EUROPEAN CENTRAL BANK

THE USE OF CENTRAL BANK MONEY FOR SETTLING SECURITIES TRANSACTIONS

MAY 2004

CURRENT MODELS AND PRACTICES

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In 2004 all ECB publications will feature a motif taken from the €100 banknote.

CURRENT MODELS AND PRACTICES

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CONTENTS

1 INTRODUCTION: AN OVERVIEW OF CURRENT MODELS

A securities trade typically results in an obligation for the seller to deliver securities (securities leg) and a corresponding obligation for the buyer to deliver cash funds (cash leg). Central bank money settlement facilities enable settlement of the cash leg of the trade in the books of the central bank. The balances of these cash settlement accounts therefore represent an account holder's claim on the national central bank.

There are various ways of organising the interaction of securities settlement systems (SSS) and payment systems (PS) to provide central bank money settlement facilities. In the European Union Member States ad hoc solutions have been developed that suit the specific preferences of market participants and meet the needs deriving from the design and organisation of the settlement infrastructures. This note describes the various models in place in the European Union in 2003 taking account of five main aspects:

1. The (technical) location of the cash accounts used for cash leg settlement, and the entity that operates the accounts or makes the entries in the accounts of the central bank (these may be the same or different entities).

2. The entity that produces the funds transfer instructions on behalf of participants (normally the SSS; but, in some cases, a previous transfer of liquidity on the initiative of participants may be required).

3. The type and frequency of SSS-PS interaction (for each business cycle).

4. The different operating hours of SSS and PS, and thus the timing of SSS-PS interaction (daylight versus night-time or early morning pre-opening processes).

5. The composition of the funds balance available for cash settlement (which is sometimes different in case of night-time/ early morning processing compared to standard daylight processing).

The models presented here summarise the main characteristics of the various national solutions, and do not claim to reproduce in detail all the surveyed systems. The analysis is based on the answers provided by the national central banks (NCBs) of the European System of Central Banks (ESCB) to an ad hoc questionnaire in March and April 2003. The European Central Securities Depositories Association (ECSDA) also commented on the results of this survey. The ECB considers the survey a useful piece of information for interested parties, e.g. practitioners in the field of payment and settlement systems, infrastructures, other service providers, and therefore decided to make it publicly available. A table summarising the answers from the NCBs is annexed to this document.

2 WHERE? – LOCATION OF ACCOUNTS USED FOR CASH LEG SETTLEMENT

There are three main types of model, categorised according to the technical[1] location of the participants' cash accounts.

1. In the first model – the *interfaced model* – the settlement accounts of the participants are their respective Real-time Gross settlement systems (RTGS) accounts. This is the case in Spain, Greece, Italy, the Netherlands and Portugal. A variant of the interfaced model is provided in Belgium where the participants' accounts are part of a separate system (outside the RTGS environment), which in turn may interact with the RTGS system. Also in this case, the final settlement of the cash leg takes place in the central bank's environment.

2. In the second model – the *integrated model* – the participants' settlement accounts are held at the SSS. The SSS can operate the entries directly in dedicated accounts on the books of the national central bank. In other words: while, from a legal perspective, balances are claims on the central bank, the NCB outsources all the related processing activities to the SSS, which operates directly on behalf of the central bank. This is currently the case in France and Sweden.

3. In the third model – the *memorandum, pre-funded account* – the participants use their own cash settlement accounts at the SSS. This model can be considered a variant of both the interfaced and integrated models, depending on whether finality is achieved in the central bank or in the SSS environment. At least three variants of the model are possible:

   i. The participants' SSS settlement accounts need to interact with NCBs' accounts for the provision of the necessary liquidity. This is done through special facilities called *liquidity bridges* (normally at the start of the cycle) which aim to make the necessary balances available in the SSS environment where transactions are settled during the business day. At the end of the cycle, the final balances are moved back to the NCB accounts. Normally the SSS internal accounting is not considered an account for central bank money, and accounts work only as "memorandum or shadow accounts". The actual movement of central bank money will always take place in the accounts of the central bank[2] at the end of the cycle. An example of this interaction model is the one adopted for the overnight net cycle of Monte Titoli's Express II[3] in Italy (see Section 4 and Figure 7 below).

   ii. A *legal arrangement* links the settlement in the accounts of the SSS with the balances in central bank money (at the central bank), ensuring that finality is already achieved at the time of transfers in the SSS settlement accounts. This is the case both with the German system[4] and in the United Kingdom. For instance, in the case of Crest (United Kingdom), for each settlement cycle, the SSS receives new information on central bank money balances "earmarked" (i.e. "blocked") on each SSS settlement bank account at the NCB. These amounts are reflected in the liquidity memorandum accounts in the SSS. Settlement in central bank money takes place in the accounts located in, and managed/controlled by, the central bank. But finality is legally achieved in the SSS because movements across SSS members' cash memorandum accounts create an *irrevocable undertaking on the part of the NCB to make the corresponding debit/credit entries in the accounts of the settlement*

1 From a legal perspective, central bank money settlement always occurs in the books of the central bank.
2 This is required to qualify settlement as central bank money when the SSS operator would normally have a banking licence and risk-taking activities (otherwise, in such cases settlement would take place in commercial bank money).
3 There is no exchange of liquidity flows on a continuous basis. Express II does not perform any operation modifying intermediaries' cash accounts.
4 Introduced in November 2003.

banks of the buying and selling members[5]. The interaction with the cash accounts located at the NCB through liquidity bridges (initial, on demand, and at end-of-day) is similar (but not necessarily identical) to that described under point (i).[6]

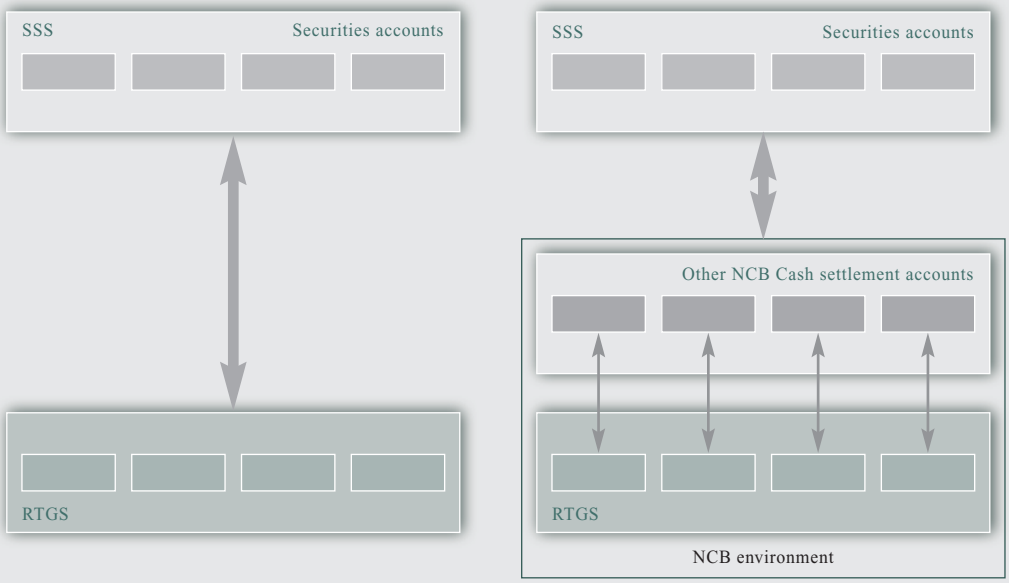
iii. Another variant of the pre-funded model is the *autonomous central bank money model,* which is in place in Finland. In this model, the SSS participates in the RTGS system, and its account is used for cash settlement of its participants. Participants in the SSS need to pre-fund the SSS settlement by transferring the required funds from their own RTGS account to the SSS's RTGS account. The SSS keeps a sub-accounting record of securities-related cash transfers among its participants. In practice these transfers are internal (sub-) transfers taking place inside the RTGS account of the SSS. However, the SSS's sub-accounting is not considered central bank accounting, and there is no effective contract outsourcing. Central bank money provision is made through liquidity transfers (credit transfer by each participant) to the SSS's RTGS account. The main difference with other cases is that the central securities depository (CSD) operating the SSS is strictly speaking a non-risk-taking entity, without any kind of banking licence. The SSS is a "hermetically sealed" system with no other injection or leakage points apart from the RTGS account. The overall balance of the SSS's RTGS account matches the total of funds in SSS sub-accounting. Unrestricted use of the RTGS account balance is the irrevocable guarantee, as it is for all the other RTGS accounts. A liquidity bridge "on demand" complements the initial provision of liquidity to make additional funds available whenever needed. At the end of the day, the SSS transfers back the sub-account balances to the RTGS accounts of the SSS participants.

