# **RIBBONS OF VISIBLE AIR**

by

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### ABSTRACT

*Ribbons of Visible Air* is a work of about twenty minutes duration for soprano saxophone, violin, cello, piano, one percussion, and live digital sound processing. Though the work unfolds as one continuous movement, it is conceived as being in several sections, each lasting from approximately one to four minutes. The primary ideas behind the form of *Ribbons of Visible Air* originate in the concerto principle (with the saxophone in the role of soloist) and variation technique; these ideas influence not only the large-scale form, but also the organization of material in respect to the different instruments and the relationship of the ensemble as a whole to the electronic processing. This composition explores a number of harmonic techniques related to the harmonic series, as well as the rhythmic possibilities inherent in multiple levels of pulsation. Of particular relevance to this work is the incorporation of extended techniques of the soprano saxophone, especially the alteration of pitch and timbre through unorthodox fingering patterns.

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### **1. INTRODUCTION**

#### **1.1 History of this project**

The idea of composing an extended work for soprano saxophone and a group of supporting instruments dates back to 1994. My own new music ensemble shared a concert at the Calgary International Jazz Festival with Vancouver saxophonist and clarinettist François Houle; François had recently returned from studies in England with the British saxophonist Evan Parker. Parker is a pioneer in extended techniques on the saxophone, and has developed a particular mode of improvisation based on circular breathing, over-blowing, and unconventional venting.<sup>1</sup> (The last of these techniques is a point of departure for my own development of unorthodox saxophone fingerings, and is described in subsequent sections of this paper.) François has mastered these techniques, and developed a number of improvisations of his own that explore transformations of a single gesture over long stretches of time. I was fascinated by the incredible harmonic subtlety of these pieces, as well as excited by the virtuosity of this particular style of playing.

In 1995, as I began my studies at the University of British Columbia, I approached François with the idea of composing a concerto-like work for soprano saxophone, ensemble and possibly live sound processing. As he was looking for new repertoire for his Standing Wave ensemble (saxophone/clarinet, violin, cello, piano, percussion), we agreed upon this instrumentation. Later that year, we met and discussed some of the extended techniques that he had learned from Evan Parker; he showed me the technical means for producing these unusual sounds, and we further discussed the tremendous compositional possibilities for someone willing to analyze and notate the results of venting

<sup>&</sup>lt;sup>1</sup> Examples of these techniques can be heard on Parker's recording *Conic Sections* (Parker, 1989).

certain fingerings and fingering patterns.

In the summer of 1996 I spent a great deal of time experimenting with new fingerings, finally settling on two sets of fingering variations that became the starting point for *Ribbons of Visible Air*. I worked on the composition through 1997; in the spring of 1998 an abbreviated version of the work was performed by the Standing Wave ensemble as part of the Vancouver New Music Festival. The unique opportunity of hearing the work in progress has allowed me to receive a variety of useful comments from the performers and others who heard the work-in-progress, and to fine tune a number of aspects of the work.

#### **1.2 Conception of the piece**

The title *Ribbons of Visible Air* stems from a mental image I have of long, colourful ribbons of sound streaming from the bell of the soprano saxophone. The piece is scored for soprano saxophone, violin, cello, one percussion and piano, with live digital signal processing of all of the instruments. The duration is approximately twenty minutes, with a degree of variability should the saxophonist choose to extend the cadenza.

The uniqueness of the technique required and the recognition of the saxophone as the core of the ensemble suggests a sort of concerto-like piece, with contrasting passages of rapid arpeggiation and resonant lyricism. The subtle harmonic transformations of repeated material suggest a variation form, but one in which a variety of musical ideas can be explored, including timbre, rhythm, register, and texture (especially the relationships between the different instruments comprising the ensemble). Further, the combination of extended techniques and sound processing conjure a unique world of sound.

#### **1.3 Why this piece now?**

A doctoral thesis seems an appropriate vehicle for a large-scale work that is simultaneously a culmination of many years of study and an indication of a number of new directions to pursue. Over the last fifteen years I have written several works for saxophone (not surprisingly, as it is my own first instrument), including three saxophone quartets, a handful of solo pieces (one for saxophone and live processing), and a small number of chamber works requiring a saxophonist. My strong sense of the capabilities of the instrument (both musical and technical) and my new understanding of methods of extending the instrument's sound world help make this piece a significant contribution to the repertoire for the instrument.

Further, I have since 1985 composed several works for tape alone, instruments and tape, and most pertinently here, instruments with live processing, including works for trumpet (*Helix I*, 1986), cello (*All of My Sleep is Dreaming*, 1991), and chamber ensemble (*South and West*, 1995, for clarinet, viola, piano, percussion, and processing). The use of new technology to broaden the palette of the chosen instrument(s) timbrally and polyphonically has become an element of my own musical language. The electroacoustic extension of the ensemble in this work represents my most ambitious integration of sound processing and instrumental writing.

