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StanForD 2010
Benefits, needs and requirements
for users and manufacturers

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1 BACKGROUND

StanForD has been coordinated by Skogforsk since the first initiative to establish a standard was taken in 1986/87. The first standard was decided in 1988. Finnish users have been involved since the early 90's through Metsäteho. The organisation of the standard was set in its present form in the late 90's when the large manufacturers agreed to finance the administrative work together with the Swedish forest companies through Skogforsk.

The present standard has had the same format since the beginning and one of the fundamental principles has been to have full backwards compatibility through never allowing any variables to be excluded. The format was established with the goal of being flexible as well as small in size. These facts mean that it has been possible to adapt the standard to changing conditions but also that quite a bit of historical garbage (variables presently of no use) has accumulated over the years. The format is still working well but it is unique. This means that for a beginner a quite a lot of work has to be put into understanding (reading and writing) the technical format.

1.1 Objectives for StanForD 2010

It has, during the last years, been discussed to upgrade the standard with a totally new version which in this document is named "StanForD 2010". The objectives of developing a new standard should for example be to achieve:

- Structures that support data management requirements of today in a better way
- Better structural descriptions
- Stricter priorities (stricter implementation rules)
- A system for management of standard versions
- An adaptation to a possible papiNet -standard for wood raw material (the present idea is a close relationship but not merger)
- Reduction of old variables and structures
- Common and general format with open interface (for example XML), making it easier to implement the standard in new wood supply applications (e.g. in new markets)

1.2 Coverage of standard

Presently the focus of the updated standard is:

- Forest machines (harvesters, forwarders etc)
- Control, reporting and monitoring/follow-up of logging production

StanForD is, when for example comparing with papiNet, not primarily a standard for business transactions, even though some production data can be used as a basis for business transactions. StanForD is covering communication with a machine and not with a business partner.

It is suggested that we continue with the same limitations in the future. This means that we exclude for example silvicultural operations that do not involve any machinery, for example inventory of planting results.

2 OBJECTIVE

The objective with this report is to describe the result from a questionnaire to figure out the benefits and needs with a new standard.

3 MATERIAL AND METHODS

In November 2007 a questionnaire made by Skogforsk and Metsäteho was sent out to forest owner and forest wood supply organizations, machine manufacturers and software companies. The objective of this questionnaire was to collect information and opinions to decide if and how we should develop StanForD for future use. The idea was to analyze the needs during the winter 2007-2008 and to make a decision in May 2008 if we should go on with a more detailed analysis of a new StanForD version.

The main issues addressed were:

- the present use of StanForD by different organizations in general
- the needs of a new version of StanForD
- requirements on a new system
- economic potential (costs and revenues) of changing system

Some questions were hard to answer - especially the economical potential. The aim was to collect some personal rough estimates of costs and revenues, in other words, whether the companies believe it is economically sensible to develop a new standard or not.

The questionnaire was sent to members of StanForD as well as forest companies and software companies in Sweden and Finland. The questionnaire was also sent to Norway, Germany and Canada. We have received answers from a total of twenty different organizations, see table 1 below.

Table 1. Number of companies, which have answered the questionnaire, in different countries.

Country	Machine manufactures	Software companies	Forest organizations	Total
Canada				
Norway				
Germany				
Finland	4		3	7
Sweden	4	1	8	13
Total	8	1	11	20

The answers from manufactures (forest machines) and users (software companies and forest companies) are presented separately in the following sections.

4 RESULTS

4.1 Use of StanForD in general

4.1.1 Forest companies and forest owners

The use of StanForD for forest companies today and in the future is described in table 2. All organizations use StanForD data for managing (controlling) timber production. Most of the companies also use StanForD data for following up production and controlling harvester measuring. In Finland all companies use harvester measurement data for financial transactions to pay forest owners.

The results show that the use of StanForD data will increase in the future. All companies predict that they will use measuring data for financial transactions to pay forest owners, for following up timber production, for controlling harvester measuring and for forwarding reporting. The use of operational monitoring data and detailed stem data will also increase.