The various solutions are described in Figures 1 to 3. The list of the features does not claim to be exhaustive, and some simplifications in presenting the main typology of interaction/ models were necessary for the sake of clarity. As a result, the figures represent general models rather than specific SSS.

5 The Crest system, as well as several other systems, has a two-tier membership structure. Although this is not reported in detail in the note, it is sufficient to state that the United Kingdom model provides central bank money settlement accounts to settlement banks, and not to all SSS members. In other systems, although SSS members have central bank money settlement accounts, many investors only have access to the SSS through these members.

6 For instance, in the German system, the SSS debits and credits the "home (NCB) accounts" of participants, and not the RTGSplus accounts (which start and end the day with a zero-balance). Also the reservation of balances for night-time processing, and the subsequent debiting, are done on these "home accounts". The proceeds of securities settlement can be used in the liquidity bridge to the RTGSplus system.

Figure 1 Interfaced model



(a) interaction SSS-RTGS system

The accounts used for settlement of the cash leg of securities transactions are the RTGS accounts of SSS's participants

(b) Models that use non RTGS but still NCB's accounts:

The accounts used for settlement of the cash leg of securities transactions are NCB's accounts located outside the RTGS system.

Figure 2 Integrated models

Technical and operational integration

The accounts used for settlement of the cash leg of securities transactions are legally in the books of the NCB. Their management is fully outsourced to the SSS, which makes entries in the NCB's accounts on behalf, and as if it were the NCB. Regular interaction with RTGS system is therefore not strictly necessary.

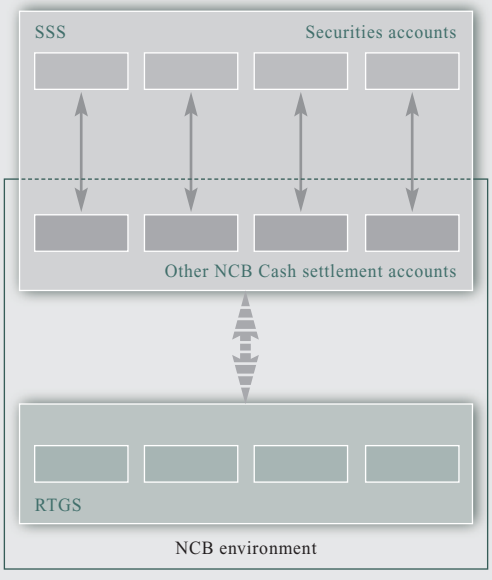
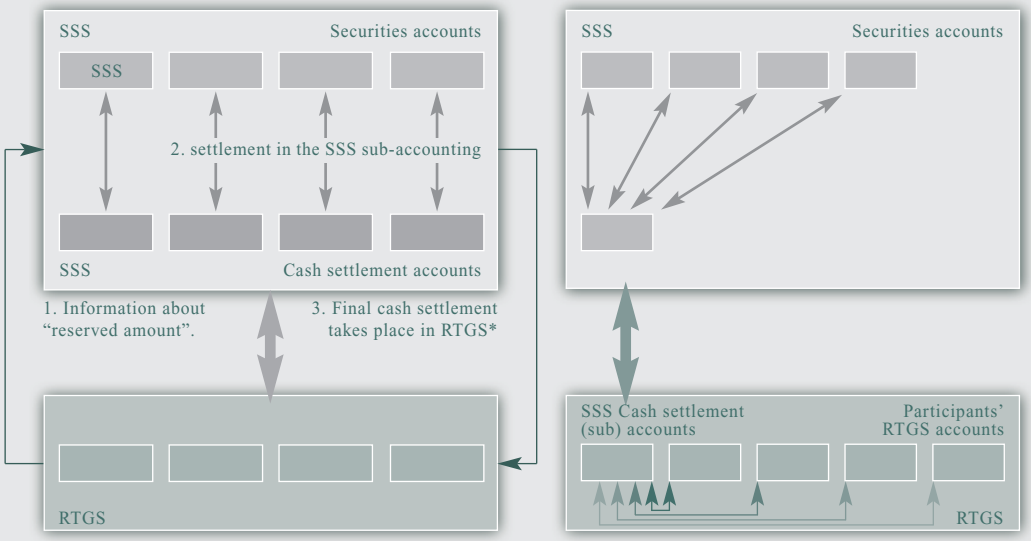


Figure 3 Model with Memorandum/pre-funded accounts



Interfaced variant

The accounts used for settlement of the cash leg of securities transactions are in the SSS environments. SSS's accounts movements are pre-funded or guaranteed by funds "reserved" (earmarked or blocked) in the RTGS system, where final cash settlement takes place. The SSS uses the information about the reserved balance available in the RTGS system.

* Alternatively, cash settlement finalty may be achieved in the SSS according to the variant described under 3 (ii).

Autonomous central bank variant

The SSS has an account in the RTGS system, which is pre-founded by SSS's participants with transfers from their respective RTGS accounts. The SSS keeps an internal accounting reflecting the movements related to securities settlement. This internal accounting is not considered central bank accounting. The participants can fund and withdraw cash whenever necessary. At the end of the day the outstanding balances of the sub accounts are returned to the participants' RTGS accounts.

3 WHO? – GENERATING PAYMENT INSTRUCTIONS AND OPERATION ACCOUNTS ENTRIES

The SSS is normally in a better position than its participants to calculate their respective obligations within the settlement process. Therefore it is the SSS that typically initiates the interaction with the payment system: in practice, at the beginning and/or end of its settlement cycle, the SSS sends a request for cash settlement to the funds transfer system. It is therefore the SSS that produces the required cash settlement instructions on behalf of its participants[7].