# 2. COMPOSITIONAL MATERIAL AND METHOD

#### 2.1 Harmony

As an undergraduate, I experimented with different systems designed to organize or even generate pitch material for compositions, ranging from diatonic and whole-tone modes to symmetrical intervallic structures and nondodecaphonic serialism. The most successful pieces, in my opinion, are those in which I allowed myself to be less systematic in approach, those in which I relied more heavily on my ear as both the initial and ultimate arbiter. By trial and error, I think I have become more aware of consonance and dissonance within a given harmony or even unpitched sound as principally acoustical phenomena, and have thus endeavoured to be more considerate of the degree of tension and complexity of acoustical relationship in a given sound or succession of sounds.

In 1989, I came across the music of the French school of spectral composition, and since that time nearly all of my harmonic thinking has been founded on spectral relationships. Composers such as Tristan Murail (*Memoire/Erosion, Gondwana*), Gérard Grisey (*Partiels*), and Kaija Saariaho (*Nymphea*) have followed a method of deriving harmonic material from the computer-aided spectral analysis of acoustic sound. By this method, spectral analyses (including both harmonic and non-harmonic overtones) are translated into chord structures which include a large number of pitches, some of which are in fact microtonal. These relatively stable harmonies are then distorted as one chord structure evolves into another.<sup>2</sup> The result is most often a highly complex and dissonant harmonic language which is mediated by moments of harmonic-series consonance; while I was intrigued by the fine control of consonance and dissonance in these works, I felt that in my music a simpler method would be more flexible and expressive.

In my own work since that time, I have tended to form melodies and harmonies by one of two methods (or more often, a combination of both methods): by modalizing the harmonic series and progressing through a succession of fundamentals, or by combining notes from two overtone series.

<sup>&</sup>lt;sup>2</sup> For a detailed introduction to spectral composition, see the article by François Rose (Rose, 1996).

*Ribbons of Visible Air* utilizes both of these techniques. Additionally, I have explored a third technique in this piece wherein some of the notes of a given harmonic series are altered by semi-tone, creating a broader palette of harmonic possibilities. I will call these three techniques (respectively) spectral modalization, spectral combination, and spectral alteration.

Spectral modalization is the simplest of these three techniques, involving the creation of a diatonic mode from the first thirteen harmonics of a given fundamental (I have adjusted the seventh and eleventh harmonics to fit into the chromatic scale):<sup>3</sup>





This scale has been called the Lydian/Mixolydian mode due to the raised fourth and lowered seventh degrees (as compared to a major scale), and has been used by composers such as Béla Bartók. Many melodic passages in *Ribbons of Visible Air* are created using this mode; I tend to conceive of these melodies as arpeggiations of the upper notes of the harmonic series.

Spectral combination involves the selection of (some or all) pitches (or pitch classes) from harmonic series built up from two different fundamentals. In its strictest application, the pitches would retain the relative registral spacing of

<sup>&</sup>lt;sup>3</sup> Interestingly, string and wind players often adjust the intonation of these pitches to more closely approximate the appropriate overtone in the harmonic series.

the harmonic series:

Figure 2: Spectral combination



A more flexible approach to chord creation involves the simultaneous application of spectral modalization and spectral combination. Here the register of the individual harmonics is not always respected; the combination of two series with different fundamentals results in what could be termed a form of polymodality.

Having many "chord tones" to choose from leaves me a great deal of freedom to sculpt harmonies according to ear while providing a larger framework upon which the long-term harmonic motion of the piece can be strung. This framework usually amounts to a progression of harmonic fields, each based on the combination of two different fundamentals, as can be seen in Figure 3. In this series of chords, pitch classes common to both fundamentals are indicated with white note heads, pitch classes unique to one harmonic series or the other are indicated with black note heads:



As is evident, common tones between the two harmonic series allow for an ambiguity as to which of the fundamental tones is most dominant at any one moment. The degree to which the registration of the resultant chord resembles a harmonic series influences its tonal stability; in Figure 3, the second and fourth chords are more stable by virtue of their registration. Further, harmonic direction can be initiated by the gradual emphasis of one or the other series, as well as by large-scale patterns (perhaps a step-wise succession of fundamentals or succession of sharp-side/flat-side "modulations").