Most of the forest companies also want to have a standard for covering silvicultural operations, inventory data and reports of standing stocks.

Table 2. Use of StandForD by forest companies today and in the future. The following question was asked: "How important is StanForD in your organization or for your machine or products for following purposes?"

	Today				Future			
	Important	Partly used	Not used	Number	Important	Partly used	Not used	Number
Management (production control) of timber production and bucking (apt, ap1, oai)	90%	10%	0%	10	91%	9%	0%	11
Timber measurement by harvester for financial transaction (prd, pri, stm)	36%	9%	55%	11	64%	27%	9%	11
Follow-up of timber production (management of storages/ logistics) (prd, pri, prl)	91%	9%	0%	11	100%	0%	0%	11
Control of harvester measurement (ktr, stm, sti)	82%	18%	0%	11	100%	0%	0%	11
Forwarder reporting (prl) and management of transportations	36%	27%	36%	11	82%	18%	0%	11
Use of log data in production management of sawmills (pri, prd)	9%	27%	64%	11	40%	40%	20%	10
Logging site planning and GIS applications in forest machines (ghd)	11%	44%	44%	9	70%	20%	10%	10
Follow-up of work and machine operations (drf)	10%	30%	60%	10	60%	30%	10%	10
Work time follow-up and payments for machine operators (drf)	0%	20%	80%	10	20%	40%	40%	10
Stem databanks (stm)	30%	20%	50%	10	60%	40%	0%	10
Simulations: selection of timber assortments, bucking, pricing, logging operations, transportations etc. (all files)	40%	40%	20%	10	89%	11%	0%	9
Management and control of silvicultural operations done by forest machines (not implemented)	14%	0%	86%	7	50%	13%	38%	8
Inventory and reporting of standing stock after thinning of the forest stand (inv)	10%	20%	70%	10	50%	40%	10%	10
Other purposes, what?	0%	0%	100%	6	0%	0%	100%	6

4.1.2 Manufacturers and software companies

The use of StanForD for manufacturers and software companies today and in the future is described in table 3. The results show that all machine manufacturers use StanForD data for control of harvester measurement, collecting stem data and for simulations.

The machine manufacturers are not interested in extending StanForD in order to also cover silvicultural operations, inventory or reporting of standing stocks.

Table 3. Use of StandForD by machine manufacturers and software companies today and in the future. The following question was asked: "How important is StanForD in your organization or for your machines or products for following purposes?"

	Today				Future			
	Impor- tant	Partly used	Not used	Num- ber	Impor- tant	Partly used	Not used	Num- ber
Management (production control) of timber production and bucking (apt, ap1, oai)	71%	14%	14%	7	71%	14%	14%	7
Timber measurement by harvester for financial transaction (prd, pri, stm)	71%	14%	14%	7	71%	14%	14%	7
Follow-up of timber production (management of storages/ logistics) (prd, pri, pri)	71%	0%	29%	7	71%	0%	29%	7
Control of harvester measurement (ktr, stm, sti)	100%	0%	0%	7	100%	0%	0%	7
Forwarder reporting (pri) and management of transportations	57%	14%	29%	7	71%	0%	29%	7
Use of log data in production management of sawmills (pri, prd)	57%	14%	29%	7	57%	14%	29%	7
Logging site planning and GIS applications in forest machines (ghd)	29%	29%	43%	7	71%	29%	0%	7
Follow-up of work and machine operations (drf)	86%	0%	14%	7	86%	0%	14%	7
Work time follow-up and payments for machine operators (drf)	57%	14%	29%	7	71%	0%	29%	7
Stem databanks (stm)	86%	14%	0%	7	100%	0%	0%	7
Simulations: selection of timber assortments, bucking, pricing, logging operations, transportations etc. (all files)	57%	43%	0%	7	57%	43%	0%	7
Management and control of silvicultural operations done by forest machines (not implemented)	0%	14%	86%	7	0%	71%	29%	7
Inventory and reporting of standing stock after thinning of the forest stand (inv)	14%	0%	86%	7	29%	14%	57%	7
Other purposes, what?	0%	0%	100%	3	0%	0%	100%	3

4.2 Main advantages of StanForD

Both manufacturers and forest organizations agreed with the advantages as described in table 4. It means that they all believe that StanForD is a good tool for controlling logging operations, to control different machines in a cost effective way, to take care about information of the productions and it makes development faster and cheaper.