In this context, the payment instruction required to transfer the funds can take three main forms:

– *credit*[8] or *debit transfer*[9], where the payment instructions are given, for each transfer, respectively, by the payer or the payee (*i.e.* by one of the SSS participants);

– *direct debit* (*i.e.* the possibility of a pre-authorised debit on the payer's account, upon instruction of the payee)[10];

– *mandated payment, i.e.* a payment made on behalf of a participant (securities buyer) upon instruction issued by a third party (in this case the SSS). In practice, the SSS or the central bank is authorised to produce the required transfer instructions on behalf of the account holders and to address them to the relevant cash accounts manager/system. The system receiving the mandated payment instructions can recognise that the sending party is not the account holder; therefore, the account manager must be at least (i) aware of the agreement between the sending party (SSS) and the account holder (securities buyer) and (ii) able to validate the message[11].

7 In memorandum, pre-funded models, there may be a need for a previous transfer of liquidity, on the initiative of the SSS participant, of the required liquidity from the RTGS accounts to the SSS cash settlement accounts (e.g. Finland). Once funds have been recorded in the SSS sub-accounting system, settlement of trades takes place automatically, i.e. the system credits and debits cash and securities on its own. In the Finnish case, also repatriation of liquidity from the SSS takes place on the initiative of the account holder (participants) using the SSS interface.

8 A credit transfer is an order by the part that has the obligation to pay addressed to the manager of its account to debit its account and transfer the funds in favour of the beneficiary.

9 A debit transfer is an order by the part that has the claim on the funds addressed to its account manager to collect funds in its favour from the account manager of the part with the obligation to pay.

10 Direct debit is not allowed in the current TARGET system, which is based on credit transfers.

11 In the case of the Netherlands, the scheme is based on a tripartite agreement between commercial bank, the SSS and the NCB. The Dutch SSS (interfaced model) sends the payment instruction to the NCB to pay out to the securities seller. The sender of the message is not the ordering institution.

4 HOW? – FREQUENCY AND TYPE OF DVP INTERACTION: GROSS VERSUS NET DVP SETTLEMENT

Delivery-versus-payment (DVP) can be defined as a link between a securities transfer system and a funds transfer systems that ensures that a delivery occurs if, and only if, another delivery occurs and vice versa. It can be conceived as a three-step procedure: (1) reserving/blocking securities in the securities accounts, and sending cash instructions to the central bank money cash accounts; (2) settling, with finality, the required funds in the central bank money cash account of the seller, and (3) settling, with finality, the securities in the securities account of the buyer.

The frequency and type of interaction (sending of cash instructions from SSS to PS and their settlement) may follow different modalities depending on the organisation of the settlement process.

Three main models[12] are used (see Figure 4):

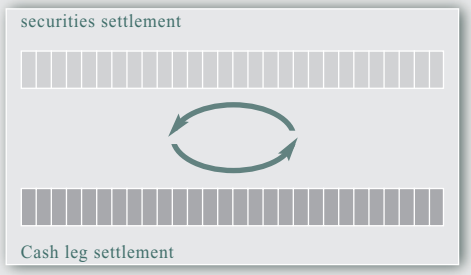
1) In the case of the *real-time gross settlement* of securities, there is a trade-by-trade settlement cycle, and interaction is therefore continuous when operating times of systems settling in securities and cash accounts overlap. This type of interaction produces one cash settlement request for each settled transaction, and it can be used in both integrated (e.g. Euroclear France and the Swedish system) and interfaced models (e.g. Iberclear's platform CADE in Spain, the Bank of Greece's RTGS procedure for Eurosystem operations, Monte Titoli's Express I DVP gross procedure in Italy, Euroclear Netherlands and SITEME in Portugal).

2) In the case of securities leg *net settlement*, interaction takes place at the end of each netting cycle, when the SSS sends a batch of requests for cash settlement to the PS (e.g. BOGS' procedure for commercial transactions in Greece, Monte Titoli's Express II daylight DVP net cycle in Italy).

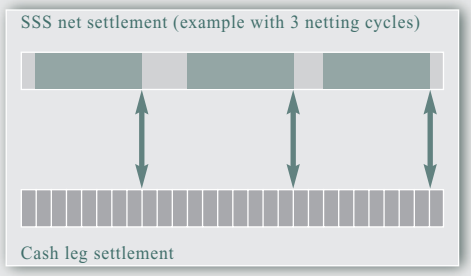
3) In the case of the *multi-batch gross settlement* of securities ("quasi-real-time" systems), interaction takes place by sending the cash instructions before and after its numerous batches (between ten and up to hundreds per business day): individual transactions in each batch are settled one-by-one (or, if securities or cash are unavailable, postponed to the following batch). When the number of batches is sufficiently high, the interaction with the funds transfer systems is almost continuous and therefore effectively real-time gross settlement (e.g. Crest).

12 For a detailed description of DVP models, see the report "Delivery-versus-payment in securities settlement systems", by the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries, BIS, Basle, September 1992.

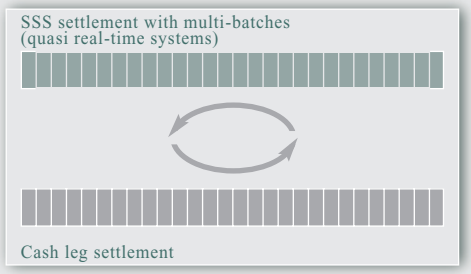
Figure 4



Continuous SSS-PS interaction



SSS-PS interaction at the end of each SSS netting cycle



SSS-PS interaction at the end of each SSS batch, but so frequent that may be virtually continuous

5 WHEN? – TIMING OF INTERACTION: MODELS VARIANTS FOR PRE-OPENING/NIGHT-TIME PROCESSING OF NEXT VALUE DATE

Since settlement cycles for securities are normally longer than T+0, participants may send securities settlement instructions to the SSS before the settlement date. This also makes it possible to pre-match securities instructions at an early stage, thus both helping to reduce the incidence of settlement failures and reducing part of the participants' operational risk and liquidity risks in the SSS. Some SSSs that know about transactions before the settlement date find it convenient to operate (gross or net) batch processing cycles *overnight* in addition to during daytime opening hours. The countries with night-time pre-opening processes are Germany, France, the Netherlands, Spain and Italy. In practice, the systems simply bring forward to the early morning – or even to the late afternoon or the night of the previous calendar day – a part of the processing for a certain value date. However, this is not the standard organisation of large-value payment systems, which typically follow daytime opening hours. Night-time DVP settlement cannot therefore be achieved using the standard daytime processes in those models (e.g. the interfaced models) which require contemporaneous availability of RTGS or other NCBs' accounts. In the models with pre-funded/ memorandum accounts night-time DVP requires cash pre-funding for the next value date.