Spectral modalization/combination is not limited to harmonic fields. Below is an example of a melodic gesture in which two fundamentals are implied:

Figure 4: Melodic spectral combination



In this example the melody fluctuates between overtones of C and E; the middle measure is ambiguous as to which note is the true fundamental. The excerpt "resolves" to a C fundamental in the third measure.

The third harmonic technique employed in *Ribbons of Visible Air* is that of spectral alteration. This is a rather simple technique, amounting to the alteration by semi-tone of one or two of the notes of the harmonic series to create a different mode. In all instances, the resulting set of pitches is diatonic in nature. When using this technique, I have been more inclined to retain a semblance of fixed register to preserve the sense of overtone relationship between different notes of the chord. In Figure 5, the chord is derived from the harmonic series on C, with the seventh harmonic raised to B natural. The modalization of the resulting set of pitches would yield a pure Lydian mode, but the registration implies C as a fundamental:

Figure 5: Spectral alteration



A further influence on harmonic structures in this work is the application of sound processing, specifically the harmonization of sustained pitches at a particular interval of transposition. Where electronic harmonization is employed, chords must be formed in consideration of the harmonized outcome. Figure 6 illustrates this concern:



The pitches and spacing of the first chord imply a fundamental of A natural. The second chord takes the first chord and harmonizes it a perfect fifth lower,<sup>4</sup> resulting in a strong implication of D as the fundamental (the C# could be accounted for as either a spectral alteration [C becomes C#] or as a combination of A and D harmonic series). The third chord in Figure 6 is the first chord harmonized a minor seventh lower, strongly implying B as the fundamental. Harmonizations at other intervals would result in more dissonant combined spectra.

In *Ribbons of Visible Air*, the specific harmonic fields and progressions are also heavily influenced by investigations into the harmonic results of venting the side keys on the saxophone. The specific pitch classes produced by the first set of alternate fingerings are B, C#, and D (concert A, B, and C), while the second set of fingerings yields A, B, C# and D (concert G, A, B, and C). (The timbral and microtonal inflection of the two sets of pitch classes is not the same.) While spectral combination and spectral alternation allow a wide variety of chord structures using these pitch classes, the most prominent fundamentals in the work are F and G. The specific melodic gestures and harmonic structures created out of the alternate fingerings will be discussed in detail later in this paper.

<sup>&</sup>lt;sup>4</sup> Pitches are nearly always harmonized downwards so as to preserve audio quality.

### 2.2 Rhythm

Apart from a few experiments with spatial notation, my rhythmic language has been evolving over the last several years towards a flexible system that allows passages of clear metrical pulse, passages in which no pulse can be readily detected, and transitional passages from one of these rhythmic identities to the other. The principal features of my rhythmic language are a potential obscuring of the underlying pulse through a variety of compositional techniques and a reliance on characteristic motives and gestures that complement other aspects of my musical style.

For the most part, my recent compositions rely on a relatively slow underlying pulse that governs the surface-level rhythmic activity. This underlying pulse is often obscured in one (or more) of three ways: irregular subdivision of a beat or at a level higher than a single beat (eg. half note triplets), the use of ties to avoid regular articulation of the beat, and the articulation of multiple pulse streams<sup>5</sup> that vie for perceptual prominence with the underlying pulse. Figure 7 illustrates how these three techniques can be easily combined:





<sup>&</sup>lt;sup>5</sup> I have adopted this term coined by John Roeder (Roeder, 1994).

In Figure 7, a quarter note pulse is established in the lower voice (and on a higher level, a half note pulse on beats two and four), while the upper voice features a triple sub-division of the half note pulse (asynchronous with the lower voice).

On the simplest level, the idea of multiple pulse streams may be applied to sub-divisions of a dominant pulse (eg. triple and quintuple divisions of a quarter note beat), and may occur simultaneously (usually in different instruments, creating a polyrhythmic effect) or consecutively (in the same instrument, suggesting a sort of tempo modulation). Perhaps more interestingly, contrasting pulse streams may operate at or above the beat level (as illustrated by Figure 7); this state might be more clearly described as multiple tempi, as the notated pulse is only one of two or more audible currents of rhythmic regularity. Individual instruments may delineate their own unique pulse stream, shift between one pulse stream and another, or combine with other instruments to articulate a pulse stream: in Figure 8, the vibraphone and piano maintain steady and consistently articulated pulse streams, while the saxophone and strings articulate only certain beats of their respective pulses, and in the case of the cello, switch from one pulse stream to another. More complex possibilities include the initiation of a pulse stream on a sub-division of a beat, or pulse streams that go in and out of phase with the underlying pulse. This method can be traced back to medieval music, and profoundly influences the music of such diverse twentiethcentury composers as Schönberg, Takemitsu, and Carter. I first (consciously) experimented with this particular technique in The Clocks of the World (1989), where the three instruments (piano, harp, and guitar) actually play at different notated tempi. Later pieces adhere to one notated tempo, with a high degree of syncopation and often irregular subdivisions of the beat.



