report)	06/2016	Planned	€ 31,345.60

6 Acknowledgement

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