Different solutions have been adopted to bypass the inconvenient unavailability of the cash accounts located in the payment systems:

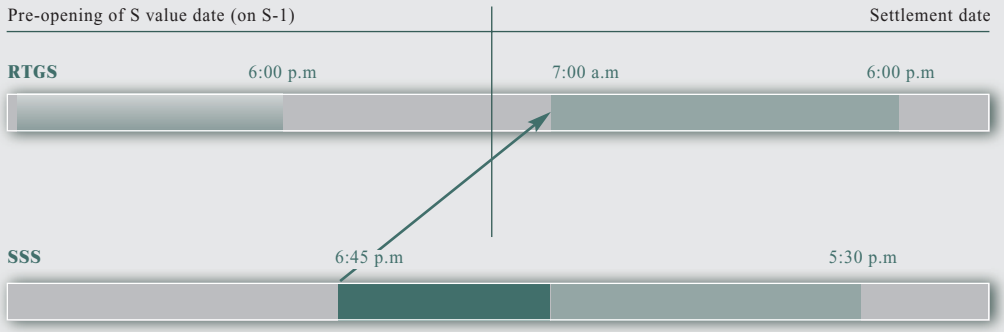
1) to *extend the opening hours of the payment systems*, usually by pre-opening them for an early morning slot overlapping with the SSS operating hours, usually for activity limited to facilitating the settlement of securities settlement systems (or other clearing systems, e.g. retail payments). This possibility is explicitly envisaged by the TARGET Guideline, Annex V, 3 (i), which states that "*(RTGS) early opening, before 7.00 a.m., may take place after prior notification has been sent to the ECB: (i) for domestic reason (e.g. in order to facilitate settlement of securities transactions, to settle balances of net settlement systems, or to settle other domestic transactions, such as batch transactions channelled by NCBs into RTGS systems during the night); or (ii) for ESCB-related reasons (e.g. on days when exceptional payment volumes are expected, or in order to reduce foreign exchange settlement risk when processing the euro leg of foreign exchange deals involving Asian currencies)*".

This option has been followed by the Netherlands where there is continuous interaction of the SSS and RTGS systems during the pre-opening of the RTGS system.

2) to *reserve funds in the following value day opening balances of the RTGS accounts* (or other central bank settlement account). In practice these balances are "blocked" and are only made available for settlement of securities transactions. This means that the owner of these funds cannot use them for purposes different from paying the cash obligations stemming from the securities settlement process. Thus, the RTGS balances reserved for SSS settlement *secure* the securities settlement process. The amounts will then be actually debited in RTGS system/other NCBs' accounts when the payment systems open (e.g. as in Italy and Germany). This time may be the normal opening time (7:00 a.m., as in Italy) or an earlier time if the NCB has opted for the early opening possibility under the TARGET Guideline (e.g. as in Germany), as described in the previous point.

Where central banks books are accessible directly by the SSS in both technical and operational terms (as in the French technical integrated model), or when the central bank is the owner/manager of the SSS, the contemporaneous availability of the RTGS system outside its normal operating hours is not necessary. For instance, after the closing time of 5:15 p.m., the French system is able to pre-open the following value date at 8:00 p.m. with all the required (dedicated) accounts available for final settlement.

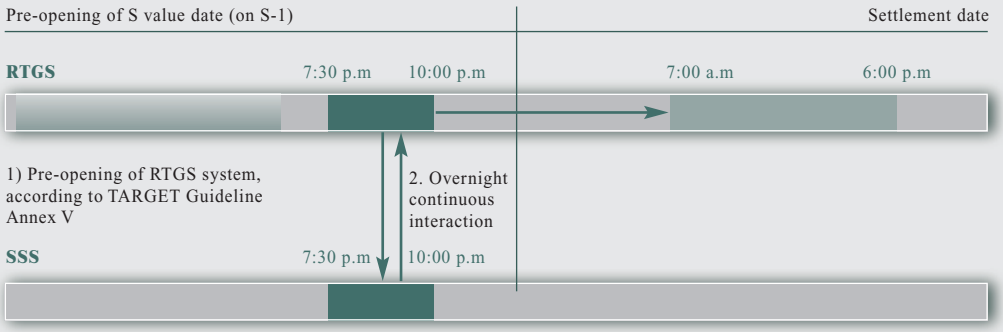
Figure 5 Night-time processing in Spain (Interfaced model)



After the closure of the RTGS system, and once the calculation for the reserve requirements is finalised, the opening balance of the next value date is taken. This pre-opening is done after closing the previous accounting date, so there is no impact on the balance used to calculate the reserves.

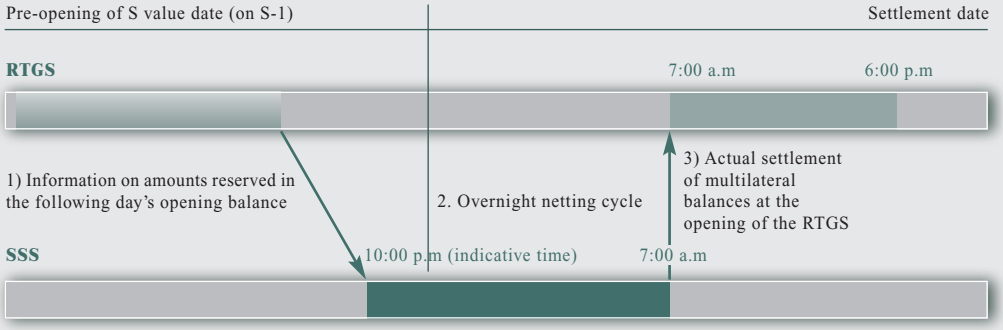
Figures 5 to 9 provide a schematic representation of the night-time interactions models in place in the above-mentioned countries.

Figure 6 Night-time processing in The Netherlands (Interfaced model)



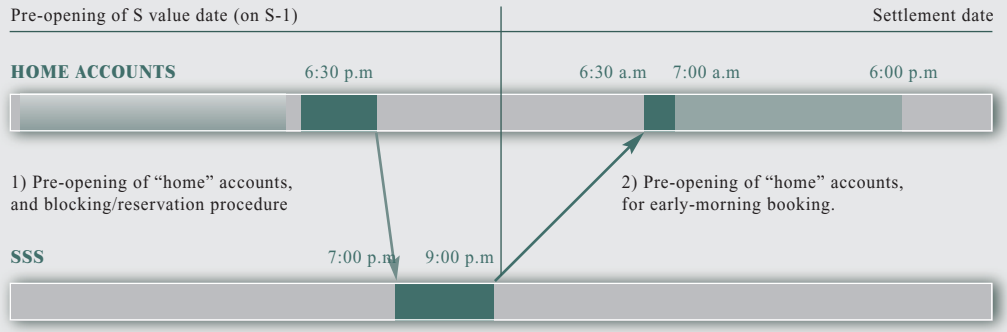
Continuous interaction with RTGS accounts, during operating time of RTGS. Available balance is calculated with the same methodology for both day-time and nigh-time pre-opening: for some accounts only cash, for other accounts cash plus collateral

Figure 7 Night-time processing in Italy (Interfaced model with balance reservation procedure)