Another aspect of my rhythmic language is the employment of frequent changes of meter; these changes of meter are predicated by a change in harmony, the rearticulation of a low fundamental, a shift of pulse streams, or other important musical event. Metrical changes rarely disturb the underlying quarter note pulse (meters are usually restricted to 2/4, 3/4, 4/4, 5/4, and 6/4); a change of meter simply places an accent on the downbeat of the measure. The regularity of the quarter note pulse (a pulse stream in itself) is thus contrasted by the irregularity of metrical downbeats; I believe the tension resulting from this contrast creates rhythmic interest on a deeper structural level than the multiple

pulse streams described above.

Characteristic motives are also of importance to my rhythmic language. In this work, the rhythmic identity of the seminal gestures is crucial to the understanding of the form as a whole. The specific nature of these gestures and their formal significance will be described later as part of the formal analysis of the work.

In a certain sense, there is a comfortable correspondence between my rhythmic and harmonic languages in the coexistence of multiplicities: tempi and harmonic centres respectively. In both domains, passages of ambiguity and complexity can be contrasted with passages of clarity and simplicity that focus on one pulse stream or fundamental. Further, a counterpoint is created between the two domains, i.e. the instability created by multiple pulse streams can be balanced by a relatively simple harmonic structure.

#### 2.3 Timbre and instrumentation

I have composed works for a wide range of instrumental combinations, from solo pieces and tape compositions to orchestral and choral pieces. In many works, it has been essential to choose an instrumental combination that well suits the musical ideas. In other pieces the opposite is true; idiomatic or unique ways of achieving interesting timbres on an instrument have directed the development of musical ideas. Given the challenges of live processing and unique nature of the saxophone writing in this work, a chamber ensemble seemed the best vehicle for the particular ideas outlined above.

The specific instrumentation for *Ribbons of Visible Air* was largely dictated by the make-up of the Standing Wave ensemble: saxophone/clarinet, violin, cello, piano, and percussion. My approach to this ensemble divides the

instruments into three groups: the saxophone soloist, the strings, and the percussive instruments. (Most of the percussion part is for vibraphone, with the occasional use of tuned gongs.) The pairing of the strings, as well as the piano and percussion, creates opportunities for heterophonic realizations of musical gestures.

As indicated earlier, while much of the saxophone part in *Ribbons of* Visible Air lies within the realm of traditional technique, I explore some of the harmonic and gestural possibilities of extended techniques on the instrument. The inspiration for this exploration is the improvisation technique of British saxophonist Evan Parker. Parker's technique centres around rapid arpeggiations of more or less traditional harmonies (eg. different varieties of triads and seventh chords). By holding open a particular key or keys (venting), the arpeggio is altered in an unpredictable way. A new harmony of incidental overtones and microtones is created by the unconventional fingering patterns. What was of particular interest to me was the predictable microtones and changes of instrumental colour that are created by unconventional fingerings, and how these might be reconciled with my harmonic thinking in general. The two sets of fingerings I decided to use are similar in that they both vent the instrument's side keys; the sustained fingerings are different (G and F# respectively). The timbre of the alternate fingerings is rather muted; the amplification of the instrument is particularly helpful in making audible the subtle changes of timbre and harmonic inflection.

While the saxophone almost invariably takes a leading melodic role in the piece, the percussion and piano are rather restricted in function to accompaniment-like repeated patterns, flowing arpeggiations of the harmony, and short melodic interjections (especially when the saxophone and strings are sustaining longer notes). The string instruments exhibit a wider functional range within the ensemble, occasionally offering harmonic support through pedal tones or arpeggiation, elsewhere taking on a more contrapuntal role.

## 2.4 Sound processing

My earliest works with live processing are now largely unperformable due to the obsolescence of the sound processing equipment required. In addition, some of the processes stipulated are so clichéed as to render the composition somewhat anachronistic. To remount these pieces today would require a degree of rethinking of the sound processing; in one or two cases, the piece would need to be composed again from scratch.

The sound processing set-up in *Ribbons of Visible Air* requires that each instrument is microphoned and routed to two processors, one of which is dedicated to colouration (slight chorus, reverb) while the other is used for more pronounced effects such as harmonization and echo. The processing is cleanly integrated into the composition itself; for example, the harmonization is considered in the construction of lines and chords, and the echo is considered in its canonic implications. With *Ribbons of Visible Air*, I have purposely endeavoured to keep the sound processes simple and subtle so that they can be easily created on any number of commercially available processors. The reasons for this limitation are two-fold: 1) to broaden the possibilities of performance to ensembles with access to similar if not identical equipment, and 2) to ensure that the piece does not become impossible to perform in the future when the specific processor models are no longer available.