Table 4. Main advantages of StandForD. The following question was asked: "What are the advantages for your organization with StanForD."

	Manufacturers				Forest companies			
	Yes	No	Don't know	Number	Yes	No	Don't know	Number
Management of operations: makes it easier and more efficient to control the logging operation and products.	100%	0%	0%	7	100%	0%	0%	11
Makes it possible to manage the information flow from forest machines (CTL) to different companies' information systems.	100%	0%	0%	7	100%	0%	0%	11
Makes it possible to use different machines with different software versions without adapting them for different countries and companies.	100%	0%	0%	6	90%	0%	10%	10
Makes development and acquirement of applications cheaper and faster.	100%	0%	0%	7	80%	10%	10%	10

4.3 Main problems with StanForD

The manufacturers think that the data structure, the description of variables and priorities can be improved. They also think that the standard needs better rules for implementation and version management. They think that the documentation is relatively good and that implementation of changes and new functions work relatively well.

Forest organizations also think that the structure of StanForD can be improved, that the time from idea to implementation should be shorter and that the standard needs better rules for implementation. They also think that documentation is relatively good.

Table 5. Main problems of StandForD. The following question was asked: "Which are the main problems for your organization with StanForD?"

	Manufacturers				Forest companies			
	Yes	No	Don't know	Number	Yes	No	Don't know	Number
Data structure in StanForD (files, variables, data relations)	75%	25%	0%	8	60%	20%	20%	10
Descriptions of variables and files	88%	13%	0%	8	36%	36%	27%	11
Priorities of StanForD variables in different use (countries, market areas, use cases)	75%	25%	0%	8	44%	22%	33%	9
Documentation of StanForD	25%	75%	0%	8	30%	50%	20%	10
New needs or changes to StanForD definitions (too long time from an idea to implementation)	38%	63%	0%	8	70%	20%	10%	10
Lack of implementation rules, use rules or use scenarios (descriptions how StanForD files and variables should be used)	88%	13%	0%	8	80%	10%	10%	10
Version management of StanForD	63%	38%	0%	8	44%	22%	33%	9

4.4 Objectives of a new standard version

Important objectives of a new standard are a new and better structure as well as better descriptions. All forest organizations want to change to a newer format, for example XML, but some manufacturers are a little bit uncertain if a format change is good. The forest organizations think that it will be easier to use standard software with a new format. In principal all companies think that software development will be cheaper with a new standard. Connected to a new format it is very important to consider the issue of data security, it should not be possible to manipulate the data content.

It is still important in many countries and regions to keep the size of the messages down due to communication problems. Most forest companies don't think that this will be any significant problem in the future with the development of better communication systems. Some companies suggested a lighter version (small size) of a new standard for countries and regions with communication problems.

In the future all manufactures and most of the forest companies suggest a standard where the production data is not aggregated, instead just raw data (stem and log data) is registered. Aggregated data like volume per species, per assortment, per driver and so on can then be calculated later, (compare with today's pri-file or prl-file).

Table 6. Objectives of a new StandForD standard according to manufacturers and forest companies.

