
Navigocorpus at Work: A Brief Overview of the Potential of a Database

**Jean-Pierre Dedieu, Silvia Marzagalli,
Pierrick Pourchasse and Werner Scheltjens**

Navigocorpus is a database on shipping and maritime trade; at present it contains data for the eighteenth and nineteenth centuries. It was created under a four-year programme financed by the French Agence Nationale de la Recherche and can be consulted online.¹ It has been designed to store, within a common framework, information from the greatest variety of sources and to make it widely available. We intend to insert into Navigocorpus not only data provided by colleagues but also data we have collected or will collect.

From the outset, Navigocorpus was conceived as more than a simple storage medium for transcribed raw data. While trying to preserve all the information in a form as close as possible to the sources, we also wanted to facilitate the use of the database for all kinds of queries. The first aspect forced us to conceive of a series of additional fields which would specify, for instance, whether a place involved a past event, an intended destination or an intended destination which was never reached (for example, a ship taken as a prize). The need to ease information retrieval led us to design a series of tools and uniform fields. The technical problems we encountered in reconciling these apparently conflicting goals were described in a previous essay.² This paper discusses the content of the database, provides examples of possible queries and shows the added value that we expect from its use. We also describe some of the tools we are providing to facilitate the use of the database.

¹Navigocorpus was developed using FileMaker software. Its contents can be accessed at <http://navigocorpus.org> thanks to the partnership established with TGE-Adonis of the French CNRS. Users can query the database either by using FileMaker online (the online query will be progressively extended to all fields in the second half of 2012) or an SQL version with forthcoming query screens. For news and comments on Navigocorpus, see the website at <http://navigocorpus.hypotheses.org/>.

²Jean-Pierre Dedieu, Silvia Marzagalli, Pierrick Pourchasse and Werner Scheltjens, "Navigocorpus: A Database for Shipping Information – A Methodological and Technical Introduction," *International Journal of Maritime History*, XXIII, No. 2 (2011), 241-262.

The Present Content of Navigocorpus

Navigocorpus has been planned as an open database; it is our intention to increase its content over time. When we first thought about the project, many colleagues offered us their databases, some of which could be integrated relatively easily, while others require additional work to fit into the structure of Navigocorpus.³ In a few instances, however, we rejected data. We decided, for instance, not to include Pierrick Pourchasse's material on French trade with the Baltic because in the interim our colleague Jan Willem Veluwenkamp received a grant to digitize the totality of the Sound Toll registers.⁴ We also decided to give priority to databases which contain the totality of information in a given source. Many scholars created their databases by selecting information according to specific research goals while disregarding evidence they deemed irrelevant. This is a perfectly legitimate procedure that is often adopted to save time, but it does not fit our goals. A good example is Biagio Salvemini's decision while studying trade between southern Italy and Marseille to omit the names of ships provided by the Health Office at Marseille. This choice was consistent with his research goals because he was interested in aggregate results; indeed, his team has made an important contribution to our knowledge of this trade in the eighteenth and early nineteenth century.⁵ But the inclusion of this database in Navigocorpus would have been problematic because not only does the absence of ship names hinder the identification of vessels and captains which might be found in other sources, but the selection of only those ships arriving from southern Italy could lead future researchers consulting Navigocorpus into some serious errors. Moreover, within Salvemini's selective framework it would be impossible to study the total shipping between

³Within the next year, we will add to the on-line database the material collected by Christina Dahlede (shipping at Göteborg), Jean-Claude Bats (Amirauté de Bordeaux, colonial trade), Werner Scheltjens (*Galjootsgeldregisters* on shipping in the Gulf of Finland) and Silvia Marzagalli (US shipping at Bordeaux, 1780-1815). Leos Müller's database on Swedish Algerian passes still needs to be converted into the structure of Navigocorpus but will also be added. We welcome other requests for inclusion.

⁴See Werner Scheltjens and Jan Willem Veluwenkamp, "Sound Toll Registers Online: Introduction and First Research Examples," this forum, 301-330.

⁵See Biagio Salvemini and Maria Antonietta Visceglia, "Marsiglia e il Mezzogiorno d'Italia (1710-1846): Flussi commerciali e complementarietà economiche," *Mélanges de l'Ecole Française de Rome, Italie et Méditerranée*, CIII, No. 1 (1991), 103-163; Salvemini and Visceglia, "Pour une histoire des rapports économiques entre Marseille et le sud de l'Italie au XVIIIe et au début du XIXe siècle," *Provence historique*, XLIV (1994), 321-365; and Annastella Carrino and Biagio Salvemini, "Porti di campagna, porti di città: Traffici e insediamenti del Regno di Napoli visti da Marsiglia (1710-1846)," *Quaderni storici*, XLI, No. 1 (2006), 209-254.

Naples and Marseille, for instance, since his database excludes vessels which called at a port in southern Italy but began their voyages elsewhere. On the other hand, we are quite happy to accept any database which includes the total source, such as the one built from Danish consular records in southern Europe and Danish Algerian passes by Dan Andersen.⁶

While reviewing existing databases, we also collected new data to test the structure of Navigocorpus, to work on the tools we thought necessary and to demonstrate the database's potential. To do this we promoted the transcription of all available registers of clearances from French ports in 1787; entries of the Health Office at Genoa in 1770; entries of the Health Office in Marseille for 1787, 1793-1795 and 1800; consular records of American ships entering Tunis between December 1806 and 1867; French consular records at Philadelphia of ships bound for Napoleonic Europe between 1805 and 1813; entrances and clearances at Valparaiso in 1854 and 1856; and the weekly lists of entrances at Cádiz published in 1789.⁷ We chose these sources because of their different natures (clearances and entrances) and because they were produced by a variety of institutions with distinct goals (consulates, Health Offices, Admiralties, printed journals) and thus collected different types of information (including, or not, shipowners, consignees, duties, cargoes, etc.). The on-line database (<http://navigocorpus.org>) currently contains over 60,000 documentary units,⁸ and we expect it to double in size by the end of 2013.

⁶We will probably make an exception for "Amphitrite," a database on Greek shipping which, although taking data from a variety of sources, did so on a consistent basis. See Gelina Harlaftis, "The 'Eastern Invasion:' Greeks in Mediterranean Trade and Shipping in the Eighteenth and Early Nineteenth Centuries," in Maria Fusaro, Colin Heywood and Mohamed-Salah Omri (eds.), *Trade and Cultural Exchange in the Early Modern Mediterranean: Braudel's Maritime Legacy* (London, 2010), 223-252. For the sources used, see Gelina Harlaftis and Sophia Laiou, "Ottoman State Policy in Mediterranean Trade and Shipping, c. 1780-c. 1820: The Rise of the Greek-Owned Ottoman Merchant Fleet," in Mark Mazower (ed.), *Networks of Power in Modern Greece: Essays in Honour of John Campbell* (London, 2008), 1-44.

⁷For French clearances in 1787, see footnotes 10 and 11. Archivio di Stato di Genova, Sanità, 398-399; Archives départementales des Bouches-du-Rhône, 200 E 543, 550, 551 and 556; United States, National Archives and Records Administration, College Park, MD, RG 84, Tunis, vol. 51, shipping registers, 1806-1857; Archives du Ministère des Affaires Étrangères, Nantes, Consulat de Philadelphie, reg. 133; National Archives of Chile, Marina, 137 and 140; Archives Nationales de France (AN), AE, BIII, 353; and *Parte oficial de la Vigía de Cádiz*.

⁸A documentary unit is the set of information related to an entry in a given source – in our case, most consist of a single ship. The database is structured on the geographical point touched by the ship during its voyage. A documentary unit which provides information on a ship sailing from Naples to Marseille and clearing for Tunis

We hope that scholars will consider using Navigocorpus to insert data they wish to analyze. We are conscious that this will require some effort since the database is relatively complex and contains a wide variety of fields which are not structured according to the specific source they might want to add. Yet we hope that they will recognize the added value which we believe comes from the extreme flexibility of Navigocorpus in dealing with complex cases and the existence of user-friendly tools to handle masses of information. In addition, some scholars might find it useful to add their data to a much larger pool which can provide additional information on the ships, captains, products, places and shipowners in which they are interested; in other words, the greater the density of data, the greater the potential depth of the analysis. The following section discusses the potential of Navigocorpus more concretely by looking at the sources we located on shipping and trade from French ports in 1787.