As implied above, the processing plays multiple roles within *Ribbons of Visible Air*. Most obviously, processing greatly enriches the blend of the ensemble beyond what is achievable by purely acoustic means. Further, contrasting processes are used as a formal element in the same way as contrasting harmonic, rhythmic, or textural ideas. Thirdly, processes that actually multiply the acoustical signal (by harmonizing at a certain harmonic interval or echoing at a certain temporal interval) allow for a density of texture normally attainable only by a much larger ensemble.

### **3. FORMAL ANALYSIS**

#### 3.1 The Generative theme

In broad outline, *Ribbons of Visible Air* is a work for five instruments and sound processing of about twenty minutes duration. The work unfolds as one continuous movement, but is conceived as being in ten sections of approximately one to four minutes duration. The primary ideas behind the form of this composition originate in the concerto principle and variation technique. While I have not adopted the traditional three-movement concerto model, the work is structured in such a way as to feature the saxophone, including a cadenza near the end of the composition.

Central to the form of *Ribbons of Visible Air* is a concise theme comprising five distinct gestures that is presented by the saxophone beginning in m. 36. The ordering and the nature of the five gestures influence the structure and musical material of the entire composition. I call this passage the "generative theme," as the material for each of the subsequent sections of the work is derived from the five gestures presented.





The generative theme is prefaced by a brief flourish in the saxophone part (mm. 33-35). The first developmental gesture ("side keys") is characterized by rapid venting of the side keys of the instrument, yielding a microtonally-inflected line. This gesture leads upwards to a series of high, sustained notes ("high sustain"), closely followed by a more sweeping lyrical ascending and descending gesture ("pulse") that reintroduces a sense of regular pulse. The phrase is interrupted by a low note (a sort of fundamental) followed by an arpeggio derived from the harmonic series of the fundamental. This gesture occurs throughout the piece; when coupled with a strong articulation of the fundamental in the cello and/or low piano, I call this gesture the "crash" motive. The generative theme concludes with a cadential motive of quiet sustained notes in the middle register ("chorale"). Of course, as the piece progresses, each of these gestures is not strictly confined to this particular sequence; the gestures may interrupt each other unexpectedly or combine to create new gestures.

Each of these gestures is defined in part by its rhythmic identity. The "side keys" gesture features a motoric rhythm (sextuplets); the "high sustain" gesture is marked by relatively unpulsed sustained tones, ties, and irregular durations. The "pulse" gesture features alternating duple and triple rhythms, ties, and rather stable (although syncopated) multiple pulse streams; the "crash" gesture is distinguished by unstable multiple pulse streams that are initiated by a heavily accented downbeat. The final "chorale" gesture comprises long sustained tones.

The formal plan proceeds from this opening phrase. (See Figure 10 below.) An introduction featuring the ensemble minus the saxophone opens the work; it gives way (with the entry of the saxophone) to the generative theme described above. The theme itself is repeated once (in varied form), and then is followed by rather more developmental sections based on the individual gestures that



Figure 10: Formal plan

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comprise the theme. The generative theme returns in varied form between each of the developmental sections.

#### 3.2 Large-scale harmonic structure

The large-scale harmonic structure in this work is based on the succession of fundamental tones that govern the harmony of each section. In general, this succession of fundamentals describes linear motion upwards from G natural and then downwards (again to G) over the course of the piece:

Figure 11: Long-range fundamental motion



Of course, through most passages in the music, more than one fundamental is implied; the structural importance of the pitches in the example above is gained through either a prolonged pedal tone or a cadential gesture landing on a clear fundamental. Figure 12 is a more detailed reduction of the long-range harmony, with annotations regarding points at which the structural fundamentals are most clearly audible:



In the above figure, fundamentals describing the step-wise arch motion are indicated by white noteheads, while fundamentals whose significance is more transitional are indicated by black noteheads.