Objective / needs to change the standard	Manufacturers				Forest companies			
	Yes	No	Don't know	Number	Yes	No	Don't know	Number
Structures that support data management requirements of today in a better way.	75%	13%	13%	8	90%	0%	10%	10
Common and general format with open interface (for example XML).	63%	25%	13%	8	100%	0%	0%	12
Commercial software and tools should be easier to be used with StanForD files; (browser technology, office tools, database products).	63%	13%	25%	8	82%	0%	18%	11
Better descriptions of files and variables (making a proper data dictionary to define data elements, data structures and conceptual definitions).	88%	13%	0%	8	100%	0%	0%	10
Flexible variable priorities that are defined separately for different use cases (countries, market areas etc.).	75%	13%	13%	8	64%	9%	27%	11
Descriptions of different use cases (rules for use).	75%	25%	0%	8	78%	0%	22%	9
The size of the messages. Today the size of a message shall be small because of traditional low communication speed. In the future probably the speed will increase. This means that size will not matter in the future.	38%	50%	13%	8	50%	40%	10%	10
Information should not be repeated in the same message. What can be calculated (for example total volume per species, per driver, per assortment etc) should not be included, avoid aggregated data.	100%	0%	0%	8	82%	9%	9%	11

Objective / needs to change the standard	Manufacturers				Forest companies			
	Yes	No	Don't know	Number	Yes	No	Don't know	Number
Messages should be kept "clean". Bucking data in bucking messages and not in production or monitoring messages. Avoid mixing messages.	63%	13%	25%	8	64%	9%	27%	11
Data should normally only be sent once, not repeated in several subsequent messages. However, send rules should be defined by use cases and by files.	63%	25%	13%	8	70%	10%	20%	10
The new messages must allow for both real time (on-line) reporting as well as reporting with a low frequency, e.g. once per site.	88%	13%	0%	8	82%	9%	9%	11
The new version should support new data transfer technologies, like wireless broadband networks and new mobile communication technologies.	88%	13%	0%	8	100%	0%	0%	11
Version release policy and management system.	100%	0%	0%	8	82%	9%	9%	11
An adaptation to a possible papiNet-standard for wood raw material (the present idea is a close relationship but not merger).	13%	25%	63%	8	70%	10%	20%	10
Reduction of old variables and structures	88%	0%	13%	8	73%	0%	27%	11
Cost reductions in application development	100%	0%	0%	8	82%	9%	9%	11
The new version must be a solution for the future rather than for the history. To a certain extent it must be possible to limit the total backward compatibility when going from the present version to a new version.	88%	0%	13%	8	82%	0%	18%	11
Others needs or requirements.	33%	0%	67%	3	0%	0%	0%	0

Another need mentioned in the answers is security tools, for example a checksum. This is an important issue for some users in order to make it more difficult to manipulate data in StanForD files.

4.5 Other issues related to a new StanForD version

Other issues related to StanForD are included in table 7. All companies understand that we need two parallel systems for some time, probably up to a couple of years. In average the manufacturers would accept a transition period of 3.8 years while the forest companies would accept a period of 2.8 years.

Today there is small interest in using StanForD for business transactions, work time reporting and silvicultural operations. Forest companies are interested in using the standard for geographical information.

The manufacturers think that it is a good idea to decrease the number of updates of the standard to once a year but the forest organizations do not agree.

Table 7. Other issues related to a new StanForD standard.

	Manufacturers				Forest companies			
	Yes	No	Don't know	Number	Yes	No	Don't know	Number
How to run two versions parallel? How to avoid the possible situation that we must have conversion applications between two versions? Is it OK to run two standards parallel?	100%	0%	0%	8	50%	25%	25%	12
If yes on last question, what would be a suitable time for the change from your point of view (example 5 years)?	3,8 years			8	2,8 years			6
Should standard cover also business transactions of wood procurement operations (e-business standard)? So far StanForD has been limited more or less to technical data communication only.	0%	63%	38%	8	27%	55%	18%	11
Should there be more common and flexible systems for the forest machine operators' work time reporting and for reporting of other work-related payment information (like driven kilometres, additional work etc.) that the standard does not cover today?	38%	25%	38%	8	27%	27%	45%	11
Do we want to include silvicultural operations (like soil preparation and planting by machines) in the standard?	13%	50%	38%	8	45%	9%	45%	11
Apteri versus apt-file? Do we need the apt-file? A new bucking instruction message may include references to ap1-messages or it may include all data per price matrix (apt-file) Guidance and control of bucking has to be reviewed thoroughly.	38%	25%	38%	8	20%	0%	80%	10
Should it be possible to use common standards of geographic data (e.g. GML, national forest standards etc.) together with StanForD?	38%	13%	50%	8	82%	9%	9%	11
Traceability of wood and logs. It is possible to trace the logs and their origin with new technology, like RFID, from the forest to end products. Do you think StanForD will be an essential part of the information chain when tracing for example stem and log information?	100%	0%	0%	8	60%	20%	20%	10
The present standard is updated twice a year. Do you think it would be better to decrease the number of updates to once per year?	63%	38%	0%	8	36%	45%	18%	11
Other issues	33%	0%	67%	3	0%	0%	0%	0