Data on Shipping in France in 1787: A Test for Navigocorpus

This section briefly discusses the sources we used on shipping in France at the end of the Ancien Regime. The density enables us to glean information about some ports for which sources no longer exist, as for Vannes in Brittany. Our aim here is not to provide an exhaustive analysis of shipping in France but rather to use it to suggest the variety of queries Navigocorpus can handle.

Each vessel, including small boats, clearing from a French port in the eighteenth century had to pay a duty called the *droit de congé*. This was collected with only a few exceptions each time a vessel left port; coastal fishermen could apply for a six-month clearance, and *caravane* traders in the Mediterranean could obtain a two-year clearance which allowed them to travel back and forth even if they spent most of their time outside France.⁹

The duty was collected by over a hundred Admiralty offices. As it provided the Admiral of France, the Duke of Penthièvre (1725-1793), with

generates three records – one for each port – which are linked through a unique identifier. For a detailed explanation of the structure of the database, see Dedieu, Marzagalli, Pourchasse and Scheltjens, “Navigocorpus: A Database for Shipping Information.”

⁹On French *caravane* shipping to the Levant, see Daniel Panzac, *La Caravane maritime: marins européens et marchands ottomans en Méditerranée (1680-1830)* (Paris, 2004); Gilbert Buti, “Aller en caravane: le cabotage lointain en Méditerranée, XVIIe et XVIIIe siècles,” *Revue d’histoire moderne et contemporaine*, LII, No. 1 (2005), 7-31; and Buti, *Les Chemins de la mer, Un petit port méditerranéen: Saint-Tropez (XVIIe-XVIIIe siècles)* (Rennes, 2010). Gilbert Buti, “Entre échanges de proximité et trafics lointains: le cabotage en Méditerranée aux XVIIe et XVIIIe siècles,” in Simonetta Cavaciocchi (ed.), *Ricchezza del mare, Ricchezza dal mare, secc. XIIIe-XVIIIe* (Florence, 2006), 287-316, discusses the limitations of the *congés*. Nonetheless, the *congés* are the only sources providing data for all French ports.

substantial revenues, the Admiralty offices were ordered to keep a detailed register of the *congés*. By the end of the Ancien Regime they actually kept two copies, one of which was sent to Paris. What remains of these registers is kept at the National Archives in Paris in the sub-series G5.¹⁰ They contain the date, name of the ship, its burthen, the name of the captain, the destination, the amount of the duty and the class of the *congé* (French, foreigner, fishing and a few local variants). Information on rig, port of register, captain's origin and the nature of the cargo depended on the whims of the officer.

We decided to enter into Navigocorpus content from all the registers of clearances for French ports in 1787. We chose this year because of the work by a member of the team, Christian Pfister, who patiently went through the entire G5 sub-series to establish that 1787 was the year for which the data were most exhaustive. Pfister also compiled a list of the ports where the clearance duty was collected, including those for which the registers have not survived. This allowed us to search for missing data in local archives¹¹ and to quantify the amount of missing material. All told, we collected data on more than 31,000 of a total of 45,000 clearances. We also added 3600 entrances for Marseille, the main French port for which clearance data were missing. Figure 1 shows that while the coverage of Mediterranean ports is poor, registers are well preserved for the Atlantic (we were able to collect data for seventy-nine percent of all clearances in Atlantic and North Sea ports). Most registers for colonial ports have vanished, but we were able to retrieve those for Saint-Pierre and Miquelon and French Guyana which opened new possibilities for studying the trade of these two colonies.¹² These data allowed us to obtain a global view of shipping in France at the end of the Ancien Regime, both in number and, for ports where the registers have survived, tonnage.¹³ A com-

¹⁰The official finding aid of the sub-series is available online at <http://www.archivesnationales.culture.gouv.fr/chan/chan/pdf/sa/G5.pdf>. It mentions the ports which had a principal Admiralty office but not the many subordinate ports. Nor does it indicate missing years in the series. Because this finding aid was too incomplete for our purposes, Christian Pfister produced a more detailed finding aid which is now available at <http://navigocorpus.hypotheses.org/>.

¹¹Gilbert Buti provided Navigocorpus with data for Saint-Tropez (Archives Départementales du Var, 7 B 10), and Hiroyasu Kimizuka gave us those for Lorient (Archives départementales du Morbihan, 10 B 19).

¹²For an analysis of data for Mediterranean ports in the sub-series G5, see Silvia Marzagalli and Christian Pfister-Langanay, "La navigation des ports français en Méditerranée au XVIIIe siècle: premiers aperçus à partir d'une source inexploitée," *Cahiers de la Méditerranée*, LXXXIII (2011), 273-295.

¹³All volumes in French sources are expressed in *tonneaux* (1.44 cu. metres).

parison of figures 1 and 2 (the latter looks at tonnage) shows the importance of small craft along the Atlantic coast where the great number of clearances contrasted with the modest tonnage. The dominance of Bordeaux and Le Havre is clear when viewing tonnage rather than number of vessels.

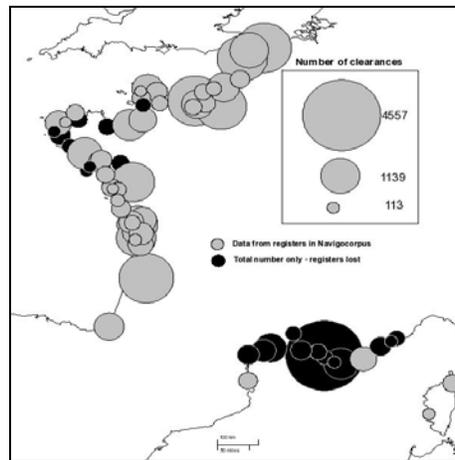


Figure 1: Number of Clearances from French Ports, 1787

Note: Ports with more than 100 clearances only.

Source: Navigocorpus.

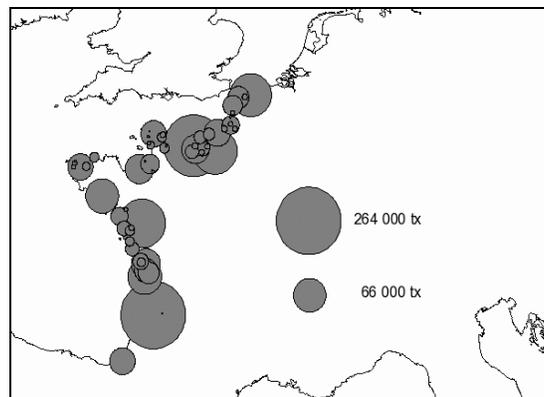


Figure 2: Total Tonnage Clearing French Atlantic Ports, 1787

Source: See figure 1.

Once data are entered, there were various ways to use them. Here we will provide two examples: on the one hand, we will work at the level of a single port; on the other, we will show how Navigocorpus makes it possible to study the activity of a port like Vannes for which data are no longer extant.

Studying the Geography of Trade and Shipping Patterns of a Given Port

It is of course possible to work on a single port. Bordeaux has been studied extensively, but for the late eighteenth century, scholars have concentrated mainly on its colonial, slave and European trades. Paul Butel has provided information on the coastal trade for some years and some ports, but he did not quantify its overall importance for any given year or examine the spatial relations of Bordeaux’s shipping and trading connections.¹⁴ The data in Navigocorpus, however, make it possible to gain a global view of the destinations of ships clearing Bordeaux in 1787; this confirms the primacy of the West Indies as the major destination (figure 3a), as well as a clear orientation toward northern Europe (figure 3b). The domestic coastal trade was important in virtually all the Atlantic ports (figure 3c), whereas connections to the Mediterranean were sporadic and limited only to the major ports (figure 3b).