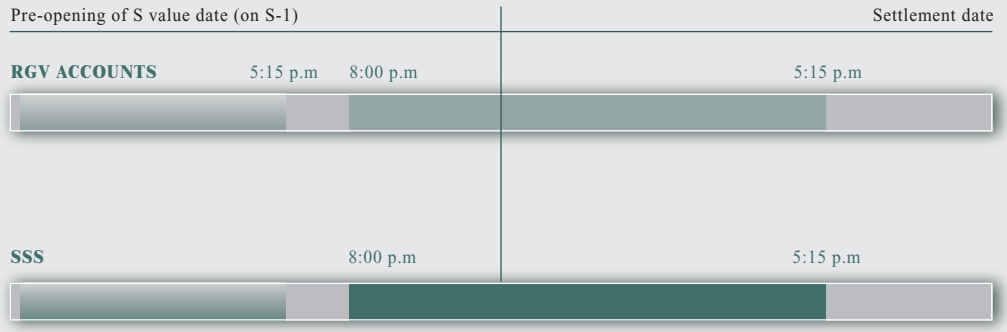
The overnight net cycle runs during the night before the settlement day (S). The multilateral cash balances of the overnight cycle are settled through the Italian RTGS system BIREL at the start of the business day, drawing on funds set aside on the participants' cash account (called "liquidity reserve"). Accordingly, the evening before the settlement date (S-1), Monte Titoli receives from the Banca d'Italia notification of the cash "blocked" by participants for securities settlement purposes; in addition, at the start of the settlement date, the "liquidity reserve" is increased of: a) cash amounts regarding coupons and redemption payments of Government securities, credited to BIREL accounts by Monte Titoli; b) the countervalue of the intra-day credit obtainable through additional collateral automatically transferred by Monte Titoli on behalf of BIREL participants. Such an additional intra-day credit is actually granted by the Banca d'Italia at the start of the operational day according to the normal procedures but is dedicated only to the completion of the overnight netting cycle.

Figure 8 Night-time processing in Germany (Integrated model with reservation/ blocking of balances for night-time processing)



Available balances for night-time cycle: blocking/reservation procedure taking into account: current balance on home account (including minimum reserve balances) and available collateral (balances on deposit facility are not used). The reservation of funds for the night-time processes is made on the home accounts. The debiting of results of the overnight process is also made on the home accounts. Following that, the proceeds of securities settlement can be used in the bridge to the RTGSplus system.

Figure 9 Night-time processing in France (Integrated model with technical and operational outsourcing to the SSS)



Complete overlapping with SSS operating time (one continuous settlement cycle for value date S, from 8:00 p.m. S-1 to 5.15 p.m. S). No batch process. In this model the kind of interaction is the same for day-time and night-time processing . However, the cash balance available is different in the two cases: for day time the balance available on the dedicated account (RGV cash position), can be fed by: (1) transfers from the main RTGS account; (2) automatic provision of intraday credit collateralised by securities in stock or under process. During the night, the cash balance available is given only by the automatic provision of intraday credit collateralised by securities in stock or under process.

6 THE COMPOSITION OF THE BALANCE AVAILABLE FOR CASH SETTLEMENT

As described in Section 4, in the DVP three-step procedure, securities are finally delivered only after checks have been made to ensure that the cash transfer is possible, i.e. that the account has the required amount "available" and blocked for the settlement of the securities transaction.

The term "available amount" encompasses at least two items:

1. The current balance of the account used for SSS settlement based on instructions forwarded by participants, i.e. (i) the RTGS account balance in interfaced models, (ii) the balance of another central bank account (where the RTGS is not directly used), or (iii) the balance of the participant's (sub) accounts in the SSS environment pre-funded with central bank money, or assisted by central bank money balances guarantee[13], depending on the model used.

2. Intraday credit available (when managed separately from the RTGS account balance), which in turn depends on the amount of available eligible collateral.

Two aspects are worth noting:

(i) *Current balance* is the cash balance at the time of interaction with SSS.

(ii) In some systems, the *amount of available collateral* for the purpose of intraday-credit is calculated by also including in the computation the securities that the SSS *is trying to deliver* to the buyer in the same settlement cycle for which the check of the available intraday credit is done.

The computation may be different in the case of night-time pre-opening of the following business day for the following reasons:

– It takes place after the payment systems and accounting system end-of-day "housekeeping" procedures, therefore the current RTGS or "home account" balance is in fact the *opening balance* of the following business day. This may include funds that have been "released" by the central bank after the closing of the previous day accounting date, for example the balances that may have been "blocked" for the fulfilment of the reserve requirement, and that have therefore become free for mobilisation at the opening of the following business day (e.g. in Germany, Italy and Spain). In principle, the same reasoning could be applied to the funds for which the counterparty has requested the activation of the deposit facility, which are automatically "returned" to the account holder on the following morning. According to the survey, however, none of the responding NCBs follows this practice.

– The RTGS current balance may not be available as such (because the RTGS system is closed). Therefore, in the computation of the RTGS balance (available for SSS settlement) it is possible that only the amount explicitly devoted by RTGS participants is entered for the purpose of SSS night-time settlement (e.g. Italy[14]).

– Alternatively, SSS cash accounts may have been adequately pre-funded via a liquidity bridge.

– Intraday refinancing possibilities for value next day could be counted as well, in a sort of night-time/early-morning provision of collateralised intraday credit. In the French system, this facility is the only one available during the night-time processing.

13 In this case the settlement may not be in central bank money.
14 Monte Titoli works on the basis of the information received from the Banca d'Italia based, in turn, on participants' instructions.

ANNEX

Replies provided by the national central banks of the ESCB

			WHERE	WHO
	Country	System or procedure (for SSS operating different procedures)	1. Where are the cash accounts used for SSS settlement located?	2. Who generates payment instructions and operation account entries?
INTERFACED MODELS	Belgium	CIK system	RTGS system ("interfaced system"). In Belgium there are no RTGS accounts; only NBB's cash accounts (also used for RTGS payments).	The SSS, on behalf of its participants (CIK has been mandated by the participants to debit their NBB cash account). First the securities are blocked in CIK, then a payment is issued to NBB via SWIFT message, upon confirmation of payment the securities are released.
	Spain	CADE	RTGS system ("interfaced system")	The SSS, on behalf of its participants.
		SLCV	RTGS system ("interfaced system")	The SSS, on behalf of its participants.
	Greece	BOGS	RTGS system ("interfaced system")	The SSS, on behalf of its participants.
	Italy	Monte Titoli – DVP gross procedure (Express I), and Monte Titoli – daylight DVP Net cycle of Express II	RTGS system ("interfaced system")	The SSS, on behalf of its participants.
		Monte Titoli – night-time pre-opening DVP Net cycle of Express II	RTGS system ("interfaced system")	The SSS, on behalf of its participants.
	The Netherlands	Euroclear NL	RTGS system ("interfaced system").	The SSS, on behalf of its participants.
	Portugal	SITEME	RTGS system ("interfaced system"). There is also a sub-system (SLOD) outside the RTGS system but still in a system of the NCB, for other depositors not participating in the RTGS system.	The SSS, on behalf of its participants.
		INTERBOLSA	RTGS system ("interfaced system"). There is also a sub-system (SLOD) outside the RTGS system but still in a system of the NCB, for other depositors not participating in the RTGS system.	The SSS, on behalf of its participants.
	Denmark	Vaerdipapircentralen A/S – VP	RTGS system ("interfaced system"). There is also a sub-system within the central bank interacting with the Nationalbanken's RTGS payment system KRONOS (RTGS system) where the participants can dedicate funds to the settlement in the VP-system.	The SSS participants transfer funds to the dedicated settlement accounts for daylight settlement during the opening hours of the RTGS system and to the night settlement through a pre-opening facility.