One of the needs mentioned is that the new standard must provide a flexible structure for fast development and implementation of new data. It is also important to use new tools for maintenance and development. Web-based and other electronic tools like extranet and other new meeting places can be used full.

4.6 Estimates of economic potential

4.6.1 Cost to update the standard (short / long term)

Some comments from the manufacturers and forest organizations related to the cost of implementing a new standard version are included below. It is very difficult to draw any clear conclusions concerning the costs since the new standard has not yet been set.

- Costs for development, programming and testing are high in the short term.
- In the short term it causes a lot of costs.
- A high cost for sure. Impossible to quantify.
- In the short term, development/testing/updating causes costs.
- In the short time only a cost.
- Short term: -
- Short term (1-3 years): Some Millions SEK (–) for manufacturers in cost for development.
- Short term: No potential because no other system uses the new standard.
- Short term effect is negative, but after a few years it will change to positive.
- A half to one year work for all developers.
- The implementation cost is of course the cost in the short term, after that there will be some cost to handle the parallel standards.
- Costs for the company are 100 000 – 150 000 euro, depending on the variety of the changes (keeping ap1 logic, Apteri).
- Very rough estimate; from 50 000 euro up to? Depending on the needed changes in the systems. It is really hard to say.
- Development, testing and updating costs a lot. It is not possible to estimate any numbers, because we don't know how big the changes are.
- Short term (1-3 years): A few Millions SEK (–) in cost for development No revenues in the sight if only the format is changed.
- We are using inv, apt, spp, pri and ktr file. We have 2-3 caliber applications using StanForD files and changing them will cost about 150,000 SEK. We also have 2-3 PC applications using these files, changing them will cost about 300,000 SEK. We will support the new standard when needed.
- Cost is mostly short term (less than 5 years). Hard to say before knowing the implementation technique.

In table 8 there is a rough estimate of the costs to upgrade the StanForD standard according to the answers in the questionnaires. The cost will be higher for some companies and lower for others. There is a difference between Sweden and Finland because in Sweden most of the StanForD files are sent to SDC where they are analyzed. That means that the forest organizations don't need to adapt their system in a significant way.

Table 8. Rough estimation of costs based on the questionnaire.

Organization	Number	Estimated cost (euro per company)	Total cost (euro)
Specification (Metsäteho / Skogforsk)	2	50 000 – 100 000	100 000 – 200 000
Machine manufacturers	5	100 000 – 150 000	500 000 – 750 000
Computer calipers	4	25 000 – 50 000	100 000 – 200 000
Administration tools, simulation tools	5	50 000	250 000
Forest companies Sweden	5	50 000	250 000
Forest companies Finland	5	100 000	500 000
Software company / SDC	5	100 000	500 000
Total			2 200 000 – 2 600 000

4.6.2 Revenues to update StanForD (short / long term)

Some comments from the manufacturers and forest organizations related to the revenues of implementing a new standard version are included below.

- Savings: easier to begin with, faster development, new applications cheaper, more clear variable structures, definitions, priorities and better compatibility with the third party applications. Faster SW development and testing.
- Global and flexible standard gives some economical benefits in the long run.
- Long term: Large potential if producers start using the standard.
- In longer term it will save costs, because it's easier to use and begin using. Enables faster development.
- If the amount of programming needed to use StanForD is decreased (by removing legacy variables, standardized format etc.) we will be able to save money in the long run. We will also be able to create new applications to use the data in new applications which are not possible today.
- In the long term (6 – 10 years) a +.
- It is important that new standard is technically made better in such a way that it reduces development costs in long term. For example adding new variables should be made easy.
- After the initial investment has been done it should begin to pay back in the long run by simplifying the use and programming of StanForD.