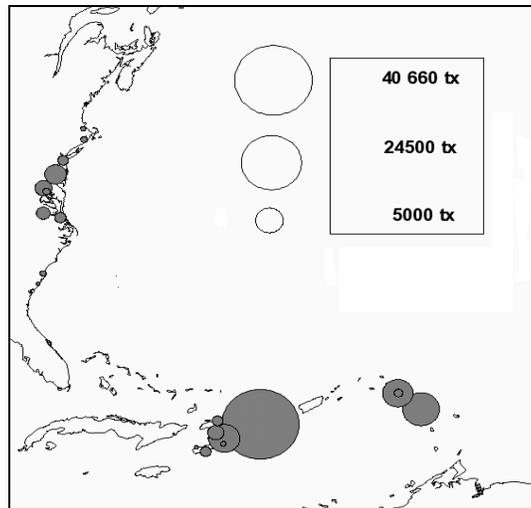


Figure 3a: Total Burthen of Ships Clearing Bordeaux for the Americas, 1787

Source: See figure 1.

¹⁴Éric Saugera, *Bordeaux, port négrier XVIIe-XIXe siècle* (Paris, 1995); and Paul Butel, *Les négociants bordelais, l’Europe et les Iles au XVIIIe siècle* (Paris, 1974).

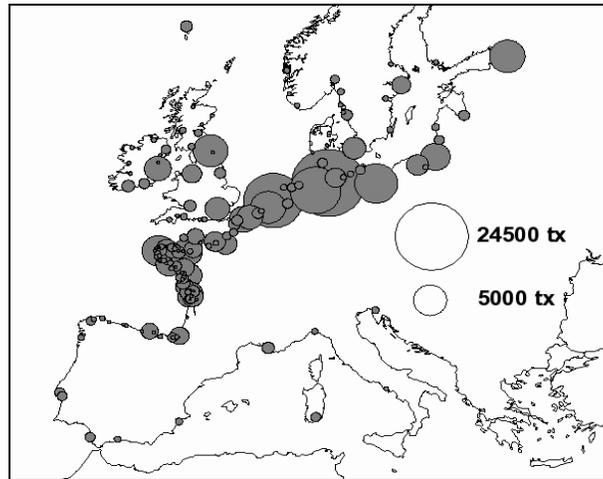


Figure 3b: Total Burthen of Ships Clearing Bordeaux for European Ports, 1787

Source: See figure 1.

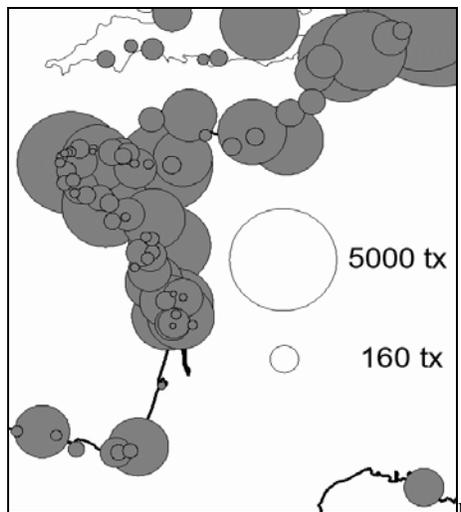


Figure 3c: Total Burthen of Ships Clearing Bordeaux for Other French Ports, 1787

Source: See figure 1.

The database also makes it possible to track the regional focus of trade with respect to specific cargoes. We can take the example of a port with a relatively limited hinterland like Sables d’Olonne on the western Atlantic coast. Sables d’Olonne was seldom visited by foreign vessels but played an important role in the domestic salt trade. Only five of 280 clearances were by non-French craft (one British and four Spanish, all of the latter from Plentzia in the Basque Country). The destinations, however, often went far beyond French borders, as Sables was a port of departure for Newfoundland. Besides fishing, the port traded mainly with Bordeaux and, to a lesser extent, Bayonne. Cargoes to both and to Bilbao were almost exclusively salt (see figure 4).

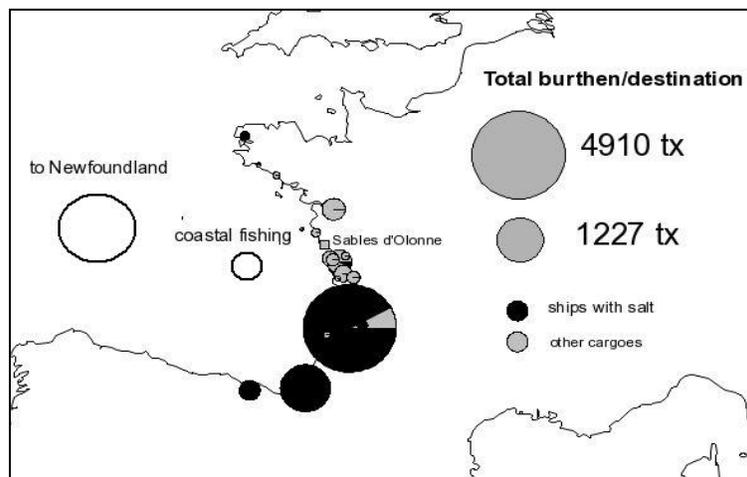


Figure 4: Destinations of ships clearing Sables d’Olonne in 1787

Source: See figure 1.

Figure 5, which depicts the ports where the ships clearing from Sables d’Olonne were registered, looks quite different from figure 4. A total of thirty-nine percent of total tonnage clearing from Sables was registered in the port, and over half of it was engaged in the Newfoundland fisheries. The coastal salt trade to southwestern France was thus carried by ships registered in a number of small ports, most of which were located farther north in Brittany and Normandy.

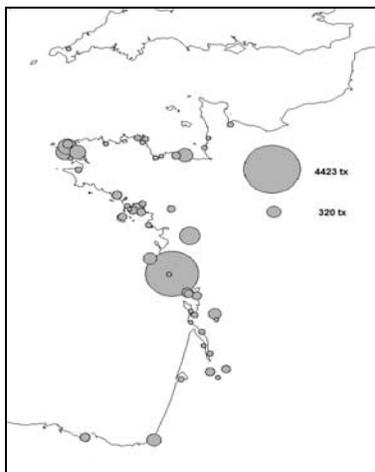


Figure 5: Ports of Registry of Ships Clearing Sables d'Olonne, 1787

Source: See figure 1.

Reconstructing the Activity of a Port for which Records are No Longer Extant

The density of information in Navigocorpus makes it possible to study indirectly the activity of ports, particularly on the south coast of Brittany and in the Mediterranean, for which the registers of clearances (*congés*) are no longer available. For most of these ports, we have detailed statistics sent by the provincial administrations to the central Admiralty in Paris which provide an overview of the total number of clearances. For the port of Vannes, on the south coast of Brittany, table 1 shows the available information for 1787.

Table 1
Total Number of Clearances in Vannes by Type of *Congé*, 1787

| | |
|---------------------------------|----------------------------|
| Clearances (bound for Brittany) | 68 |
| Clearances (fishing) | 131 |
| Clearances (French flag) | 97 |
| Clearances (non-French flag) | 42 |
| Total Clearances | 338 |
| Value of Taxes | 329 <i>livres tournois</i> |

Source: Archives Nationales de France (AN), G5 33.

Historians cannot draw firm conclusions about the nature of shipping activities from this information alone except to notice that approximately forty percent of the local fleet was engaged in fishing along the coast of Brittany.

Existing statistics¹⁵ for other years in the 1780s provide similar information for the fishing vessels in this Breton port but do not help us to understand the commercial geography of the 207 ships which were not fishing. Fortunately, a considerable amount of information can be drawn from the clearance registers of other French ports. Navigocorpus make it possible to identify 142 vessels loaded in a French port bound for Vannes. The ports of departure of these vessels are shown in figure 6. Six of these 142 vessels were registered in a foreign country, most in Denmark, and cleared from the nearby ports of Brest, Lorient and Nantes (see table 2).