			WHERE	WHO
	Country	System or procedure (for SSS operating different procedures)	1. Where are the cash accounts used for SSS settlement located?	2. Who generates payment instructions and operation account entries?
INTEGRATED MODELS	Belgium	NBB SSS	SSS ("integrated model"). In Belgium there are no RTGS accounts, only NBB's cash accounts (also used for RTGS payments).	In this case the NCB is the SSS, the initiative is taken by the SSS software.
	Belgium	Euroclear Bank	SSS ("integrated model"). Legally, accounts are located on the books of the NCB, but are technically operated by the SSS.	The SSS, on behalf of its participants.
	Germany	Clearstream Frankfurt	SSS ("integrated model"), plus other central bank funds transfer system (outside the RTGS system, but within the central bank).	The SSS, on behalf of its participants.
	France	Euroclear FR (RGV)	SSS ("integrated model"). Legally, accounts are located on the books of the NCB, but are technically operated by the SSS.	The SSS operates the cash accounts. A bridge between their dedicated cash accounts and their TBF accounts enables participants to credit/debit directly their dedicated accounts during the operating hours of the RTGS.
	Sweden	Current system (adopted in November 2003)	SSS ("integrated model"). Legally, accounts are located on the books of the NCB, but are technically operated by the SSS.	The SSS operates the cash accounts on behalf of its participants. A bridge between their dedicated cash accounts and their RTGS-accounts (RIX-accounts) enables the participants to credit/debit directly their dedicated account during the operating hours of the RTGS system.
	United Kingdom	Crest[1)]	SSS ("integrated model"), which works with shadow/memorandum liquidity accounts for SSS settlement banks (UK 2-tier model).	The NCB is responsible for debiting/crediting RTGS settlement accounts.
AUTONOMOUS CB MODEL	Finland		APK has a separate account for each of its SSSs on the BoF-RTGS through which participants fund their cash positions dedicated to the relevant system. Internal accounting of the APK is not considered as central bank accounting.	The SSS participants, directly (the owners of the accounts). In the sense that the participants fund the SSSs account on BoF-RTGS through credit transfers. The SSS only operates its internal accounting based on which trades are settled in DVP mode.

1) CREST(UK) is also the SSS for Irish equities.

Replies provided by the national central banks of the ESCB (cont')

			WHEN		
	Country	System or procedure (for SSS operating different procedures)	3. Operating times of SSS settlement	4. Availability of RTGS system for domestic activity (extra-time compared to TARGET operating times, according to TARGET Guideline, Annex V, 3 (i))	5. If applicable: availability of cash accounts used for SSS settlement (other than RTGS accounts)
INTERFACED MODELS	Belgium	CIK system	From 6:00 a.m. to 4:00 p.m.	TARGET operating times.	TARGET operating times.
	Spain	CADE	Pre-opening: 6:45 p.m. on S-1. Day-time 7:00 a.m.-5:30 p.m.		
		SLCV	Only Day-time: 3 batches a day: 9:30 a.m. / 12:30 p.m. / 2:00 p.m.		
	Greece	BOGS	Only Day-time Eurosystem operations: RTGS facility during TARGET operating times. Commercial transactions: end-of-day netting cycle (finalised at 3:30 p.m.)		Specific payment accounts are maintained in the Bank of Greece, but outside the Greek RTGS (HERMES), by certain participants of BOGS. These accounts are available for SSS instructions during BOGS operating hours (7:00 a.m.-4:00 p.m. CET) for commercial transactions. (These accounts are held by institutions which are not eligible to monetary policy operations).
	Italy	Monte Titoli – DVP gross procedure (Express I), and	Only Day-time 7:00 a.m.-6:00 p.m.	TARGET operating times.	N/A.
		Monte Titoli – daylight DVP Net cycle of Express II	9:30 a.m. to 12:30 p.m.	TARGET operating times.	N/A.
		Monte Titoli -– night-time pre-opening DVP Net cycle of Express II	1 batch from 10:00 p.m. (S-1) to 7:00 a.m. S	TARGET operating times.	N/A.
	The Netherlands	Euroclear NL	Continuous interaction with RTGS accounts, during operating time of SSS.		
	Portugal	SITEME	Only Day-time: 7:00 a.m. - 6:30 p.m.	N/A.	N/A.
INTERFACED MODELS	Portugal	INTERBOLSA	Eurosystem credit operations: from 7:00 a.m. to 6:30 p.m. (CET); transactions settled under the General settlement system: at 11:30 a.m.; transactions settled under the SL plus system: 5 settlement cycles daily – 9:30 a.m., 11:00 a.m., 1:00 p.m., 2:15 p.m. and 5:00 p.m. will be discontinued in the near future; transactions settled under the SLrt system (real-time settlement system), and that require financial settlement at the Banco de Portugal, such as DVP transactions from 9:30 a.m. to 5:30 p.m. FOP transactions: from 9.30 a.m. to 7.00 p.m.	SSS, on behalf of its participants	N/A.
	Denmark	Vaerdipapircentralen A/S – VP	Night-time settlement: contains 3 batches taking place at 6:00 p.m./11:45 p.m./ 6:00 a.m. Day-time settlement contains 2 batches taking place at 10:30 a.m. and 1:35 p.m., the latter in Euro. There is also a VP - RTGS facility during the opening hours of the RTGS system (8:00 a.m.-3:00 p.m.).	All night-time settlement is in DKK including trades in euro, which are swapped from DKK to euro in a PvP batch during the opening hours of TARGET. Thus the pre-opening facility regards only DKK and is operating from 4:00 p.m. to 4.30 p.m.. The monetary-policy day in Denmark closes at 3.30 p.m.	From 4:30 p.m. on S-1 and until 3.30 p.m. on S.
INTEGRATED MODELS	Belgium	Euroclear Bank	From 6:30 a.m. to 2:30 p.m.	TARGET operating times.	TARGET operating times.
	Belgium	NBB SSS	At the end of each DVP settlement cycle every hour, from 10:00 a.m. to 4:00 p.m.	TARGET operating times.	TARGET operating times.

Replies provided by the national central banks of the ESCB (cont')

			WHEN		
	Country	System or procedure (for SSS operating different procedures)	3. Operating times of SSS settlement	4. Availability of RTGS system for domestic activity (extra-time compared to TARGET operating times, according to TARGET Guideline, Annex V, 3 (i))	5. If applicable: availability of cash accounts used for SSS settlement (other than RTGS accounts)
INTEGRATED MODELS	Germany	Clearstream Frankfurt	Night-time pre-opening: Standard settlement from 7:00 p.m. to 9:00 p.m. Day-time: Same-day-settlement 1: from 6:00 a.m. to 9:45 a.m. Same day settlement 2: from 10:45 a.m. to 12:30 p.m. Real time settlement fop: from 6:00 a.m. to 6.00 p.m. Real time settlement dvp from 7:00 a.m. to 4:30 p.m.		Day-time: equal to TARGET operating times Note: new German settlement model which went live on November 2003 has also the following Night-time pre-opening from 6:30 p.m. to 7:00 p.m. of S-1, and early morning booking on "home account": from 6:30 a.m. to 7:00 a.m.
	France	Euroclear FR (RGV)	Night-time/early morning pre-opening: from 8:00 p.m. S-1 to 7:00 a.m. S Day-time: 7:00 a.m. to 5:15 p.m. [distinction between night and day-time processing only for the purpose of the questionnaire as there is no interruption between the two, but a single window from 8:00 p.m. S-1 until 5:15 p.m. S]	not relevant	Complete overlapping of the availability of cash accounts with SSS operating time: continuous settlement. No batch process.
	Sweden	Current system (adopted in November 2003)	Only Day-time from 7:00 a.m. to 5:00 p.m.	not applicable	From 7:00 a.m. to 2:00 p.m.
	United Kingdom	Crest[2)]	Day-time: from 7:00 a.m. to 4.40 p.m. (times are for DVP transactions. Different deadlines exist for FOP transactions)	not applicable	not applicable
AUTONOMOUS CB MODEL	Finland		Day-time RM System operates according to TARGET operating days and times. OM System settles through a single daily batch at about 10:00 a.m. CET and observes domestic bank holidays.	not applicable	not applicable