- Long term (4-10 years): A better defined standard reduces our costs compared to today's standard, when it comes to maintenance and adding functionality.
Short term (1-3 years): Depends if a new standard can be implemented with a software upgrade and this upgrade is merchantable.
Other non monetary revenues: Easier and better defined standard -> Easier to outsource programming, easier to train programmers and technicians, better product quality.
- Long term benefit comes from easier application development. Due to long development time it takes at least 5 years to come even.
- Better data, better quality, lower costs, more compatibility.
- Less faults, better value in timber, easier follow-up, cheaper to make new software, easier and cheaper maintenance of software.

No one has specified any amount of money for the points above. But according to the costs in table 8 a new and better structure probably will give a positive return on the investment in 5 years.

4.6.3 Other comments

Some general comments concerning costs and revenues in the questionnaire:

- Standard must be updated at the latest in the first years of 2010. The matter is not urgent right now, but planning and developing of the new version must be started soon in order to make progress.
- If the progress takes too much time, machine-specific implementations may increase fatally.
- It is time and money consuming, but in the long run I hope that the money could come back due to ease of use and programming of the files.
- The costs are not an important issue, neither in short or in the long term. The work has to be done anyway. What is important is the length of the transition period (max 3 years).
- Development, testing and updating costs a lot. It is not possible to estimate any numbers, because we don't know how big the changes will be. Repayment period will be long. Amount of money is not possible estimate in this phase. In our point of view, we can not see any great economical benefits in new standard.
- Actual revenues from the update can not be expected, but if the standard lags badly behind from the other data management systems of the day (it is partly that already now) it can put the development of the for-

est machines in danger according to the present and future requirements.

- Repayment period will be long. Amount of money is not possible estimate in this phase.
- In our point of view, we can not see any great economical benefits in a new standard.

5 DISCUSSION

5.1 Use of the standard

Today StanForD standard is used on wide scale to control the machine and to monitor the production in the Nordic counties. In the nearest 5 years the use of data from harvesters and forwarders in the Nordic countries will increase even more. Probably close to 100 % of the organizations will use StanForD for controlling the machines (harvester, forwarder), to monitor production figures, for quality control of the machine operations and measuring etc.

The use of data will probably also increase in the rest of the world during the coming 10 years. Based on the conclusions, it is probably a good idea to update the standard before the use increases even more than today in the rest of the world.

5.2 Objective of a new standard

The main objective with a new standard version for the different companies is to achieve an improved structure and better descriptions. If there will be a new structure more or less all organizations want to change format.

5.3 Future structures

All manufacturers and 8 of 10 users think that data which can be possible to calculate from presented data should not be calculated in the machines in the future. Instead the machines should only register "base/raw data".

In the standard today a lot of calculations are made in the machine and saved in the StanForD files, for example: log tally, volume per species (sob, sub), volume according to price type, volume per driver, average stem size, number of tree per DBH, etc. Many of these calculations are made in a little bit different ways for different harvester models. To reduce the risk of error and to reduce the work and time for updating a computer the suggestion is that, in the future, just log and tree data are stored in the StanForD files for harvester production. As a complement there can be a standardization which describes how different data shall be calculated according to StanForD.

A second step for calculating the results can be made in the office using StanForD data or in the forest machine using an administrative software. These

softwares can then present the results on the screen as today or store the result in a StanForD light version. One reason to store the result can be if you just want to send some result to the office because of communication problem.

StanForD components for calculating aggregated data (for example a very small message with total volumes per assortment) could be certified by the StanForD group and could then be possible to use by all manufactures, companies or forest organizations.

This way of working would increase the possibilities for special solutions. It will then be possible to create a very user adapted result without any change from the manufactures in the StanForD files. Of course there will be a demand to add new characteristics or base data but the calculation and the results will be possible to calculate by the users themselves.