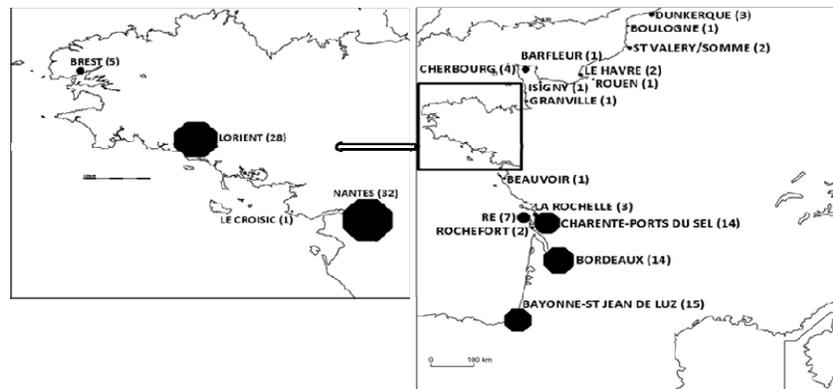


Figure 6: Clearances from French Ports to Vannes, 1787

Source: See table 1.

Table 2
Clearances of Non-French ships to Vannes, 1787

| Date | Cleared from | Registered Port | Name of Captain |
|------------------|--------------|-----------------|--------------------|
| 23 April 1787 | Lorient | Angensund | Jens Bruck |
| 23 April 1787 | Lorient | Arendal | Ole Madsen |
| 30 April 1787 | Nantes | Papenburg | Jan Jansen Hartsen |
| 25 May 1787 | Brest | Christiania | Hans Arnessen |
| 13 July 1787 | Lorient | Frederichstadt | Ole Gresle |
| 14 November 1787 | Lorient | Boston | Samuel Toluyill |

Source: See figure 1.

It is extremely likely that most of these ships came to Vannes to load salt and were bound for Scandinavia or the Baltic because salt was the usual

¹⁵AN, G5 33.

outward cargo for northern vessels which came to Vannes. The Sound Toll Registers Online¹⁶ allow us to find one of the ships (Jan Jansen Hartsen/Jan Jantzen Hartken of Papenburg) sailing eastward and provide information on six additional vessels which cleared from Vannes and delivered salt to Baltic ports (table 3).

Table 3
Ships from Vannes Bound for the Baltic, 1787

| Date | Destination | Registered Port | Name of Captain | Goods |
|---------------|-------------|-----------------|-----------------------|----------------|
| 1 April 1787 | Baltic | London | John Gardiner | 78 lasts salt |
| 1 April 1787 | Liebau | Worckum | Tjerd Hilckes de Boer | 88 lasts salt |
| 1 June 1787 | Baltic | Amsterdam | Wiebe Jans | 44 lasts salt |
| 3 June 1787 | Baltic | Langesund | Jens Poge | 44 lasts salt |
| 26 June 1787 | Riga | Papenburg | Jan Jantzen Hartken | 73 lasts salt |
| 27 June 1787 | Riga | Amsterdam | Jacob Sybrands | 103 lasts salt |
| 27 Sept. 1787 | Riga | Dockum | Jan Pieters Visser | 88 lasts salt |

Source: <http://www.soundtoll.nl>.

Thus, by using Navigocorpus and the Sound Toll Registers Online we were able to find information on twelve of the forty-two non-French ships (twenty-nine percent) which cleared from Vannes in 1787. Together, we now have information on 148 out of 207 trading ships (71.5 percent). The fifty-nine “lost” vessels came to Vannes either from French ports for which data have not survived – many registers for small ports in Brittany are missing – or directly from foreign ports. The addition of new sources to Navicocorpus, particularly Norwegian records, would likely provide more information because we know that many Norwegian vessels (twenty-nine in 1781 and thirty-two in 1791) came to deliver fish roe for bait in Lorient, Concarneau and Douarnenez and returned to Scandinavia laden with salt.¹⁷

The French ships which cleared from Vannes were registered in small ports on the south coast of Brittany (eleven in Arzon, eighteen in Île-aux-Moines, nine in Île d’Arz, seventeen in Quiberon and fourteen in Locmariaquer) and comprise a service fleet engaged mainly in the wine trade from Bordeaux and Nantes or in the salt trade from Charente and Île de Ré to Brittany, Normandy and northern France. To reconstruct the activity of Vannes, it is necessary to look at these ships individually and to analyze all the available information. For example, the records of Thomas Cario, captain of the twenty-eight-tonneaux *Vigilant* allow us to reconstruct his activities by

¹⁶<http://www.soundtoll.nl>.

¹⁷Bernt Lorentzen, *Bergen og sjøfarten, Vol. 1* (Bergen, 1959), 375 and 385.

looking at the dates of known clearances recorded in Navigocorpus. Existing information suggests that the master cleared three times from Vannes to Lorient in 1787. We do not know, however, how he spent the five months between February and August; either he took a six-month clearance for fishing or pursued other activities during this season.

Table 4
Clearances of *Vigilant*, Captain Thomas Cario, 1787

| Date | Clearance in Navigocorpus | Reconstruction of the Activity |
|-------------------|----------------------------------|---------------------------------------|
| 17 January 1787 | Lorient to Vannes | Clearance Vannes-Lorient |
| 28 February 1787 | Lorient to Vannes | Clearance Vannes-Lorient |
| 02 August 1787 | Lorient to Vannes | |
| 18 August 1787 | Lorient to Vannes | Clearance Vannes-Lorient |
| 14 September 1787 | Lorient to Vannes | |

Source: See figure 1.

Although we do not have clearances for Marseille, some shipping patterns in that port can be identified by comparing its entrances with clearances from other French ports. The 100-*tonneaux* brigantine *La Bonne Malouine* left Le Havre on 1 February 1787 for Saint Malo with the “rest of a cargo” imported from Marseille. It cleared Saint Malo for Newfoundland on 6 April with salt and, having passed Gibraltar on 21 September, arrived at Marseille on 2 October from Newfoundland with 2000 quintals of cod.

Although gaps remain, it is clear that Navigocorpus enables us to better understand the activity of a port for which detailed local records are no longer preserved. This kind of reconstruction is possible for most French ports for which the clearance registers are lost.

Auxiliary Tools in Navigocorpus

Collecting data in Navigocorpus allows us to go far beyond the aggregation of ships and tonnages or the trading patterns of various ports, whether their registers are preserved or not. To facilitate the use of the diverse collections of ship movement records in the database, a set of auxiliary tools has been incorporated. A geo-referenced database, a descriptive dictionary of ship types and multilingual thesauruses of commodities, weights and measures have been stored in separate tables. We will briefly describe the first two of these tools and show in more detail the procedure we adopted to handle cargo items.

Geo-referenced Codes and Mapping

The geo-referenced database at present covers Europe, the southern Mediterranean and the Americas, and contains about two million entries. It provides the latitude and longitude of given ports, their various spellings in different languages and an alphanumeric code (A for Europe and the northern Mediterranean, B for the Americas) used by Navigocorpus. In Navigocorpus we have left the original place name and spelling as it appears in the source but have added an extra field with the geo-referenced code – the same one to designate, for instance, Leghorn, Livorno and Livourne (see figure 7). This allows us to circumvent the problem of the various spellings and languages in the sources.

| © CNRS | | Name sort | List | All fields |
|----------|-----------|-----------|------|------------------------|
| A0251183 | Livorno | | lx | Leghorn Populat |
| | Italy | | lx | Fortezza Nuova Populat |
| | Toscana | | lx | Livorn Populat |
| | Livorno | lx | lx | Livourne Populat |
| | | C | lx | Livorno Populat |
| | | A0251183 | | |
| | Populated | | M | |

Figure 7: Geo-referenced Database Linked to Navigocorpus

Note: The geo-referenced database of places (Geo_general) is available at: http://fms.tge-adonis.fr/fmi/iwp/res/iwp_auth.html (enter as “Compte In-vité”).

Once the place names have been coded in Navigocorpus, the passage from the database to maps is extremely easy. By exporting the selected data from Navigocopus into a spreadsheet and then importing them into cartographic software – we used Cartes & Données™ – it is possible to visualize data on a rough map even before producing a more elaborate map.

Ship Types

A short description of ship types is provided, together with a few images and bibliographic references which were developed by Apostolos Delis, who worked as post-doctoral fellow on the project for a year. This dictionary can also help a researcher who is not a specialist in vessel construction and who might be surprised to see that a ship entering two ports in a relatively short time span was noted as having two distinct rigs. A *goelette*, for instance, can quite easily become a topsail schooner by adding a square rig.