1) The end of day on RGV (FR) is 5:15 p.m. for "standard" operations. However, in case the French Central Bank would decide to add a late operation (mainly an overnight repo between the Central Bank and a participant in order to cover its cash position on the RTGS (impacted by the reimbursement of the "intraday repo" with the NCB) – there is still the possibility to settle this type of operations on RGV from 5:15 p.m. to 6:00 p.m. In this case, this new settlement has good (S – same day) value date. This procedure can be activated only at the request of the French Central Bank, and has no impact on the beginning of the next accounting day (8:00 p.m., for value S+1).
2) CREST(UK) is also the SSS for Irish equities.

Replies provided by the national central banks of the ESCB (cont')

			HOW		ADDITIONAL COMMENTS
	Country	System or procedure (for SSS operating different procedures)	6. How are the cash accounts used for SSS settlement funded/covered	7. What balances enter in the calculation of liquidity considered available in the cash accounts used for SSS settlement	8. Any other information/ comment that is deemed useful to understand the functioning of the model
INTERFACED MODELS	Belgium	CIK system	Continuous interaction with RTGS accounts.	Day-time: available cash balance and intraday credit. Early morning pre-opening of RTGS: no settlement but the available amounts are the same.	CIK system (OTC and stock exchange transactions – no eligible paper for monetary policy); the CIK has been bought by Euroclear Group and will be integrated on their new Single Settlement Engine (SSE) planned for 2005.
	Spain	CADE	Continuous interaction with RTGS accounts.	Pre-opening: after the closure of the RTGS and once the calculation for the reserve requirements is done, the opening balance of next value day is taken. This pre-opening is done after closing the previous accounting date, so there is no impact on the balance used to calculate the reserves. Day-time: current balance of RTGS account.	
	Spain	SLCV	Through 3 batches on the RTGS accounts.		
	Greece	BOGS	There are no specific SSS-designated cash settlement accounts in the RTGS. Participants maintain general cash settlement accounts in HERMES. These accounts are used for all payment obligations generated in the System, including those of the Bank of Greece's SSS (BOGS).	Current balance of the RTGS account.	
	Italy	Monte Titoli – DVP gross procedure (Express I), and	Continuous interaction with RTGS accounts.	Current balance of the RTGS account (= Cash + intraday liquidity).	
		Monte Titoli – daylight DVP Net cycle of Express II	End of net-cycle, 12.30 p.m.	Current balance of the RTGS account (= Cash + intraday liquidity).	
INTERFACED MODELS	Italy	Monte Titoli – night-time pre-opening DVP Net cycle of Express II	The multilateral cash balances stemming from the night cycle of Express II are settled on RTGS account using amounts previously "blocked" (the so called "liquidity reserve") by RTGS's participants. [See "Additional comments" for a description of the mechanism to set aside funds for the settlement of SSS (the so-called "liquidity reserve"].	"Liquidity reserve" + payments and redemption of Government Bonds + cash deriving from the collateralization of securities held on the property accounts and from the self-collateralization of securities resulting from the settlement process. The sources of the "liquidity reserve" for the settlement of the overnight cash balance of Express II are: (1) the current balance of RTGS account, included the compulsory reserve, (2) the balances in excess of the fulfilment of the reserve requirement, and (3) the intraday credit available.	The new Italian DVP net procedure (Express II): The net system is composed of an overnight cycle, ending at 7:00 a.m. and a daylight cycle, ending at 12.30 p.m. The first one runs during the night before the settlement day (S) and settles participants' multilateral balances at 7:00 a.m. on the basis of the settlement instructions sent by participants until the late afternoon of S-1. The multilateral cash balances of the overnight cycle are settled through the Italian RTGS system BIREL at the start of the business day, drawing on funds set aside on the participants' settlement account (called "liquidity reserve"). Accordingly, the evening before the settlement date (S-1), Monte Titoli receives from the Banca d'Italia notification of the cash "blocked" by participants for securities settlement purposes; in addition, at the start of the settlement date, the "liquidity reserve" is increased of: a) cash amounts regarding coupons and redemption payments of Government securities, credited to BIREL accounts by Monte Such an additional intra-day credit is actually granted by the Banca d'Italia at the start of the operational day according to the normal procedures but is dedicated only to the completion of the overnight netting cycle. The second netting cycle will run in the morning of the settlement day (S). No "liquidity reserve" mechanism is foreseen for the settlement of the cash balances of this cycle, which will rely only on ordinary BIREL facilities (queue, intra-day credit and ordinary collateralisation procedure).

Replies provided by the national central banks of the ESCB (cont')

			HOW		ADDITIONAL COMMENTS
	Country	System or procedure (for SSS operating different procedures)	6. How are the cash accounts used for SSS settlement funded/covered	7. What balances enter in the calculation of liquidity considered available in the cash accounts used for SSS settlement	8. Any other information/comment that is deemed useful to understand the functioning of the the model
INTERFACED MODELS	The Netherlands	Euroclear NL		Both day-time and night-time pre-opening: for some accounts only cash, for other accounts cash + collateral.	The evening processing (t-1) from 7:30 p.m. till 10:00 p.m. should be considered as early morning processing because the value-date is t.
	Portugal	SITEME	Every institution participating into the Portuguese RTGS (SPGT) holds a single settlement account with the Banco de Portugal, the debit balance of which cannot exceed the standby collateralised credit ceiling previously agreed with the central bank. Orders that exceed the predefined credit ceiling are held in a queue. Any operation entering the queue must be covered by sufficient funds and/or collateral within 90 minutes (a system parameter) and always before the time at which the queuing mechanism normally closes (6 p.m.), otherwise it is cancelled. The ordering participant may ask the system to cancel a queuing operation. Every institution participating into SLOD holds a single settlement account with the Banco de Portugal and is integrated into this gross settlement system, less sophisticated and governed by more restrictive rules (e.g. participants have no access to the Interbank Services Company – SIBS, transfer channel and therefore use SWIFT and fax, and cannot be granted intraday credit), although settlement does occur within the settlement platform of SPGT. In the case of shortage of funds, debit orders are considered null for 90 minutes. During that time, if the participant's account is provisioned, the original operation will be cancelled and a new instruction will be resubmitted to payment. If the participant's account is not provisioned during the 90 minutes, the original operation will be cancelled due to lack of provision.	The current balance of the RTGS accounts are considered fully available for SSS settlement.	