5.4 Estimates of economic potential

The cost for a standard update in the Nordic countries will be approximately 2 500 000 euro according to the rough estimation in table 8. This is a relatively small cost if it is compared with the volume harvested by these machines today and in the future. Approximate annual cut in the Nordic countries (Sweden, Norway and Finland) is at least 150 000 000 m³ solid over bark per year.

If the Nordic countries cover all the cost for the first development of the StanForD 2010 over a period of 5 years it will cost 0,003 euro per m³ solid over bark (750 000 000 m³ solid over bark). A new standard will also give some advantages which will decrease these costs.

Our belief and hope is that the revenues will be at least in the same amount as the costs.

6 CONCLUSIONS

Below are the conclusions based on the answers in the questionnaires:

1. The forest organizations' use of StanForD data in the digital chain will increase in the future. Compared to today the forwarding reporting and GIS application will increase most, but there will be an overall increase in the StanForD data chain.
2. A majority of the organizations think that a new standard version is needed.
3. A majority wants to have StanForD also in the future as an independent standard, but it must be possible to have a well defined interface with other relevant standards.
4. An important part to improve in the standard is the structure and descriptions of the variables.
5. Many organizations want stricter rules for implementation of new data in the standard.

6. A majority want to change format of the standard, probably to XML format.
7. The size of the standard files is still a concern to many organizations because of low transmission speeds in some regions. In the Nordic countries these problems will be solved but for some part of the world (Russia, Canada) there will be problems for longer time.
8. There is no big interest today to develop StanForD more for business transactions, silviculture operations or work time follow up.
9. Two parallel versions of the standard will be necessary for 2-4 years. Maybe it can be possible to convert old StanForD files to the new format by a conversion software, at least for prl, pri, ktr and stm.
10. Economically a change of the standard in the short term (2-3 years) will result in high costs, but after that period the change will mean higher revenues (or actually lower costs).

APPENDIX 1.

1 (3)

QUESTIONNAIRE USED TO COLLECT DATA

Company name	
Country	
Answerer (name)	

Type of organization	
machine manufacturer	
forest company or wood procurement organization	
IT company	
research and development unit	
other	

1) USE OF STANFORD IN GENERAL			
1.1 How important is StanForD in your organization or for your machine or products for following purposes?			
1 = important (StanForD applications in main role)			
2 = partly used or experimental use			
3 = not used			
	Today	In the future	Other, non-StanForD solution
Management of timber production and bucking (apt, ap1, oai)			
Timber measurement by harvester for financial transaction (prd, pri, stm)			
Follow-up of timber production (management of storages/ logistics)(prd, pri, prl)			
Control of harvester measurement (ktr, stm, sti)			
Forwarder reporting (prl) and management of transportations			
Use of log data in production management of sawmills (pri, prd)			
Logging site planning and GIS applications in forest machines (ghd)			
Follow-up of work and machine operations (drf)			
Work time follow-up and payments for machine operators (drf)			
Stem databanks (stm)			
Simulations: selection of timber assortments, bucking, pricing, logging operations, transportations etc. (all files)			
Management and control of silvicultural operations done by forest machines (not implemented)			
Inventory and reporting of standing stock after thinning of the forest stand (inv)			
Other purposes, what?			

Appendix 1 2 (3)

1.2 Main advantages of StanForD		
Agree: 1 = Yes 2 = No 3 = We don't know, doesn't matter.		
	Agree	Comments
Management of operations: makes it easier and more efficient to control the logging operation and products.		
Makes it possible to manage the information flow from forest machines (CTL) to different companies' information systems		
Makes it possible to use different machines with different software versions without adapting them for different countries and companies.		
Makes development and acquirement of applications cheaper and faster		
Other, what?		