Figure 8: Examples of Ship Type Descriptions in Navigocorpus

Source: See figure 1.

Processing Commodities in Navigocorpus

Processing commodities in a database is not especially complicated technically, but there are cognitive problems. What do the various items mean? How can the huge variety of goods be reduced to manageable categories without distorting reality? The solution to this dilemma does not lie in the computer but in the researcher’s capabilities. The database should do three things. First, it should link commodities to other data sets to enable the researcher to work on them without tampering with other data. Second, it should provide a multilingual tool to solve translation problems (this is particularly important in a multilingual database such as Navigocorpus). Finally, it should provide a coding tool that is able to distinguish each commodity clearly.

Navigocorpus addresses each of these problems. The processes we describe are based on techniques Jean-Pierre Dedieu validated in other databases and are based on the principle that cognitive matters are best left to the researcher. The researcher, not the computer, makes decisions; there are no pre-defined solutions.¹⁸ We tried, however, to make these decisions easier by providing the researcher with a clear view of the context. We also tried to embed into the database all solutions to a problem so that they not only solve the special case from which they emerged but also similar cases. We took great care to enable changes to be made easily, including coding routines. But these are limited in scope so that changing one entity does not require modifying the many other related fields. In other words, what one scholar has done can be undone by others. Finally, we provided the possibility of creating new classes without destroying previous ones. We trusted the user and stressed flexibility.

¹⁸Our management of relationships among actors is based on Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford, 2005), 43-62.

Storing Information about Cargoes in Navigocorpus

Navigocorpus is a database about shipping. Its main table stores and arranges in chronological order a list of all points touched by any of the ships in the database. Cargoes and “purposes” are described in a separate table. For the most part, sources list the relevant cargo items, but sometimes they only describe the general purpose of a voyage: fishing, war, privateering or coastal trade (*cabotage*). We process purposes exactly as if they were cargo items, although we code them as a special class. Every purpose in the source and every item described as cargo are stored as specific entries in the cargo table. This table is linked to the record in the points table which describes the point to which the source relates this entry. In other words, points can be accessed from cargo entries and purposes, and cargo entries from points, but both are clearly separated. Changes to one will not interfere with the other.

| Port | Action | Initial date | Commodity | Commodity identifier | Commodity on the way coding | Quantity unit |
|-----------|--------|--------------|---------------|----------------------|----------------------------------|---------------|
| Marseille | In | 1795+1+00 | Jus de citron | Lemon juice | 00000396 ID-FCBxxx-F-FCBxxx-F0xx | 3 caisses |
| Marseille | In | 1795+01+00 | Jus de citron | Lemon juice | 00000396 ID-FCBxxx-F-FCBxxx-F0xx | 9 tonneau |
| Marseille | In | 1795+03+00 | Jus de citron | Lemon juice | 00000396 ID-FCBxxx-F-FCBxxx-F0xx | 6 barriques |

Figure 9: Cargo Table¹⁹

Source: See figure 1.

Cargo items are described in the central field “commodity” exactly as they appear in the source, regardless of the spelling. No attempt is made when entering data to introduce any kind of identifier or to homogenize data because we believe strongly that information must be preserved exactly as it appears in the source. Each time a source mentions a new cargo item, a new entry is added to the cargo table. A cargo item is characterized not only by a commodity name but also by a quantity and a unit of measurement. Moreover, the item is subject to an action (loaded, unloaded, etc.) at a given port on a given date. Every time one of these elements changes, a new cargo item – that is, a new entry – is created. For instance, a source which mentions “two baskets and three barrels of oranges” would generate two records: “two baskets of oranges” and “three barrels of oranges,” both linked to the same point and

¹⁹Small blue, yellow and brown squares displayed at the side of the fields are triggers which launch the most usual queries or skip to other screen layouts. Their description is unnecessary in the present paper.

through it to the same ship. During data input, special care is taken to separate mixed source entries. Each record in the cargo table must match only one cargo item.

At this stage, we still have not made any decision as far as commodities are concerned. We only care about transcribing the cargo items and purposes as described in the source and are not bothered with deciding whether a product in one record is the same as one in another (a decision which is necessary when loading data according to a predefined code or list of items and which, once done, is irreversible). Commodities are processed later in batches comprising many cargo items sharing the same commodity name. Viewing records in large sets make it possible to recognize patterns, including those which pertain to commodities.

Managing Commodities in Navigocorpus

We deal with commodities and purposes in Navigocorpus in three different steps. The first is to identify the various types of cargoes. Figure 10 reproduces a real case. On 16 November 1794, a vessel named *Vierge de la Rose*, under the command of Captain Lastrado, entered Marseille with a cargo of oranges; two days later, *Germain* arrived at the same port with a cargo of “*oranges douces*” and “*oranges amères*” (sweet and sour oranges). Oranges, sweet oranges and sour oranges are treated as three different commodities. In recognizing and identifying commodities, we stick strictly to the source. Each commodity is identified by an arbitrary numeric identifier. For example, oranges are assigned the identifier 00000397, sweet oranges are assigned 00000398 and sour oranges are given 00000399.

| | | | |
|-----------|----|------------|----------------|
| Marseille | In | 1794=11=16 | Oranges |
| Marseille | In | 1794=11=18 | Oranges douces |
| Marseille | In | 1794=11=18 | Oranges ameres |

Figure 10: Recognizing Commodities

Source: See figure 1.

The second step is to name the commodities. Sources give commodity names in various languages. To facilitate the use of the database and make it as independent as possible from the user’s linguistic knowledge (few specialists on Mediterranean trade know Danish, for instance, but Danish consular records in the Mediterranean are indeed in Danish),²⁰ we give each commodity a standardized name. Given our purpose, we chose to use the name of the com-

²⁰Dan H. Andersen, “The Danish Flag in the Mediterranean: Shipping and Trade, 1747-1807” (Unpublished PhD thesis, University of Copenhagen, 2000).

modity in the most widely known language, English. We store translations in an independent file called “Dictionary Commodities.” Each commodity corresponds to a record in this Dictionary.

| Commodity identifier | Commodity (French) | Commodity (Dutch) | Commodity (Italian) | Vocabulary links | Commodity permanent coding | | |
|----------------------|--------------------|---------------------|---------------------|------------------|----------------------------|---------|---------------------|
| 0000011 | Household goods | Effets de maison | | Effetto | Household goods | 0000011 | I24Cxxxx-0000000000 |
| 0000012 | Piping | Pièce | | Pièce | Piping | | |
| 0000013 | Sundries | Divers, assortiment | | Varia | Varia | | I24Mxxxx-0000000000 |

Standardized commodity name (English) Commodity (German) Commodity (Danish) Commodity (Spanish) Link to Diem

Figure 11: Dictionary of Commodities

Source: See figure 1.

Each record consists of seven linguistic fields which store the name of the commodity in English, French, German, Dutch, Danish, Italian and Spanish, the languages in which data appear in Navigocorpus thus far. This Dictionary can be extended to an unlimited number of languages. A special routine makes it possible to localize in the database with a single click all the corresponding commodities starting from its name in any of these languages.

Each record in the Dictionary is automatically provided with a number when it is created which serves as the commodity identifier. A special field links the commodity record to the relevant entry in a Description file called “Diem” in which every commodity is described with all necessary details. Figure 12 gives an example of an entry for the item called Basil/Basane. All these fields may be filled at any moment, but the system works even with partial data. Commodities can be added to the cargo items table without being previously identified in the Dictionary, and a partial identification of the same in the Dictionary is enough to provide the cargo items table with the commodity identifier it needs to make queries.

| © CNRS | | Zoom | List | Related | Manual query | 1400 | 2 / 2 | |
|---------------|--|------|------|---------|--------------|------|-------|--|
| Entry context | Produit Basil / Basane | | | | | | | |
| Entry | Basil / Basane | | | | | | | |
| Description: | - "Basane, basil., sheep' skin, leather, basane . Peau de mouton tannée à la poudre de tan, employée en rjainerie, ameublement, cuirs pour chapeaux, reliure. . Basane chipée, ayant reçu l'apprêt dit chipage. . Basane alude, apprêtée à l'alun et teinte pour la reliure (Répertoire industries/4.548). | | | | | | | |

Figure 12: Example of a Product Entry in Diem

Source: See figure 1.