# 3.3 Realization of the formal plan

The piece opens with an introductory section which stretches from the beginning to m. 32; this section might be described as a crescendo and decrescendo, with a dramatic change of harmony in m. 20. The instruments of the ensemble are added one by one except for the saxophone, which enters with the generative theme at the beginning of the next section. A number of the most consequential musical ideas are hinted at over the course of this introduction, including multiple pulse streams (compare the vibraphone and piano throughout), the sextuplet rhythm (periodically in the violin and cello), the long sustained tones (also in the violin and cello), and the accentuation of fundamentals by the cello and left hand of the piano (see especially, mm. 4, 13, and 20). Mm. 20-23 provide a good illustration of a number of important compositional procedures:



Figure 13: Mm. 20-23

The predominance of the G harmonic series is obvious, as only the pitches G, A, B, C#, D, E, and F are heard. (The G has actually been sounding continuously from the beginning as a common tone in the C and Db series.) The chord at m. 20 is spaced similarly to the harmonic series itself; this spacing gives way to a

slightly more ambiguous spacing in the subsequent measures. A number of pulse streams are clearly audible in mm. 20-1, including the eighth note (piano left hand), quarter note (cello), and quarter note triplet (violin, vibraphone). A rhythmic shift takes place in m. 22, establishing new pulse streams (half note triplets in the vibraphone and sixteenth notes in the strings) above the constant eighth note pulse articulated by the left hand of the piano.

The generative theme appears in m. 36, preceded by a sweeping gesture in the saxophone. The first statement of the generative theme is accompanied by a drone in the cello, and concludes in m. 46 (the structure of the theme itself is described above); a variation of the theme follows with a more active accompaniment by the violin and cello. The variation is more tonally unstable, though the harmonic series on F natural still predominates; the section concludes with a strong cadence on G (mm. 61-65).

The first developmental section spans mm. 66-104. It begins with the reentry of the piano and gongs; both instruments are electronically processed so as to create an echo at the interval of one beat, thus establishing a canon which lasts into m. 78. The pianist must carefully listen for the echo in the first two measures to establish the proper tempo, or the rather strict counterpoint will be compromised:

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The pauses in the piano part in mm. 66-7 are to some extent inserted to facilitate the establishment of the tempo.

The simple pulse streams initiated in m. 66 (sixteenth note and whole note) are complicated in m. 71 by the 2/4 meter (disrupting the whole note pulse stream) and the introduction of sextuplets. By m. 77, the sextuplet stream has become more prominent than the quarter note stream, and in a sense predicates the reentry of the saxophone and strings.

Figure 15 shows mm. 78-9:



Over the course of these measures, the echo is faded out of the piano part, continues in the percussion part, and is reestablished in the saxophone part. The

canon thus continues in the saxophone part until the end of the section (m. 104), with the piano taking on a polyrhythmic accompaniment role. The violin plays homorhythmically with the saxophone, while the cello plays homorhythmically with the saxophone. At first the string instruments are restricted to this function, but as the section progresses, they gradually take on a more independent contrapuntal role. In m. 89, the piano begins a gradual deceleration towards the cadence in m. 99, at which point the strings are fully independent of the saxophone and its echo.

The generative theme reappears in m. 105, for the first (and only) time with all instruments participating. The opening of this variation of the theme is reminiscent of the end of the preceding "side keys" development, with the strings in counterpoint to the saxophone and the piano and gongs relegated to an accompaniment role. This texture is inverted in mm. 110-12; while the "high sustain" motive is presented by the saxophone and strings, the piano and percussion take on a more melodic function. The texture is inverted again in mm. 113-5; only in mm. 116-20 do the five instruments combine in the "crash" gesture.

The instability of the textural/instrumental functions within this section is reflected in the instability and freedom of both the harmonic and rhythmic elements. As is indicated above, there is a harmonic restlessness throughout this appearance of the generative theme; likewise, there is no clear sense of pulse due to the acceleration and deceleration of the various lines. These factors combine to create a strong contrast to the preceding section; the level of activity in all five instruments creates a similar contrast to the subsequent section.

The border between the generative theme and the "high sustain" development is obscured by yet another reiteration of the "crash" gesture (m.

121). Out of the orchestrated resonance of the new fundamental (B natural) appear the high sustained melodic lines in the saxophone and strings. This harmony constitutes an example of spectral alteration; the D# (5th harmonic) is lowered to D natural while the chord as a whole retains a harmonic series spacing. The D# itself appears in m. 129; after this the D# and D natural are both used occasionally to imply either the B fundamental or a D fundamental.

The "high sustain" section is characterized by a pronounced chorus effect in the sustaining lines; these lines are punctuated by short figures in the vibraphone part. Over the first two thirds of this section, the saxophone writing becomes more rhythmically complicated and reaches higher in register, culminating on the high D natural (notated pitch) in m. 145. After this point, the line descends and the rhythm becomes simpler. The string parts behave slightly differently over this section, beginning with very high sustained tones and gradually descending in register. As the strings descend, their lines become more melodic in nature, echoing the saxophone figures in a number of places. Figure 16 comprises mm. 144-7. Here the B harmonic series is very prominent, with the high C natural in the saxophone (notated D natural) adding a strong dissonance. In m. 147, a new fundamental is suggested (A natural), though all of the sustained tones are common to both the B and A harmonic series. The inclusion of both (concert) G# and G natural in the saxophone adds to the harmonic ambiguity of this measure. A number of pulse streams are at least momentarily perceptible through this passage (especially quarter note triplets and eighth notes), but the long sustained notes and frequent shifts from one sub-division of the beat to another in each part create an overall floating effect in contrast to the more strictly pulsed sections.