1.3 Main problems from your point of view with StanForD		
Agree: 1 = Yes 2 = No 3 = We don't know, doesn't matter.		
	Agree	Comments
Data structure in StanForD (files, variables, data relations)		
Descriptions of variables and files		
Priorities of StanForD variables in different use (countries, market areas, use cases)		
Documentation of StanForD		
New needs or changes to StanForD definitions (too long time from an idea to implementation)		
Lack of implementation rules, use rules or use scenarios (descriptions how StanForD files and variables should be used)		
Version management of StanForD		
Other, what?		

2) Objectives of a new standard version		
Following objectives, needs and requirements have been recognized in the pre-study of the new standard version. Do you agree with the writers of these? How would you comment each issue? If you see other needs or important requirements for change, please add them to the table. Agree: 1 = Yes 2 = No 3 = We don't know, doesn't matter.		
Objective / needs to change the standard	Agree	Comments
Structures that support data management requirements of today in a better way <i>Give some examples!</i>		
Common and general format with open interface (for example XML)		
Commercial software and tools should be easier to be used with StanForD files (browser technology, office tools, database products)		
Better descriptions of files and variables (making a proper data dictionary to define data elements, data structures and conceptual definitions)		
Flexible variable priorities that are defined separately for different use cases (countries, market areas etc.)		
Descriptions of different use cases (rules for use)		
The size of the messages. Today the size of a message shall be small because of traditional low communication speed. In the future probably the speed will increase. This means that size will not matter in the future.		
Information should not be repeated in the same message. What can be calculated (for example total volume per species, per driver, per assortment etc) should not be included, avoid aggregated data.		
Messages should be kept "clean". Bucking data in bucking messages and not in production or monitoring messages. Avoid mixing messages.		
Data should normally only be sent once, not repeated in several subsequent messages. However, send rules should be defined by use cases and by files.		

Appendix 1 3 (3)

The new messages must allow for both real time (on-line) reporting as well as reporting with a low frequency, for ex once per site.		
The new version should support new data transfer technologies, like wireless broadband networks and new mobile communication technologies.		
Version release policy and management system (timetable for releases, system for keeping track of the implemented standard version).		
An adaptation to a possible papiNet-standard for wood raw material (the present idea is a close relationship but not merger).		
Reduction of old variables and structures.		
Cost reductions in application development.		
The new version must be a solution for the future rather than for the history. To a certain extent it must be possible to limit the total backward compatibility when going from the present version to a new version.		
Others needs or requirements.		

3) Other issues related to a new StanForD version

There are several other questions that are related to developing a new standard version. Do you agree with the writers of these? Your comments concerning them?

If you have other aspects in mind, please add them to the table.

Answer to questions: 1 = Yes 2 = No 3 = We don't know, doesn't matter.

Question	Answer	Comments
How to run two versions parallel? How to avoid the possible situation that we must have conversion applications between two versions? Is it OK to run two standards parallel?		
If yes on last question, what would be a suitable time for the change from your point of view? (example 5 years)		
Should standard cover also business transactions of wood procurement operations (e-business standard)? So far StanForD has been limited more or less to technical data communication only.		
Should there be more common and flexible systems for the forest machine operators' work time reporting and for reporting of other work-related payment information (like driven kilometres, additional work etc.) that the standard does not cover today?		
Do we want to include silvicultural operations (like soil preparation and planting by machines) in the standard?		
Apteri versus apt-file? Do we need the apt-file? A new bucking instruction message may include references to ap1-messages or it may include all data per price matrix (apt-file) Guidance and control of bucking has to be reviewed thoroughly.		
Should it be possible to use common standards of geographic data (e.g. GML, national forest standards etc.) together with StanForD?		
Traceability of wood and logs. It is possible to trace the logs and their origin with new technology, like RFID, from the forest to end products. Do you think StanForD will be an essential part of the information chain when tracing for example stem and log information?		
The present standard is updated twice a year. DO you think it would be better to decrease the number of updates to once per year?		
Other issues		

4 Estimates of economic potential	Answer
What is the economic potential (+/-) of updating StanForD (short / long time)?	
What is the cost for your company to update the standard (short/ long time)?	
What are the revenues for your company to update StanForD (short/ long time)?	