Translating items into English is the researcher’s task, but the internet has eased this considerably. Wikipedia, although no panacea, is a great help

because it usually provides an English entry for every piece of information and describes manufacturing processes with enough detail to make many identifications reliable. For more specialized vocabulary, we use special sources, some of which provide translations. The one we have found most useful is the *Répertoire technologique des noms d'industries et de professions*, published in 1909 by the French Ministry of Work and Social Care. It describes, lists and classifies not only occupations but also products. Although in French, it provides English and German translations of products and occupations.²¹

We insist that this is a task best left to experts rather than machines because it is far too complex and unpredictable. We tried to make it easier by creating a semi-automatic translation system based on existing cases as a guide for new translations. The “Vocabulary links” field included in figure 11 is part of this process. Technically, it works rather brilliantly, but we do not use it because practice showed that it was unnecessary. We still insert the necessary data into the “Vocabulary links” field in case we change our mind. But this increasingly looks unlikely.

What makes such a task tolerable, if time-consuming, is not automation but organization. Once a commodity has been identified and translated, it is done forever unless a more competent scholar wishes to correct inaccurate elements. Copying the identifier from the dictionary (figure 11) to the “Commodity identifier” field of the Cargo items table makes available all the information stored in the Dictionary. Changes, corrections and upgrades must be done in the Dictionary, which has a space reserved for the expert and makes it possible for laymen to take advantage of this work without having to acquire expertise. We maximize the benefits derived from specialization.

The third task is to classify the commodities. In Navigocorpus this is done in two complementary ways which try to reconcile the need for some form of standardization with the flexibility we believe individual researchers ought to have. The first of these classification schemes entails permanent coding. Thus far, commodities have been identified through an arbitrary digital identifier. We handle them as external objects without taking into account their intrinsic qualities. This is not satisfactory for a researcher, however. Amidst several thousand different items, most scholars are interested in broader categories. For this purpose, we need to equip data with more complex descriptors which embody their intrinsic qualities. The problem is that these characteristics are almost as numerous as researchers, each of whom perceives a commodity in a peculiar way according to his or her research objective. Moreover, re-

²¹France, Ministère du Travail et de la Prévoyance Sociale, Statistique Générale, *Répertoire technologique des noms d'industries et de professions français-anglais-allemands avec notices descriptives sommaires suivi des trois listes alphabétiques des noms allemand, anglais et français* (Paris, 1909).

searchers may see it differently if their question shifts. This means that the search for a universal descriptor can be worse than looking for the Holy Grail.

Nevertheless, the research community agrees that some descriptive factors are especially useful in a wide range of approaches. We chose, somewhat arbitrarily, to stress three of them: raw material, manufacturing process and main uses of the end product. We elaborated a code in three parts, based on the sequence `xx-xxxxxx-xx-xxxxxx-xxxx`, in which the first two parts describe the raw material, the second and third the manufacturing process and the last its uses. We call this coding sequence “permanent coding” and store it in a special field of the dictionary of commodities. Each of the three segments is ordered hierarchically from left to right, with the broadest term on the left and the narrowest on the right. This allows hierarchical queries: finding all the objects belonging to the same broad class and then introducing more subtle differences. We based our classification upon the *Repertoire technologique* discussed above.

The system is complex, but it introduces an efficient order to a far more complex world. It immediately allows researchers to find all agricultural products used as food and to compare them with those used as fodder, to find all industrial products made of iron, and so on. This process is still provisional and needs to be tested in real research situations by the broader research community. The main point in its favour is that in spite of its complexity, it works. But we are perfectly conscious that it does not solve every problem. On the specific issue of commodities, we need a broader international discussion.²²

Permanent coding is perforce an objectification. Although the three-segment architecture and hierarchical structure make flexible queries possible and allow us to cope with a high degree of uncertainty, this solution still cannot solve the problem of the infinite number of possible descriptions which are the necessary consequence of a research approach – and which are different from an administrative approach that arbitrarily reduces this infinity to an imposed-from-above unity. A researcher needs to be able to create artificial groupings and classes to test their heuristic value.

To make this possible, Navigocorpus offers a special “on-the-way” coding field. Users are able to mark as many records of the Commodities dictionary as they like with as many freely chosen markers as they think proper,

²²The need to discuss and coordinate on this issue was underscored by a session on “Commodity Chains in the First Period of Globalization,” organized by Werner Scheltjens at the Ninth European Social Science History Conference, Glasgow, 11-14 April 2012. Participants are involved in different projects, use various sources for different goals, come from a variety of fields and utilize diverse methodologies, but all are linked by the common problem of dealing with a great variety of items. Jean-Pierre Dedieu and Silvia Marzagalli presented the classification system of commodities used in Navigocorpus; see http://landaverde.academia.edu/SilviaMarzagalli/Papers/1680921/Dealing_with_commodities_in_Navigocorpus_Offering_tools_and_flexibility.

to use and combine them to explore any possible question, and to delete and modify them freely. We have used this procedure in other databases with great success. Researchers interested in late eighteenth-century exports from Bordeaux, for instance, might want to label sugar, coffee and indigo as “colonial goods” but wine and wheat as “regional products.” In this case, they replace “xxx” in the “on-the-way” field with their own terminology. Moreover, this on-the-way coding field makes it possible to combine criteria not exclusively connected to commodities. By adding an unlimited number of on-the-way labels, the user might, for instance, define a set of broader categories (“colonial goods,” “North Sea registered ports,” “spring departures,” etc.) if this seems useful.

Working with Navigocorpus: Present Features and Future Developments

As we have indicated, a uniform identifier links data from different auxiliary tables to the main database.²³ This feature greatly facilitates the exploitation of data. In addition to the more traditional analytical perspective of the quantification of ship movements and tonnages, or to the delicate problems related to commodities, various alternative perspectives of looking at shipping and trade become feasible. In this section we will briefly discuss three and point to the added value of their use: the possibilities of tracking ships, captains and individual voyages; the opportunity to track commodity distribution patterns; and the option of generating ton-kilometre estimates of volumes shipped.

Identifying Ships, Captains and Individual Voyages

Numerous historical tales provide examples of individual ships or masters and their respective movements. These often serve a dual purpose: on the one hand, they provide evidence of the effect of political or economic circumstances on shipping,²⁴ while on the other they add a welcome “story” element to otherwise dry accounts. It is problematic, though, to generalize from these. Navigocorpus can help to rectify this because the individual voyages of ships and captains can be traced simultaneously through a multitude of sources. It is possible, for instance, to track all the voyages in the database for any given vessel. One of the ships found at Sables d’Olonne, for instance, was the sixty-

²³For a more extensive account of the structure, see Dedieu, Marzagalli, Pouchasse and Scheltjens, “Navigocorpus: A Database for Shipping Information.”

²⁴See, for example, W.G. ’t Hart and P.C. van Royen, “Het smakschip ‘De Neufville Van der Hoop:’ een onderzoek naar de rendabiliteit van de Nederlandse vrachtaart in de achttiende eeuw,” *Economisch- en sociaal-historisch jaarboek*, XLVIII (1985), 150-168.

five-tonneaux *Notre Dame des Carmes* of Argenton under Captain Nicolas Page. The information in Navigocorpus shows that Captain Page left St. Malo in February 1787 in ballast for Bayonne but stopped at Sables to load salt. It took more than four months from the departure from St. Malo to the departure from Bayonne, but less than three weeks to clear from Le Havre to Brittany, after which we lose track of *Notre Dame de Carmes* (see table 5).

Table 5
Clearances of *Notre Dame des Carmes*, 1787

| Date of Clearance | Burthen (tonneaux) | Clearing from | Destination | Cargo Items |
|-------------------|-----------------------|-----------------|------------------------|------------------|
| 13 February 1787 | 65 | St. Malo | Bayonne | Ballast |
| 22 March 1787 | 60 | Sables d'Olonne | Bayonne | Salt |
| 22 June 1787 | 65 | Bayonne | Le Havre | Chocolate, resin |
| 10 July 1787 | 65 | Le Havre | Rouen | |
| 28 July 1787 | 65 | Rouen | Bervra [Aber Vrach] | |

Source: See figure 1.