The generative theme returns in the saxophone in m. 152, this time lightly accompanied by the violin and cello. The numerous common tones between the F and B harmonic series (F, A, B, Eb/D#) allow for an easy reinterpretation of the sustained harmony, with the section closing on C#.

The section that follows (beginning at m. 168) is a development of the "pulse" idea, wherein there is a proliferation of pulse streams and gradual acceleration to a climactic cadential gesture in m. 212. Throughout this section, the vibraphone maintains a consistently articulated pulse stream (quarter notes from mm. 168-83, quarter note triplets from mm. 184-93, eighth notes from mm. 194-204, and eighth notes with eighth note triplets from m. 195 to the cadence in m. 212). Figure 17 illustrates the proliferation of pulse streams in all instruments of the ensemble:



The most prominent and consistently articulated pulse streams are the quarter note triplets (vibraphone and at times violin) and eighth note triplets (piano and at times cello or saxophone). It should also be noted that the alternation of Ab and Bb in the piano creates two more distinct quarter note triplet pulse streams, one of which (on Bb) never coincides with the underlying pulse. There are two more audible streams: the half notes (sounding on beats 2 and 4 in the vibraphone), and the dotted quarter notes (left hand of the piano). Both of these streams are momentarily disrupted by the 3/4 measure (m. 186). Harmonically, these measures imply a Gb fundamental, although the seventh harmonic has been chromatically altered. The succession of relatively clearly implied fundamentals is characteristic of this entire section, which culminates on Db in mm. 212-8. These measures and the immediately preceding measures constitute the climax of the piece in terms of rhythmic activity (multiple rapid pulse streams) and dynamic (loudest point in the piece), and mark the turning point in the progression of structural fundamentals.

The cadenza that follows (mm. 219-246) is essentially an extended reiteration of the generative theme. It is possible for the performer to extend the cadenza further by interpolating improvised material (based on each successive motive) after each of the fermati (mm. 228, 237, and 245). The cadenza is thus rather flexible harmonically. The cadenza ends with an accelerando into the beginning of the "crash" section (m. 247).

The harmonic instability continues through the "crash" section, with various possible fundamentals being implied by strongly accented low notes on the piano every two or three measures. In a sense, this section is an extension of the cadential gesture at the end of the "pulse" section. (This constitutes a direct parallel with traditional concerto form, where the cadential gesture is interrupted by the cadenza.)

The final section is based on the "chorale" motive and forms a sort of coda. This section is the most serene of the entire piece, and is characterized by slow motion and closely spaced harmonies compounded by harmonization with the sound processor:



As the "chorale" section opens, the C harmonic series is most prominent, but is blended with the D harmonic series in mm. 268-71. The gradual descent towards the ultimate goal of G natural can be easily followed in the harmonized cello and piano parts (Bb in m. 276, Ab/G# in m. 283, and G in m. 287). Functionally, the coda is meant to balance the more rhythmically active preceding sections, perhaps in the same way that a Baroque cantata ends with a simple four-part harmonization of a chorale tune.
#### **4. CONCLUSIONS**

## **4.1 Aesthetic statement**

A composer's aesthetic statement may seem somewhat arcane in a time in which new chamber music is rarely performed and even more rarely performed again. All the same, it may be a lack of such statements and sub-sequent critical discussion that in part contributes to the broad misunderstanding of new music by the concert-going public.

Ultimately, questions of meaning and understanding, expression and significance, must be posed by the listener who in a sense creates an aesthetic experience through the act of listening to a piece of music. As a composer, I may believe that my compositions are best understood in a certain light, or that I'm trying to amplify a particular idea or personal impression, but I would hesitate to disallow a contradictory interpretation of the meaning of my own music. As such, I feel I can only create opportunities for listeners to experience something profoundly; my measure of my own music's profundity is of course founded on my own experience of its conception, creation, and performance.

I see music as potentially meaningful on a number of different levels, including the narrative (abstract or programmatic), the poetic, and the purely musical. At a purely musical level, music has meaning that cannot be extricated from the sound of the music itself, or from the existence and wonder of music in general. As a composer, I tend to begin with a literal-poetic idea: an image, a work of literature, perhaps a place or personal experience. Still, the level of meaning which preoccupies me most in the actual writing of a piece of music is the purely musical level at which I find something truly beautiful, though perhaps unconventionally so.