			HOW		ADDITIONAL COMMENTS
	Country	System or procedure (for SSS operating different procedures)	6. How are the cash accounts used for SSS settlement funded/covered	7. What balances enter in the calculation of liquidity considered available in the cash accounts used for SSS settlement	8. Any other information/comment that is deemed useful to understand the functioning of the model
INTERFACED MODELS	Portugal	INTERBOLSA	See reply given for SITEME.		
	Denmark	Vaerdipapircentralen A/S – VP	Through transfers from the RTGS accounts to the dedicated settlement accounts. Concerning the night-time settlement, the amounts available for the first batch are updated automatically after the bookkeeping of each batch. With regard to day-time settlement, the funds are transferred and re-transferred in connection with each batch. There is also an Automatic Collateralisation system where VP administrates another type of dedicated settlement accounts on an integrated basis.	Current balance of the RTGS accounts as well as credit limit based on a pool of pledged collateral and the holdings of certificates of deposits at the time of transfer to the settlement accounts. With regard to the accounts connected to the Automatic Collateralisation system, the amount of securities in stock and under process in dedicated VP securities accounts.	
INTEGRATED MODELS	Belgium	Euroclear Bank	Liquidity bridge when liquidity is needed ("on demand") during period of overlapping of SSS and funds transfer system operating times. The participants transfer liquidity from their NBB main accounts to their NBB sub-accounts (on the SSS) at the start of the day, they can send/repatriate liquidity when needed; at the EOD the liquidity will automatically be transferred back (4:30 p.m.)	Available cash amount + intraday credit	The Euroclear system for which NBB has set up a central bank money facility in December 2001: this facility is 100% operational but has not been used yet; the main reason being the fact that there is no need to use such a facility for monetary policy transactions as NBB operates a pool of pre-deposited pledged collateral.
	Belgium	NBB SSS	At the end of each DVP settlement cycle (one every hour from 10:00 a.m. to 4:00 p.m.) the SSS interact with the cash account system (RECOUR) to settle each transaction on a gross basis. If the funds are not available, the transaction is postponed to the next settlement batch.	Day-time: available cash balance + intraday credit Early morning pre-opening of RTGS: No settlement but the available amounts are the same (We operate a pool of pre-deposited pledge collateral, the part of the pool which remains available after collateralisation of monetary policy operations is automatically and dynamically assigned to intraday credit. The intraday credit is given under the form of a credit line which is automatically used by the account holders when their cash balance is not sufficient.)	NBB SSS is where all the governmental paper is issued and settled and hence is used for monetary policy operations, this CSD is operated by NBB and located on our computers.

Replies provided by the national central banks of the ESCB (cont')

			HOW		ADDITIONAL COMMENTS
	Country	System or procedure (for SSS operating different procedures)	6. How are the cash accounts used for SSS settlement funded/covered	7. What balances enter in the calculation of liquidity considered available in the cash accounts used for SSS settlement	8. Any other information/ comment that is deemed useful to understand the functioning of the model
INTEGRATED MODELS	Germany	Clearstream Frankfurt	Liquidity bridge when liquidity is needed ("on demand") during period of overlapping of SSS and funds transfer system operating times	Night-time: blocking/ reservation procedure taking into account: current balance on home account (including minimum reserve balances) + available collateral (balances on deposit facility are not used). Early morning pre-opening of "home accounts": current balance on home account + available collateral Day-time: current balance on home account + available collateral.	The Bundesbank payment system RTGSplus has its own accounts which are linked to the main accounts ("home accounts") of participants with a real-time liquidity bridge. The RTGSplus accounts start the business day with a zero balance and end the business day with a zero balance. The SSSs debits and credits the "home accounts" of SSS participants (and not the RTGSplus accounts) during the day-time (current system of day-time settlement). Also, the reservation of funds for the night-time processes is made on the home accounts. The debiting of results of the overnight process is also made on the home accounts. Following that, the proceeds of securities settlement can be used in the bridge to the RTGSplus system.
	France	Euroclear FR (RGV)	Liquidity bridge when liquidity is needed ("on demand") during period of overlapping of SSS and funds transfer system operating times	Night-time pre-opening: only automatic provision of intraday credit collateralised by securities in stock or under process. Day-time: balance available on the dedicated account (RGC cash position). This can be fed by: (1) transfers from the main RTGS account; (2) automatic provision of intraday credit collateralised by securities in stock or under process.	Complete overlapping of the availability of cash accounts with SSS operating time: continuous settlement. No batch process.
	Sweden	Current system (adopted in November 2003)	Liquidity bridge when liquidity is needed ("on demand") during period of overlapping of SSS and funds transfer system operating times. Subsequent transfer back of liquidity at 14:00	Value of funds transferred from the regular RTGS system to the accounts in the SSS + the credit limited allowed based on the securities pledged specifically for securities settlement or automatically collateralised during settlement.	There are two ways of accessing CBM in this system: for regular settlement special accounts with credit rights located in the SSS. For RTGS (manual immediate procedure) through mandated payments initiated by the SSS.
INTEGRATED MODELS	United Kingdom	Crest[1)]	Liquidity bridge when liquidity is needed ("on demand") during period of overlapping of SSS and funds transfer system operating times. NB there is a full overlap of operating times. Liquidity bridge provides 'virtual single pot': two-way transfers between each SSS settlement cycle (200-300 per day).	For each SSS settlement cycle, the SSS receives new information on central bank money balances 'earmarked' (i.e. 'blocked') on each SSS settlement banks' account at the NCB. These 'earmarked' amounts (as represented by balances on liquidity memorandum accounts in the SSS) form part of the checks that are used to determine which transactions will settle in a particular cycle.	In the UK model, although finality is legally achieved in the SSS (i.e. when SSS members' securities and cash memorandum accounts are debited/credited), central bank money settlement takes place on accounts located in and managed/controlled by the NCB. In addition, because of its two-tier nature, the UK model only provides central bank money settlement accounts to the SSS settlement banks and not to the SSS members. The movements across SSS members' cash memorandum accounts create an irrevocable undertaking on the part of the NCB to debit the settlement account of the settlement bank of the buying member and to credit the settlement account of the settlement bank of the selling member.
AUTONOMOUS CB MODEL	Finland		Liquidity bridge when liquidity is needed ("on demand") during period of overlapping of SSS and funds transfer system operating times. Accounts are funded. APK participants fund their positions on the real-time RM system at their will during the day. They can also withdraw funds from the system at their own initiative. The RM system functions autonomously during the day settling transaction in central bank money. Funds can be withdrawn only through BoF-RTGS. Same applies to the OM system with the exception that it is the SSS operator that initiates any pay-out after the daily netting run.	Current balance of the RTGS account, which in our case includes all holdings and facilities of each participant.	The Finnish systems are based on (1) an autonomous central bank money model and (2) credit transfers. The Finnish SSSs function on the basis of autonomous central bank money model, i.e. CSD's account on the RTGS is funded by its participants from their own RTGS accounts (resembling CHIPS modalities). The central bank money liquidity is then used internally within the SSS. There is no other way to fund the SSS nor are there any leakage of liquidity. It should be noted that the APK operates two technically separate SSSs.

1) CREST(UK) is also the SSS for Irish equities.