To facilitate the search for captains and ships, we provide each vessel and master in Navigocorpus with an identification code. We attributed the same code when we believed that we were dealing with the same ship or the same person. This process has to be done manually by taking into account a variety of parameters (flag, rig, burthen, ship name, port of registry, captain's name, captain's place of origin, dates, distances and so on). It is rare that all these parameters are provided in each of the sources which register the passage of the vessel at various points at different moments. One of the added values of identification is that it makes it possible to add missing information to existing data. A brig which leaves port A for port B and for which the flag or the burthen is unknown, and which enters port B a few days later under the British flag as a 120-ton brig, having similar ship and captain names, can be assumed to be the same ship. In this instance, data on its burthen and flag are attached to the first record in square brackets that identify their additional characters.

Although this process is time consuming, we believe that it transforms the database into an extremely powerful tool that goes far beyond the scope of providing easy access to transcribed sources. The information we gathered from the G5 sub-series makes it possible to reconstruct ship itineraries. Figure 13 shows the itinerary of *Maréchale* (or *Marquise*) *de Mailly* from three different sources.²⁵ The various sources gave the captain's name as "Raimond

²⁵Archives départementales des Bouches-du-Rhône, 200 E 543 (steps 1 to 4); AN, G5 149-2/4132 (step 5); and AN, G5 100/4160 (steps 6 and 7).

Frere,” “Raymon Frere” and “Raymond Isidore frère.” The Health Office in Marseille gave the vessel as a brigantine, whereas in the G5 sub-series there is no rig, but the burthen is given (140 *tonneaux*). The decision that this is the same vessel in this case relies on the similarity of the names of the ship and the captain and on the consistency of the itinerary over time.

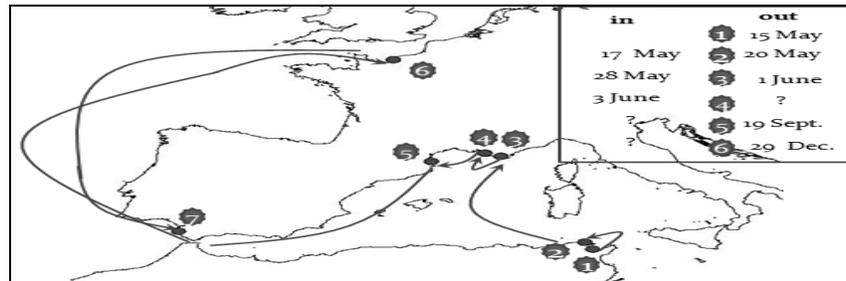


Figure 13: Itinerary of *Maréchale de Mailly*, 1787

Source: See figure 1.

Another example illustrates the obvious added advantage of identification to complete missing information in a given source, such as the Sound Toll Registers. Navigocorpus contains three documentary units on what is apparently the same ship with the same captain. As this ship passed the Sound four times in 1787, it is also recorded in the Sound Toll Registers Online.²⁶ Captain Rienk Jans crossed the Sound eastwards on 5 May and again on 18 October 1787, declaring both times that he was coming from Bordeaux and bound for Riga. But nothing in the Sound Toll database allows us to learn that this is one and the same person or that this is the same Captain Rinck Janz and Rink Jansz who sailed through the Sound westwards on 11 July and again on 28 November coming from Riga and bound for Bordeaux. Given that the Sound Toll Registers do not provide the name of the ship or its rig, the identification of captains and ships is almost impossible without recourse to other sources. The G5 sub-series provides a much denser set of information which makes identification of both captains and ships possible.

But there is more: the similarities and differences between the voyages of many individual masters can also be compared and assessed. Thus, the limitations of individual examples are overcome, and the study of populations of masters and their respective voyage patterns emerges as a powerful alterna-

²⁶<http://www.soundtoll.nl/>, accessed 1 March 2012.

tive to mainstream quantification.²⁷ Without the identification of ships and masters, this would be impossible.

Table 6
Clearances of *Femme et enfants*, 1787

| Ship Name | Captain | Burthen | Clearing from | Bound to | Date of clearance | Source |
|----------------------------|---------------|---------|---------------|----------|-------------------|-----------|
| <i>Femme et enfants</i> | Zantz, Rincke | 180 tx | Dunkerque | Bordeaux | 1787-02-27 | AN, G5-74 |
| <i>Femme et enfans</i> | Janz, Rinek | 161 tx | Bordeaux | Riga | 1787-04-02 | AN, G5-50 |
| <i>Femme et les enfans</i> | Janz, Ryenek | 161 tx | Bordeaux | Riga | 1787-09-03 | AN, G5-50 |

Source: See figure 1.

Table 7
Average Man/Ton Ratios for Ships Clearing Bordeaux, 1745, by Registered Port

| Registered Port | Average Man/Ton Ratio | Average Tonnage | Average Crew | Number of Records |
|-----------------|-----------------------|-----------------|--------------|-------------------|
| Lübeck | 5/100 | 193.70 | 9.27 | 30 |
| Amsterdam | 6/100 | 148.06 | 8.13 | 68 |
| Flensburg | 6/100 | 157.86 | 8.50 | 14 |
| Rotterdam | 6/100 | 137.78 | 7.76 | 37 |
| Bremen | 6/100 | 164.38 | 8.88 | 16 |
| Danzig | 6/100 | 163.00 | 9.29 | 28 |
| Stockolm | 6/100 | 139.73 | 8.09 | 11 |
| Zierikzee | 6/100 | 140.52 | 8.19 | 21 |
| Copenhagen | 6/100 | 154.05 | 8.63 | 19 |
| Hamburg | 7/100 | 248.86 | 14.18 | 22 |
| Brest | 11/100 | 60.81 | 6.33 | 21 |
| Le Conquet | 12/100 | 49.63 | 6.05 | 24 |
| Saint-Brieuc | 12/100 | 53.55 | 6.15 | 55 |
| Landerneau | 13/100 | 43.07 | 5.29 | 14 |

²⁷An example of this perspective can be found in Werner Scheltjens, "The Influence of Spatial Change on Operational Strategies in Early Modern Dutch Shipping: A Case Study of Dutch Shipping in the Gulf of Finland and Archangel, 1703-1740," *International Journal of Maritime History*, XXIII, No. 1 (2011), 115-147.

| Registered Port | Average Man/Ton Ratio | Average Tonnage | Average Crew | Number of Records |
|------------------------|--------------------------------------|----------------------------|-------------------------|------------------------------|
| (blank) | 13/100 | 68.94 | 7.82 | 17 |
| Camaret | 13/100 | 38.10 | 4.90 | 10 |
| St. Malo | 13/100 | 74.23 | 13.23 | 13 |
| Aber-Ildut | 14/100 | 38.08 | 4.99 | 92 |
| Argenton | 14/100 | 41.53 | 5.36 | 47 |
| Port Louis | 14/100 | 54.20 | 7.90 | 10 |
| Morlaix | 14/100 | 53.82 | 6.09 | 11 |
| Brehat | 14/100 | 35.65 | 4.94 | 17 |
| Port-Launay | 15/100 | 36.73 | 5.09 | 11 |
| Noirmoutier | 16/100 | 32.20 | 4.89 | 20 |
| Île d'Arz | 16/100 | 30.97 | 4.65 | 31 |
| L'Isle Dieu | 16/100 | 36.96 | 4.91 | 113 |
| Plassac | 18/100 | 28.84 | 4.43 | 89 |
| Bordeaux | 19/100 | 95.70 | 15.44 | 176 |
| Saint-Martin-de-Ré | 19/100 | 21.43 | 4.00 | 14 |
| Roque de Thau | 24/100 | 20.06 | 4.11 | 18 |
| St. Gilles | 25/100 | 20.83 | 4.09 | 12 |
| Arcachon | 27/100 | 19.91 | 4.45 | 32 |
| Blaye | 39/100 | 16.42 | 4.08 | 12 |
| Quiberon | 50/100 | 10.58 | 4.05 | 19 |

Source: See figure 1.