For me, the meaning and beauty of *Ribbons of Visible Air* arise from the interplay of unusual sounds coalescing in a concise yet lyrical form. I have found new ways to explore my own compositional language, and consider this piece a breakthrough to a language that synthesizes the most promising elements of my developing musical style.

## 4.2 Innovation in Ribbons of Visible Air

A number of aspects of Ribbons of Visible Air make it an innovative composition and significant contribution to the repertoire of contemporary chamber music.

Perhaps the most obvious innovation is the extension of performance technique on the saxophone. While the idea of unorthodox venting of the instrument is not new (the pioneering work of Evan Parker has been discussed above), the notation of the results of this technique is still in its infancy.<sup>6</sup>

A further innovation is my derivation of harmonic and melodic material from the harmonic series, more specifically through the techniques of spectral combination, modalization, and alteration. In addition, the succession of fundamentals implied through these techniques defines large-scale harmonic structure.

Most composers strive to find their own individual style, and to compose profound music in this style. Although the various elements of my own style are not without precedent or inspiration, I feel that I have created a unique and consistent musical language that is nonetheless evolving. For the reasons outlined in earlier sections of this paper, *Ribbons of Visible Air* represents a step forward in this evolution. The manner in which various musical elements (harmony, rhythm, form, and timbre) are synthesized constitutes the true

<sup>&</sup>lt;sup>6</sup> Daniel Kientzy has done similar research with multiphonics on the saxophone (Kientzy, 1981).

originality of any musical work or body of work.

## **4.3 Possible further development**

*Ribbons of Visible Air* has suggested to me a variety of ways in which my language might evolve in future compositions. The idea of incorporating the extended sound palette of acoustic instruments (especially through multiphonics, over-blowing, and their electronic manipulation) into my harmonic thinking is exciting; the challenge is to use these techniques in a musical way that is aesthetically satisfying.

I would further like to apply the compositional methods developed with this work to compositions for other ensembles, most particularly orchestra. I also envisage experimenting with a more systematic approach to musical texture and the relative functions of individual instruments.

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# **Ribbons of Visible Air**

for soprano saxophone, violin, cello, piano, one percussion, and sound processing

**Brent Lee** 

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Brent Lee is a graduate of McGill University and the University of British Columbia. His work ranges from orchestral music to electroacoustic pieces, and includes jazz compositions and incidental music. He has received awards or commissions from CAPAC, SOCAN, the Canada Council, the Alberta Heritage Fund, The Gaudeamus Foundation (The Netherlands), the Alberta Foundation for the Arts, and the Bourges International Electroacoustic Music Competition (France). He is currently a member of the music faculty of the Mount Royal College Conservatory, and saxophonist with the performer/composer ensemble *Modus vivendi*. He has been an associate composer of the Canadian Music Centre since 1991.

\* \* \*

#### **Ribbons of Visible Air (1999)**

*Ribbons of Visible Air* was inspired by some of the fascinating extended saxophone techniques developed by François Houle. The title stems from a mental image I have of long, colourful ribbons of sound streaming from the bell of the soprano saxophone. The required technical virtuosity suggests a sort of concerto-like piece, with contrasting passages of rapid arpeggiation and resonant lyricism. The harmonic, melodic and textural transformations of repeated material create a sort of variation form in which a variety of musical ideas can be explored, including timbre, rhythm, register, and the relationships between the different instruments comprising the ensemble. The piece was commissioned by the Standing Wave Ensemble with the assistance of the Canada Council. -BL

\* \* \*

Duration: 20:00

#### Notes to performers:

1. The percussion part requires a vibraphone and a set of tuned gongs with the following pitches:



- 2. The following sound equipment is required:
  - ♦ five microphones and cables
  - If one mixer with at least nine channels for five mic inputs and four line inputs, as well as master, monitor, and auxiliary outputs
  - ◊ five monitors and cables
  - ◊ one sound processor with simultaneous chorus and reverb
  - ◊ one sound processor with non-simultaneous harmonization, echo, and chorus
  - ◊ an amplifier and set of loudspeakers and cables
- 3. The simultaneous chorus and reverb effect should be adjusted to the natural reverberation in the concert hall.

(A part is supplied for the audio technician, who must be able to read the musical score to follow the directions for mixing the piece.)



\*The following settings are required for this processor:

1) 300 ms delay, some feedback

2) harmonization down a perfect fifth

3) 1 second delay, no feedback

4) harmonization down a minor sixth

5) medium chorus








































































































































