The second alternative perspective facilitated by Navigocorpus is the tracking of commodity distribution patterns. A particular feature of the database management system is that it allows researchers to explore the entire data collection by taking one or more commodities as a starting point. As explained above, all the commodity data in Navigocorpus, stored in its original language and spelling, are provided with a unique identifier which relates to a multilingual thesaurus of commodities. The database can be approached directly from the thesaurus. A query for a specific item, or group of items, will return all corresponding instances in Navigocorpus. These can be explored further in a variety of ways. Within the limits of the original data sources, it is possible to aggregate the movements of ships carrying a particular commodity. While such quantification certainly has its merits, different research questions may help to circumvent the issue of the comprehensiveness of the data and may lead to more satisfactory results. A query on the size of the crew versus the estimated volume of shipping leaving the port of Bordeaux in 1745, for example, reveals that the average man/ton ratio of French ships leaving Bordeaux for destina-

tions in Europe (table 7) was twice that of Dutch vessels active in the same geographic realm. Crew sizes of French ships leaving for the West Indies were, of course, different, and so are the crew sizes of ships active in the *cabotage*. An explanation of the differences in man/ton ratios lies well outside of the scope of the present article. Nevertheless, the data collected in Navigo-corporus offers a wealth of new, unexplored research materials that may confirm or alter our understanding of crew sizes and man/ton ratios.

While table 7 gives a general impression of the average crews on ships leaving the port of Bordeaux in 1745, it is worthwhile to mention that these may mask significant differences in vessels with the same registered port. It is a well-established notion in the literature that crew size depends on destination, but for the most part the available data only cover broadly defined regions.²⁸ In table 8, differences in crew size according to destination are shown for vessels registered at Bordeaux. It is evident that the man/ton ratio masks a complex interplay of factors influencing the size of a crew. Ships bound for Brest, for example, had a lower man/ton ratio than those headed for Nantes, while in fact the actual crew size differed by only one person. The six ships that went to Brest in 1745 were almost double the size of the thirty-two that went to Nantes. Was there a critical size above which vessels became significantly more efficient in terms of crew size? Whatever the answer, the detailed accounts of shipping that can be traced in Navigo-corporus will open the researcher's eyes to many phenomena in the world of shipping.

Other query options that might generate interesting results compare the commodity distribution patterns of various ports. Coffee, for example, arrived in Europe in a number of different ports. A simple query procedure reveals that each served its own market; that is, the distribution patterns overlap only partially. Especially compared with the Sound Toll Registers, the distribution patterns of coffee around the European coast reveal interesting patterns. Again, this is not the place to go into detail about these patterns or to attempt to explain them, so we will focus on the value added by Navigo-corporus. While the Sound Toll Registers are a great tool for the reconstruction of shipping between the Baltic and the rest of the world, the data in Navigo-corporus provide different geographical perspectives. For example, Navigo-corporus contributes to the reconstruction of the distribution patterns of coffee from the French Atlantic coast and offers valuable information about the distribution of coffee from Copenhagen to the Mediterranean, an area where Danish shipping

²⁸See, for example, Matthias van Rossum, Lex Heerma van Voss, Jelle van Lottum and Jan Lucassen, "National and International Labour Markets for Sailors in European, Atlantic and Asian Waters, 1600-1850," in Maria Fusaro and Amélia Polónia (eds.), *Maritime History as Global History* (St. John's, 2010), 47-72.

boomed in the second half of the eighteenth century.²⁹ Seen from Bordeaux, however, the Baltic was only one possible destination for coffee; indeed, Bremen and Hamburg were considerably more relevant as markets.³⁰ But in combination with the previous example, in which commodity distribution patterns were compared with shipmasters' domiciles, this analytical perspective puts the researcher on the track of finding specialization patterns in maritime transport.

Table 8
Man/Ton Ratio of Bordeaux ships Clearing in 1745 by Destination

| Destination | Average Man/Ton Ratio (000 Tons) | Tonnage | Crew | Number of Records |
|--------------------|--|---------|-------|----------------------|
| Dublin | 7/100 | 146.86 | 11.83 | 7 |
| Killebeg | 7/100 | 85.00 | 6.00 | 1 |
| Brest | 9/100 | 70.83 | 6.00 | 6 |
| Cork | 9/100 | 86.50 | 8.00 | 2 |
| Lorient | 11/100 | 75.50 | 8.00 | 6 |
| Redon | 13/100 | 45.67 | 5.67 | 3 |
| Bilbao | 14/100 | 37.00 | 5.00 | 1 |
| Nantes | 14/100 | 38.66 | 4.97 | 32 |
| Cayenne | 17/100 | 188.00 | 29.50 | 2 |
| Martinique | 17/100 | 199.17 | 33.82 | 30 |
| Rochefort | 17/100 | 37.86 | 5.71 | 7 |
| Marans | 17/100 | 26.00 | 4.50 | 2 |
| Cap-Français | 19/100 | 225.00 | 40.00 | 3 |
| Québec | 19/100 | 130.00 | 25.00 | 1 |
| Guadeloupe | 19/100 | 155.00 | 30.00 | 1 |
| Vannes | 20/100 | 25.00 | 5.00 | 1 |
| St. Domingue | 21/100 | 251.44 | 47.22 | 18 |
| Saint-Martin-de-Ré | 25/100 | 13.75 | 3.50 | 4 |
| La Rochelle | 26/100 | 18.51 | 3.73 | 41 |
| Le Chapus | 33/100 | 12.00 | 4.00 | 1 |
| Oléron | 33/100 | 12.00 | 4.00 | 3 |
| Mussel fishing | 46/100 | 9.33 | 3.33 | 3 |

Source: See figure 1.

²⁹Andersen, "Danish Flag."

³⁰Unlike the Sound Tolls, which required a detailed list of cargoes, the French Admiralty was not very interested in the nature of cargoes when assessing a *congé*. Consequently, information on cargoes in the sub-series G5 is extremely general. While the Sound Toll Registers Online includes 131 ships from Bordeaux bound for Baltic ports with coffee in 1787, Bordeaux's *congés* in Navigocorpus mention coffee for only thirty vessels in total; twelve were bound for Hamburg and nine for Bremen, while only six sailed into the Baltic.

The third alternative analytical perspective provided by Navigocorpus requires significant preparation. We talk about the possibility of generating estimates of tons/kilometre using a tailor-made procedure for the conversion of pre-modern weights and measures to their metric equivalents. While time consuming and inescapably connected with mistakes in conversions, this type of query may bring analysis to a different level since it makes the data comparable with similar measures for other time periods. The details of the procedure have been described elsewhere in great detail.³¹ What is important is that conversion to a ton/kilometre estimate requires the combined use of the thesaurus of commodities, the thesaurus of weights and measures and the database of geo-references. This can be done in a number of ways, depending on the goal. In the essay that describes the various steps in detail, an attempt was made to come up with a new estimate of the volume of Baltic shipping in the late eighteenth century. But not all research goals have to be on the macro-level. Given the variety of sources – each with its own density – Navigocorpus probably is even better suited to conversions on a smaller scale, such as to compare the maritime activities of two different regions or even of two different places on a ton/kilometre basis.

Conclusions

Conceiving Navigocorpus and producing it over the past four years was a fascinating, unforgettable collaborative experience. In the end, we believe that we have developed an extremely powerful database with great flexibility and a number of user-friendly tools which make Navigocorpus something more than a simple storage medium for transcribed information derived from different sources. We intend to pursue our work on the database and to integrate more databases and sources. We remain at the disposal of scholars to explain to them how to use Navigocorpus. If Navigocorpus expands as we envision, we will soon reach a point where we will need to expand our team. If we had a dream, it would be to work together to merge and connect the different databases discussed in this forum into one common database. We believe that the structure of Navigocorpus can cope with such a challenge.

³¹Werner Scheltjens, “The Volume of Baltic Shipping at the End of the Eighteenth Century: A New Estimation Based on the Danish Sound Toll Registers,” *Scripta Mercaturae*, XLIII, No. 1 (2009), 73-99, appendices. See also http://www.rug.nl/staff/w.f.y.scheltjens/SHEL TJENS_product-measure-origin_CONVERSION.pdf.